This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

Google™ books

https://books.google.com

NYPL RESEARCH LIBRARIES
3 3433 09078884 9

Digitized by Google

Digitized by Google

3-VM

Blacksmi

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

BLACKSMITH & WHEELWRIGHT

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U. S. Patent Office.

Vol. LXXVII. No. 1 — NEW YORK, JANUARY, 1918 — TERMS: One Dollar a Year. Foreign, $1.50. (6s. 3d.)

BEST HOOF PADS

Strong, tough canvasback, reinforced by new process impregnant—easily takes the place of a leatherback which is most expensive. High gravity stock in the heel too—new equipment in a big new factory enables us to turn out quantities to meet the demand—no waiting—Send for sample price list and learn something.

KAPLAN—Heavy Pads
PEARL—Light Pads
Furnished in 14 sizes—see list.



RADICAL RUBBER CO.
117 Gerry Street
BROOKLYN, NEW YORK



Saw Those Heavy Bars ON A **MARVEL** Power Hack Saw

Machine stops when work is cut off. Requires very little power.
Price is Low. Write Us.
Ask for reply by return mail.

ARMSTRONG-BLUM MFG. CO.
340 N. Ffancisco Ave., Chicago, Ill., U. S. A.

STEEL STAMPS
BURNING BRANDS
RUBBER STAMPS
STENCILS
GEO. M. NESS, JR.
81 FULTON ST. NEW YORK
Send for price list.



SUREGRIP CALKS
American Calk Co.
DETROIT, - - MICH.

THE TEETH IN
BLACK DIAMOND RASPS
ARE MINGLED
So as to Cut Clean and Free and Leave no Furrows in the Work



Twelve Medals of ...d by ... ors

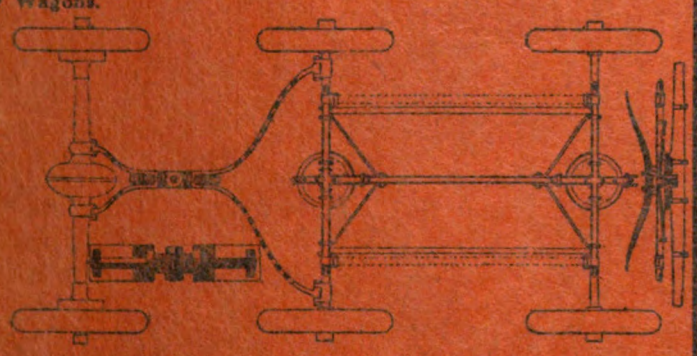
At International Expositions

C. & H. BARNETT COMPANY
Black Diamond File Works, PHILADELPHIA, PA.
Owned and Operated by NICHOLSON FILE CO.
Copy of Catalog sent Free to any interested file users upon application.

ANNOUNCEMENT

Eadie Vehicle Gear Company of New York has been taken over by The E. D. Gear Mfg. Co., Inc., who have installed a plant at Westfield, New York, for the manufacture and sale of the "E. D." (TRADE MARK) Automatic Short Turning and Tracking Devices for Trailers, Railway, Factory and Store Hand Trucks, Horsedrawn Vehicles and Toy Wagons.

Don't build trailers for the scrap heap. It's the rear wheels of a trailer that must track over all kinds of roads at all kinds of speed, as fast as the automobile dare go, and the trailer has to carry the load.



The Company is getting out new literature describing these devices and their uses, and is now in a position to supply the wants of the trade adequately.

WRITE FOR OUR NEW LITERATURE

THE E. D. GEAR MFG. CO., Inc., Westfield, New York

WELDING PLANTS, $25.00 to $ ... 00
Designed for all purposes. Small cash payment; balance, three to ... s.
Every mechanic and shop should have one.
ERTSCHY-BERMO CO. OMAHA, U ... A.



We Make **STEEL WHEELS**
To Fit Any Axle
Plain or Grooved Tire
Steel or Hickory Axles
Any Size
A Full Line of Wood and Steel
Farm Trucks
With Steel or Wood Wheels
Write for Large Catalog and Prices
ELECTRIC WHEEL CO.
Box H, Quincy, Ill.



THE WOOD WORKER'S FRIEND
Get directions for building table and operating our Jointers. This information is valuable to wood workers. We manufacture 20 styles and sizes. Try a Jointer Head 30 days, if you are not pleased, return at our expense. Get prices.
Manufactured by WHISLER MFG. COMPANY, Gilson, Iowa

PATENTS
C. L. PAR ... *al. & Offices*
Ex-Member Examining Cor ... *t Patents.*
Attorney-at-Law and Sol ... ed. Trade marks
American and foreign Patents ... alise patent rights,
registered. Searches made to de ... ot suits conducted.
validity and infringement. P ...
Pamphlet of instructions on req ...
McGill Building ... SHINGTON, D. C.

Many Years of Practical Tests

have proved the advantages of using Capewell nails.

When you drive these into the hoof of a horse you are driving the best nail.



Of course you wish to make the most of each box of nails you buy. The more horses they shoe the better for you.

Capewell nails are so carefully sorted that only serviceable nails are shipped.

For service and satisfaction no nail equals The Capewell. Best to drive, surest to hold, safest to use.



Not the cheapest nail regardless of quality but the world's best at a fair price.

The pattern on the front face of the nail head formed by diagonal lines crossing each other is our Trade Mark.

The Capewell Horse Nail Co.
HARTFORD, CONN.
Largest Makers of Horse Nails in the World

Stokes Bros.' Improved Horse Rasps
Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A.

The Perfect Power Hammer



Note the difference in construction over other makes:

Extra Long Guides, insuring a direct movement of the ram without any side motion, which causes guides and springs to break on other Hammers.

The only Hammer made with a disk attachment with special anvil for sharpening harrow and plow disks.

A recently invented **Friction Clutch** fitted with **Ball Bearings,** absolutely controls the operation of the Hammer by foot pressure from the lightest tap to the heaviest blow. This ease of operation makes the Hammer particularly well adapted for plow work, as you can get as light a stroke as you desire.

Will ship to any responsible party on approval. If not as represented, no sale.

Made in two sizes:

3 inch square, 40 lb. ram—shipping weight, 1,150 lbs.
4 " " 80 " " — " " 1,800 "

Write any jobber for prices, or

Macgowan & Finigan Cordage Co.,
204 North Third St., ST. LOUIS, MO.

"NATIONAL" BLACKSMITHS' DRILL CHUCK



Made especially for Blacksmithing and Carriage Work. Positive, durable, strongest, self-cleaning, always works, quickest to change Drills, costs no shadow, will save its cost ... other Chucks in saving of time. BUY ONE AND ... Money refunded if not as represented. Ask your jobber for it, or send direct for prices and circulars.
ONEIDA MALLEABLE CHUCK CO., Oneida, ...

Campbell
Log Company

Wholesale Automobile, Garage, Machinists', Electrical and Implement Supplies, Hardware Specialties. Duplicate Parts for Fords a specialty.
Write for any catalog or estimate and ask for the Campbell Log Co. ... St. Louis, Mo.

Digitized by Google

Your Best Trade Wants

Firestone

Carriage Tires

YOUR customers want satisfactory Carriage Tires. You want satisfied customers.

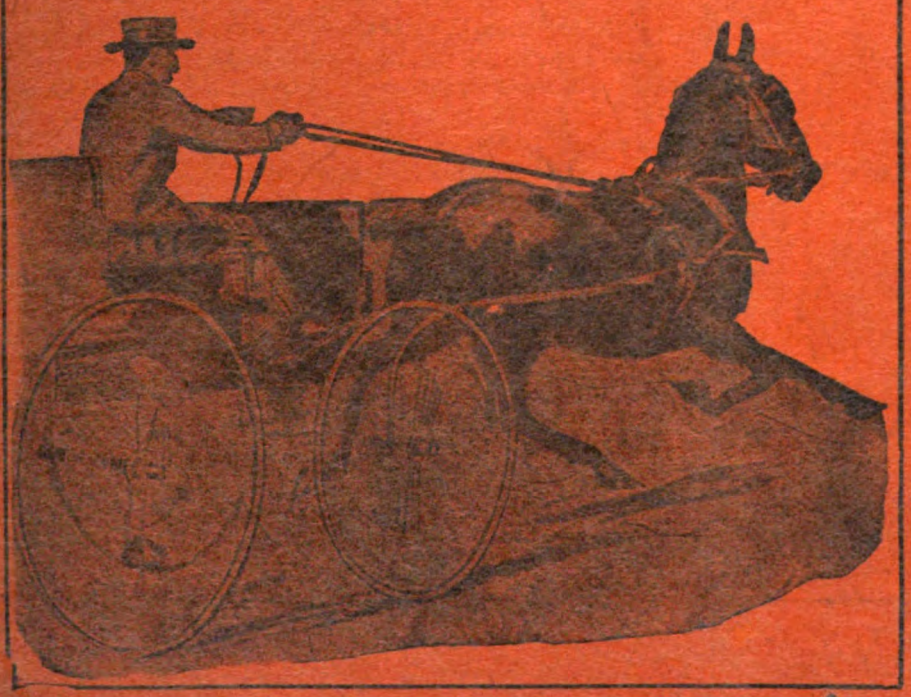
Firestone Carriage Tires meet both demands.

The even wear of Firestone Carriage Tires is always remarked upon by users. Your customers will notice that Firestone Tires don't chip or break. Their good looks add a quality touch to the finest vehicle.

To furnish such tires makes your trade grow rapidly and steadily. Your profits increase. Your reputation for handling only the best is advanced by Firestone Carriage Tires.

If you don't handle Firestone Carriage Tires now, write for our proposition.

FIRESTONE TIRE AND RUBBER CO.
Akron, Ohio Branches and Dealers Everywhere



UNITED STATES
HORSE AND MULE SHOES
ARE REAL TRADE WINNERS



PERFECT
ALL
THROUGH
AND
EASY
TO FIT



Prove It Out On Your Next Order

Carried in Stock by All Jobbers

A Handsome Souvenir Watch Fob Given Away Free To All Blacksmiths and Horsemen Upon Request.

WRITE FOR OUR LATEST CATALOG No. 16 ILLUSTRATING OUR COMPLETE LINE

Manufactured By

United States Horse Shoe Co.
ERIE, PA.



QUIT DRIVING YOUR TRADE AWAY

Stop! Look! Think! Every time you put on a set of calks that an owner can replace himself, you are driving trade away from your shop.

When you use ***welded*** calks, the owne must bring his horse to the shop when th calks need renewing.

Also, every horse's hoofs need the frequent attention of a horseshoer. You're doing the owner a good turn by using ***Sweet's Toe Calks***—"The Cold Cut Dreadnaught"—as well as keeping your shop full.

FRANKLIN STEEL WORKS

Joliet, Ill. Cambridge, Mass.
Hamilton, Ont.



Digitized by Google

"F-S" PAINTS



The Quality of "F-S" Products Is Acknowledged.

Your skill will not be wasted when you use "F-S" Automobile and Carriage Paints. They have the quality which you want for a well-finished and durable body. They dry free from dust over night in moderate temperature.

FELTON, SIBLEY & CO., Inc.

Manufacturers of Colors, Paints, Varnishes since 1863

136-140 North Fourth Street, Philadelphia

(145)

"IDEAL" LAWN MOWER GRINDER

A BIG MONEY-MAKER.
Many of our customers make $300 in one season. You can do as well.

Patented
Dec. 29, 1908
Mar. 1, 1910



"You Grind It as You Find It."

Grinds all makes of Mowers perfectly in 15 minutes without removing wheels, ratchets or reel-knife. Has perfect Skate Sharpener Attachment for sharpening skates. Operated either by hand or power. Ball-bearing; easy running. Will do the work so much BETTER, QUICKER and EASIER you cannot afford to be without it. Nearly 10,000 in use. Fully guaranteed. Sold on easy-payment terms.

WRITE TODAY for catalog and full information.

Also makers of the "PEERLESS" Horse Lawn Mower Grinder.

THE ROOT-HEATH MANUFACTURING CO.
PLYMOUTH, OHIO

Swellings and Soft Bunches

Are promptly reduced with light applications of Absorbine. It penetrates, stimulates the circulation and brings about a dissolution of the deposits without blistering or removing the hair and horse can be used.

Absorbine is invigorating and puts vim in jaded muscles—stops lameness and allays pain.

ABSORBINE
TRADE MARK REG. U.S. PAT. OFF

In addition to being a liniment, Absorbine is a powerful antiseptic and germicide, which doubles its efficiency and uses. Applied to sores, cuts and boot chafes, it prevents infection, kills the germs and promotes rapid healing.

Absorbine is economical as only a few drops are required at an application. One ounce of Absorbine added to a quart of water or witch hazel makes a good antiseptic, general purpose liniment.



USE ABSORBINE

To reduce Bursal Enlargements, Bog Spavins, Thoroughpins, Puffs, Shoe Boils, Capped Hocks, Swollen Glands, Infiltrated Parts, Thickened Tissues, Rheumatic Deposits, Enlarged Veins, Painful Swellings and Affections; to reduce any strain or lameness; to repair strained, ruptured tendons, ligaments or muscles, and to strengthen any part that needs it.

Your druggist can supply you with Absorbine or I will send you a bottle postpaid for $2.00. Write me if you have a case requiring special directions or about which you would like advice.

W. F. YOUNG, P. D. F.
55 Temple Street
SPRINGFIELD MASSACHUSETTS

Would You Sell Your Life For $65?

You wouldn't part with even an arm or a leg for that figure, would you?

Yet every vicious horse you shoe is likely to do more damage in the twinkling of an eye than can be repaired at several times the cost of **Barcus Stocks.**

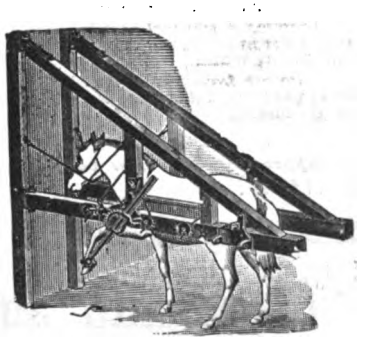
When you place a horse in a Barcus Stock, he is harmless—he cannot hurt either you or himself. Costing only $65 it is cheap insurance, indeed.

BARCUS STOCKS not only furnish the logical way to observe "Safety First," but they are also a positive aid to good shoeing. The BARCUS is a modern Stock—automatic working parts instead of the bothersome ropes, straps and blocks that made the old style stock almost more of a nuisance than a help.

If you don't know about **Barcus Stocks** you owe it to yourself and your family to write **at once** for the complete details.

The Barcus Mfg. Co.,

Wabash, Ind.



Please send me full particulars regarding your Horse Stocks without any obligation on my part.

Name.....

Town.....*State*.....

Digitized by Google

THE DIAMOND LINE

DRIVING SHOE



Made both Front and Hind

DRAFT SHOE



Made both Front and Hind

BAR SHOE

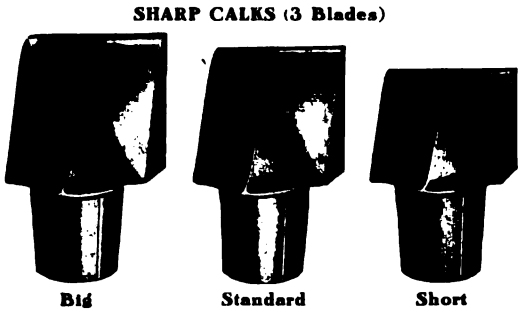


Draft Front Pattern

MULE SHOE

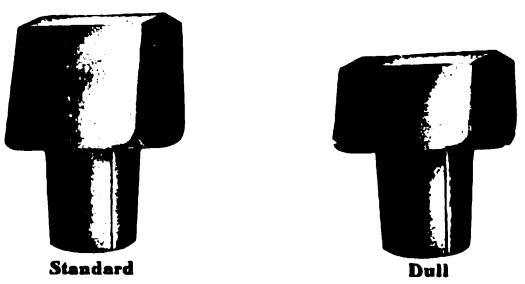


SHARP CALKS (3 Blades)



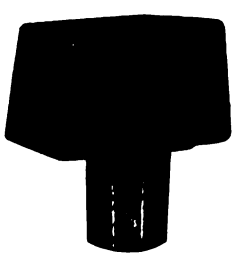
Big Standard Short

DULL CALKS (2 Blades)



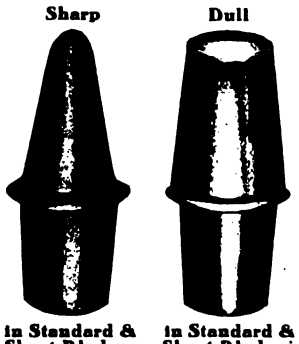
Standard Dull

BLOCK CALK



ROUND CALKS

Sharp Dull



In Standard & Short Blades — In Standard & Short Blades

DIAMOND SHOES

are made for driving, draft horses and mules, from the very best horseshoe steel, and are the only shoes guaranteed frost-proof, and not to break.

They are easy to fit, have strong toe clips,—the nailholes are in the proper place, and well punched in,—the calk holes have the deepest reinforcement around them which, together with their absolute accuracy, adds 50% to the grip of the calk.

DIAMOND CALKS

are made of the very highest grade tool steel, and tempered to file-proof hardness.

They are made in four patterns,—Sharp (with 3 size blades); Dull (2 size blades); Block (1 size blade); Round (both sharp and dull).

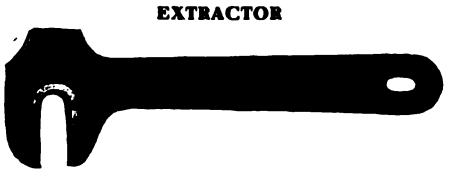
DIAMOND CALKS are practically non-breakable. the sharpest on the market and have a chisel edge. The shanks do not vary 1/10000 of an inch in diameter, which with their ribbing insures an absolute fit and prevents twisting in the shoe and falling out.

They are made in four sizes: 7/16 - 1/2 - 9/16 and 5/8.

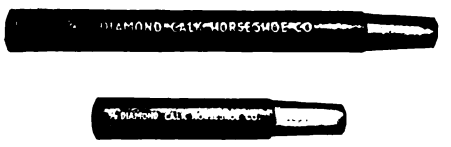
Ask for new catalogue and price list

DIAMOND CALK HORSESHOE CO.
DULUTH, MINN.

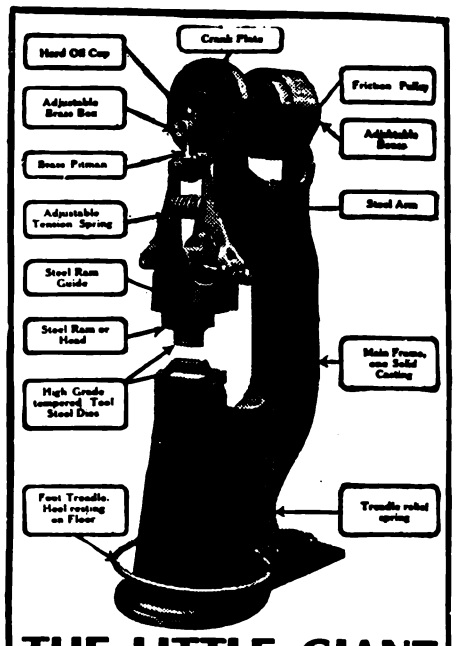
EXTRACTOR



PUNCHES



Made Both Long and Short



THE LITTLE GIANT POWER HAMMER

Is a lifetime investment built to outlast you or any able-bodied man.

This proves we build, not only to sell or stand up for a few years, but for all time.

We can prove our hammers last 20 years and that the up-keep expense per year will not exceed 2/5 of 1%.

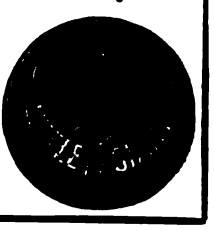
Either motor or belt driven in 25 lb., 50 lb., 100 lb. and 250 lb. sizes.

Special dies for any forging purpose.

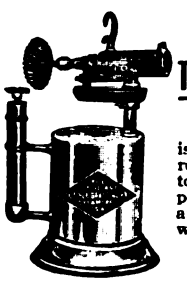
Guaranteed forever against defective material and workmanship.

Sold on 30 days' trial. Easy terms if desired.

Write us today or to your jobber.



Mayer Brothers Co.
103 Rock Street
MANKATO, MINNESOTA, U. S. A.



JOBBERS!
Turner Kerosene Torch
(No. 426)

is a rapid seller. Meets all requirements of a good blow torch. Produces a steady, powerful blue flame. Not affected by wind or bad weather.

Catalog or our complete line for the asking.

THE TURNER BRASS WORKS, Sycamore, Ill., U. S. A.
B. S. Alder, 30 Warren St., New York, N. Y., Eastern Representatives.

HIGGINS QUALITY SPRINGS—For Replacement

No hole. No bolt. No hump. No jolt. No center breakage. Guaranteed alike at all points. Out-serve and out-sell all others. Immediate shipments. Write for Catalogue C-1917



and Dealers' Discounts.

Higgins Spring & Axle Co.
Dept. 10, Racine, Wis.

900 Pages instead of 824 — **1918—SIXTH EDITION** — 3362 Illustrations instead of 2000

STILL $3.32 prepaid — **DYKE'S AUTO ENCYCLOPEDIA** — STILL $3.32 prepaid

Entirely re-written, hundreds of illustrations and many new subjects added. Practically a new book. A non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 50 **Instructions**—Simplified and Practical.

3362 **Illustrations**—the kind you understand at a glance.

2 **Supplements**, part printed in two colors, treating on the construction, operation, repairing and adjusting of the **FORD** and **PACKARD**—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.

775 illustrations and 279 pages on **Electric Ignition, Electric Starters** and **Generators**, etc.

51 pages and 79 illustrations on the **Delco** system alone.

60 pages and 254 illustrations on **Adjustments, Tests**, etc., of leading **Electric Systems**.

154 pages and 1189 illustrations on **Repairing**.

Oxy-Acetylene welding. **Axle, differential** and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.

27 pages and 180 illustrations on **Tires** and **Tire Repairing**.

44 pages and 119 illustrations on **Carburetion**.

89 pages and 291 illustrations on **Engines** and **Parts**.

16 pages on **Digest of Troubles**.

6000 lines to the **Index**. This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. **Index** begins on **colored** paper, easy to refer to.

Dictionary is also included, which gives the meaning of motoring terms.

Inserts: There are five—printed in colors. New features you never before saw or heard of in one of the inserts.

You must see this SIXTH Edition in order to appreciate just how complete a book it really is—Order NOW.

HOW TO BECOME AN EXPERT AUTOMOBILE MECHANICIAN

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion subject so thoroughly, you can adjust any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical Automobile Book in America. Price $3.32 Prepaid.

Address all orders to

THE BLACKSMITH & WHEELWRIGHT
73 MURRAY STREET NEW YORK



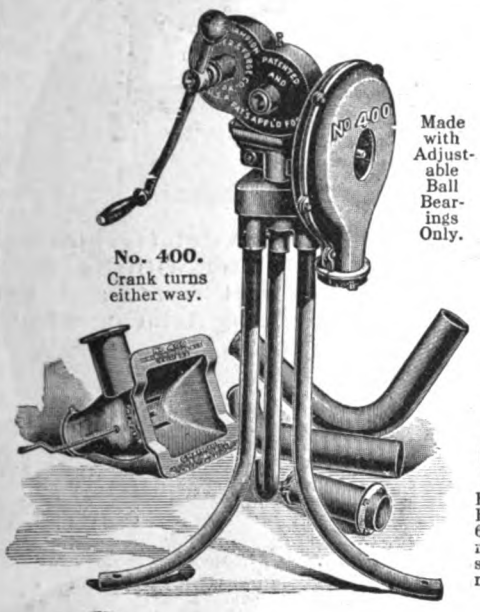
It's worth ten times its cost if only placed on the shelf and used as a reference.

Advertising Rates in the Blacksmith and Wheelwright made known on application

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

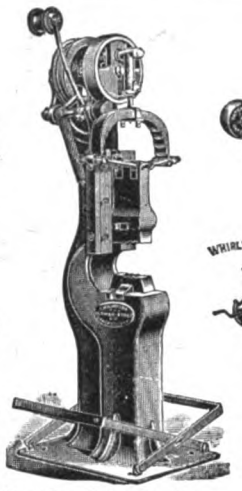
Digitized by Google

THE FAMOUS "CHAMPION" BLACKSMITH TOOLS

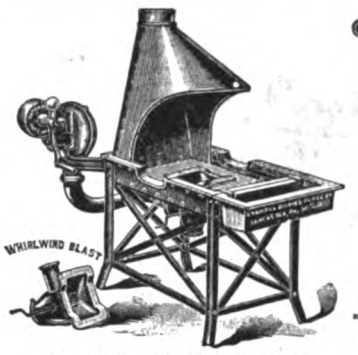


No. 400. Crank turns either way.

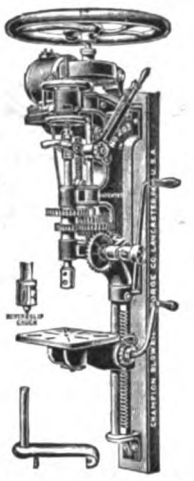
Made with Adjustable Ball Bearings Only.



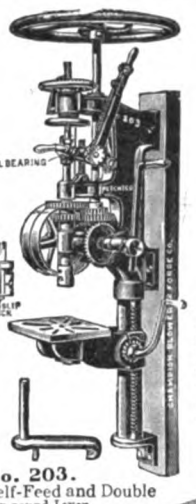
Hercules Patented Power Hammer. Weight of ram, 65 pounds. The power hammer with the flexibility in stroke of a hammer in a mechanic's hand.



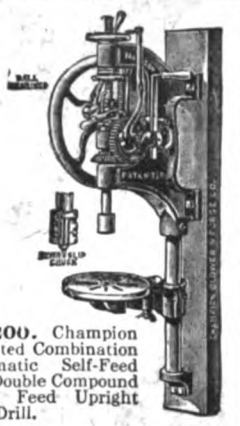
No. 408. Steel Blacksmith's Forge.



No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.



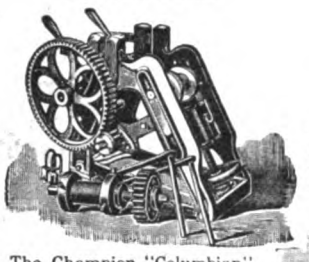
No. 203. Self-Feed and Double Compound Lever Feed Drill.



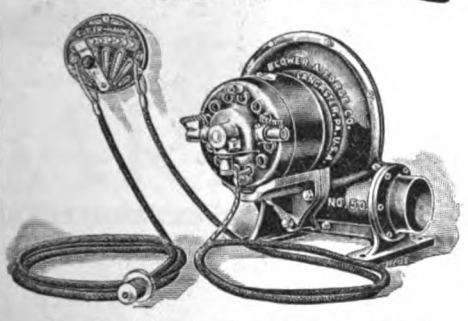
No. 200. Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



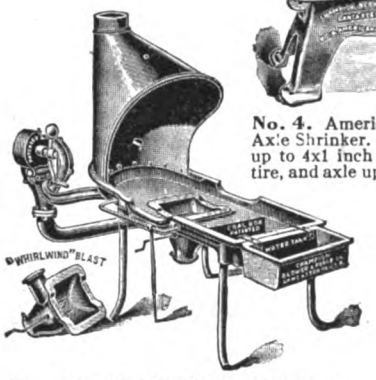
No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



The Champion "Columbian" Tire Bender. Made in 3 sizes.



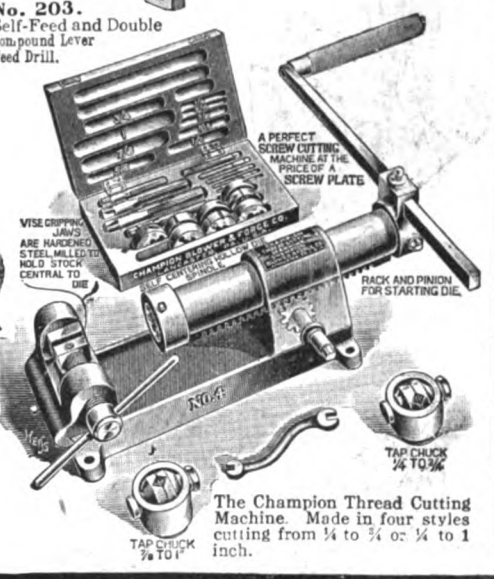
No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower with a Universal Motor for both direct and alternating current, either 110 or 220 volts, with Detached Rheostat for six speeds, and Steel Pressure Blower case, for all kinds of general Blacksmith work.



No. 433. Cast Iron Blacksmith's Forge.

Don't Fail to Get 1917 Catalog

Before purchasing a Hand Blower, Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



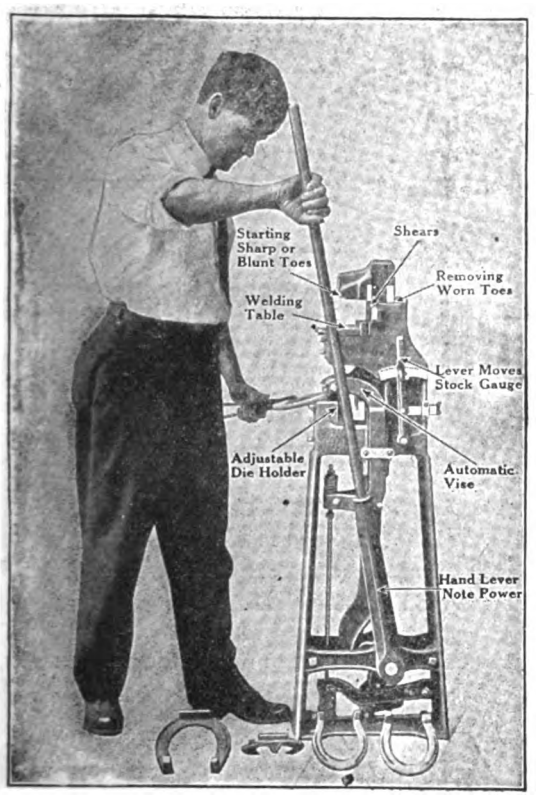
The Champion Thread Cutting Machine. Made in four styles cutting from ¼ to ¾ or ¼ to 1 inch.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

1918 MODEL
THE L. S. P. CALKING MACHINE

The Greatest Time and Labor Saving Machine On Earth



1918 MODEL—Fully covered with Patents

OUR 1918 Model is the same as our 1917 Model with the exception that we have eliminated the steel plugger attachment and strengthened some of the parts.

Do not mistake this for a machine which makes toe calks or a foot vise. This machine is for turning heel calks, both Blunt and Sharp, sticking and welding toe calks, clipping and trimming ends of shoes. IT CALKS SHOES, doing the work just the same as you do by hand with the hammer, only it is done much better and easier, and in a fraction of the time.

In turning heels, you can turn up just as much stock as you wish, upset or stoveup to make as heavy as you like and square up the calks without use of hammer. There is no losing of toes when you weld on the L. S. P.

It is a strong, handsome, well made machine and will last, as you might say, a life time, fully warranted for one year. It is in use in the best shops in the United States, users claiming more for it than we do.

Write at once for full information and prices.

L. S. P. CALKING MACHINE CO.

P. O. Box 225 **WYALUSING, PA., U. S. A.**

NATIONAL MACHINE CO., Brighton, Ontario, Canada

STOP REAR AXLE TROUBLE

BY INSTALLING THE

BAILEY BALL THRUST



at left (gear) side of Ford and Chevrolet 490 differential, to replace flat thrust washers

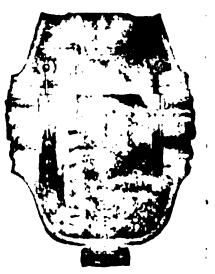
Whenever a car owner comes to you because of rear axle trouble, as a rule you will find that the flat thrust washers at left (gear) side of differential have worn thin, causing drive and pinion gears to get out of mesh and break.

Because flat washers have but a sliding contact they are bound to wear thin and cause breaks, but the Bailey Ball Thrust bearing, an exact replacement for flat washers, will not wear thin and will positively keep gears in proper mesh, make them run smoothly and last indefinitely. Hence remedying axle trouble.

The Bailey bearing is made of the finest materials, carefully heat-treated and ground, has eighteen ¼ inch balls of the highest grade, and having a capacity for six times the maximum thrust, every bearing holds an unqualified guarantee that will "stand up" under all conditions and strains.

We absolutely stand in back of you on every bearing you install.

Here is a profitable replacement business for blacksmiths. More than usual profit and an opportunity to promote considerable business if you will carry one or two on hand at all times to be ready when occasion demands. Write your nearest jobber or to us.



Fits to a 1000th Part of an Inch

Place an Order Now

List Price, $3.75

Regular Dealer Discount to Blacksmiths

GEO. D. BAILEY CO.

1124 S. Michigan Ave. **Chicago, Ill.**

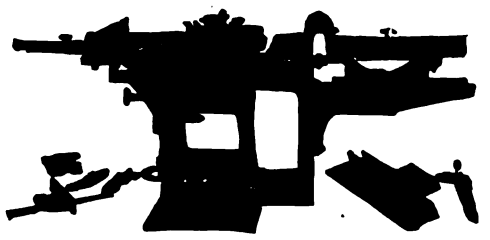
Digitized by Google

THE BICKNELL LINE

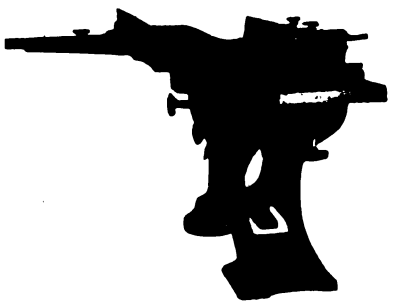
Built for Service. Not too many Machines in One but Enough.



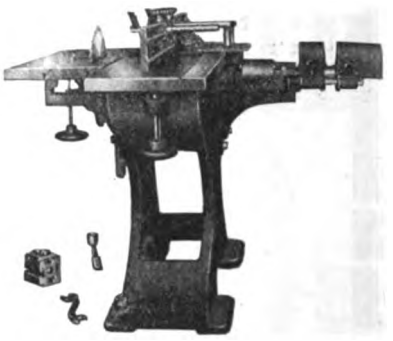
No. 88 Jointer with extended arbor.



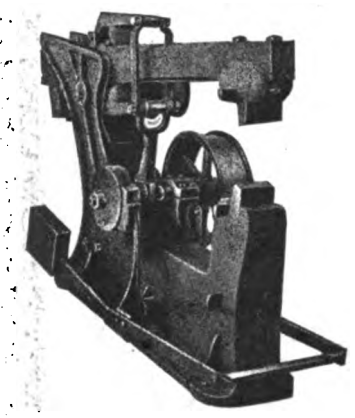
No. 884 Showing Jointer with No. 350 attachment front, and Tenoning and Boring Attachment at the back.



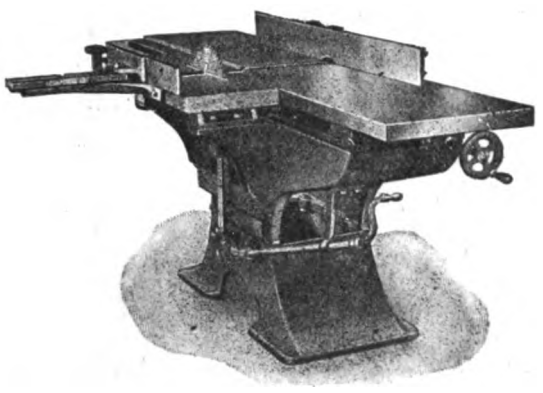
No. 88 Jointer shown with No. 350 Attachment.



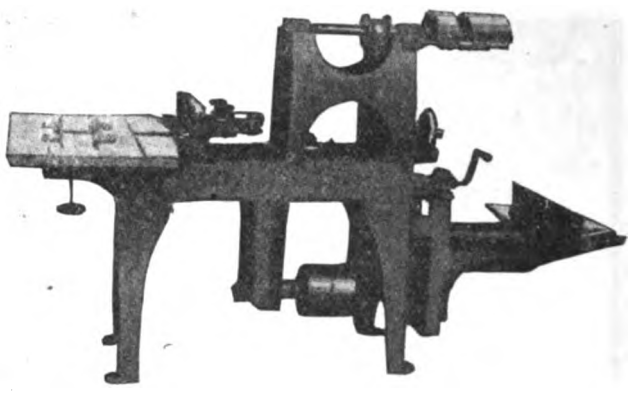
No. 88 1A Jointer showing No. 88 Jointer with No. 300 attachment front, and Felloe Rounding Attachment at the back.



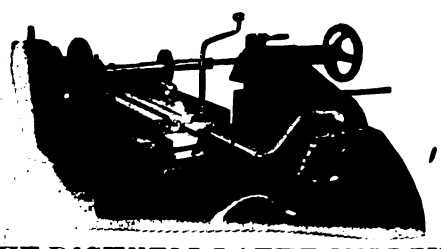
HELVE HAMMER
Simple, Effective, Practical



No. 105 shown with No. 400 Attachment. The Last Word in Jointers.



No. 600 includes a Saw Table, Jointer, Felloe Rounder, Boring Machine, enoning Machine, Tire Bolter.



THE BICKNELL LATHE MILLER
Makes a milling machine out of a lathe at a low cost. Furnished complete with arbor.

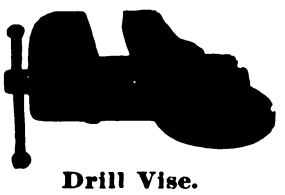
Lathes, Drills and General Shop Equipment

Automobile Tires, Tubes, Spark Plugs and Repair Supplies

BICKNELL MFG. & SUPPLY CO.

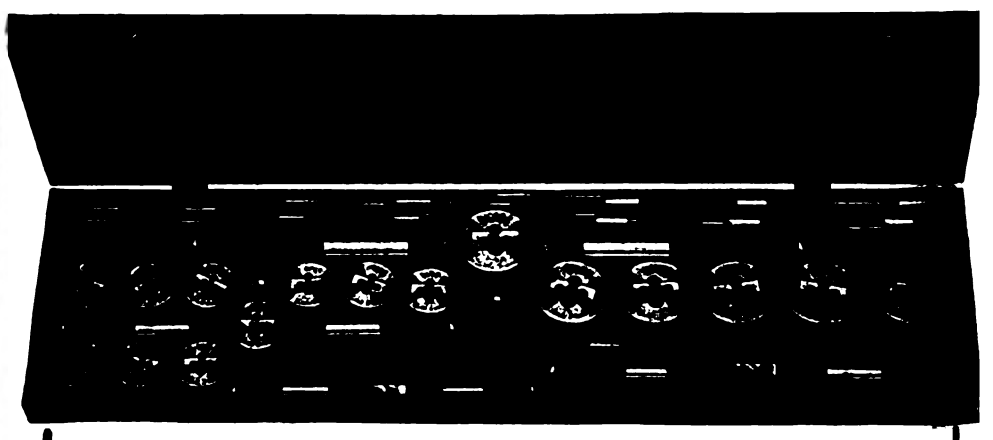
JANESVILLE, - - - WIS.

Write for Catalogue.



Drill Vise.





Little Giant

COMBINATION SCREW PLATES

For General and Automobile Repairs

Contains both U. S. and S. A. E. Std. Taps and Dies.

One set takes the place of two. This means a good saving to you.

You do not have to pay for duplicate Tap Wrenches and Stocks.

You have but *one* case which contains all the Taps and Dies the average shop needs.

A place for everything makes it easy to keep everything in its place.

Send for New No. 37 Catalog.

REG. U. S. PAT. OFF. G T D

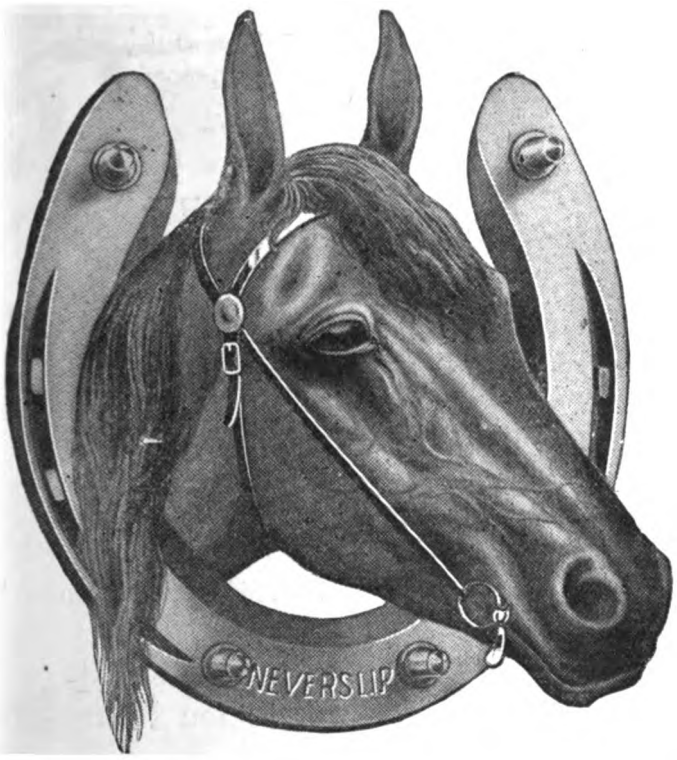
Greenfield Tap and Die Corporation

Greenfield, Mass.

NEW YORK	CHICAGO	LONDON
28 Warren Street	13 So. Clinton Street	149 Queen Victoria Street

Canada Factory: Wells Brothers Company of Canada, Ltd., Galt, Ont.

Digitized by Google



RED TIP

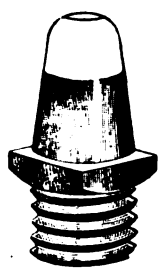
CALKS, SHOES *and* TOOLS

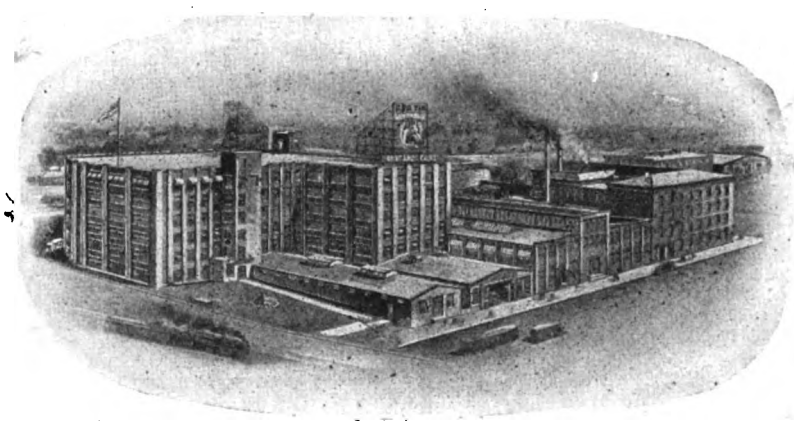
ARE ALWAYS STANDARD

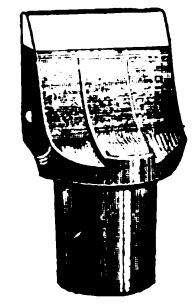
Horseshoers would do well at this time to keep a good stock of CALKS and SHOES in readiness for sudden freezes as all railroads are operating under great difficulties and your Jobber may not be able to deliver promptly.

BE PREPARED - - PLAY SAFE

ALWAYS USE RED TIPS







Catalog T Sent on Request

THE NEVERSLIP WORKS

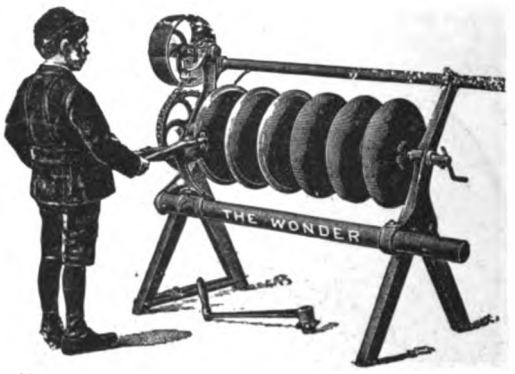
NEW BRUNSWICK, N. J.

Digitized by Google

Mr. BLACKSMITH:

DO YOU REALIZE THE MONEY YOU CAN MAKE THIS YEAR SHARPENING DISC HARROWS?

FARMERS are not buying new machinery if they can get their old machines repaired. On account of market conditions now, new machines are too high. They will have their Disc Harrows and Plow Discs sharpened, and the best machine on the market to do this with today is the



Little Wonder, Will Sharpen Disc from 12 in. to 22 in.

WONDER DISC SHARPENER

The Wonder saves one-half the time and all the labor. Why waste your time in taking each disc off the shaft when the WONDER will accommodate a

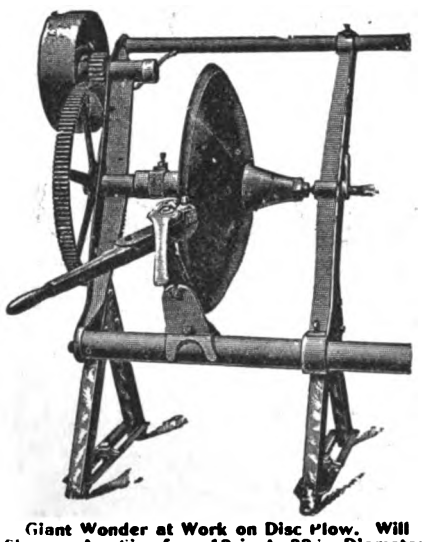
COMPLETE SECTION AT ONE TIME?

Do away with all this extra labor and waste of time. You can sharpen a set of dics with this machine in about ⅓ the time it takes the old way.

THE WONDER automatically adjusts itself to wobbling or bent discs and the tool can be shifted from one disc to another in an instant.

All the above is done WITHOUT THE TURN OF A SET SCREW OR NUT.

The knives are made from the best grade of High Speed Tool Steel and are tempered in a manner that makes them last.


Giant Wonder at Work on Disc Plow. Will Sharpen Any Size from 12 in. to 32 in. Diameter

FULLY GUARANTEED

We pay the freight both ways if not as represented.

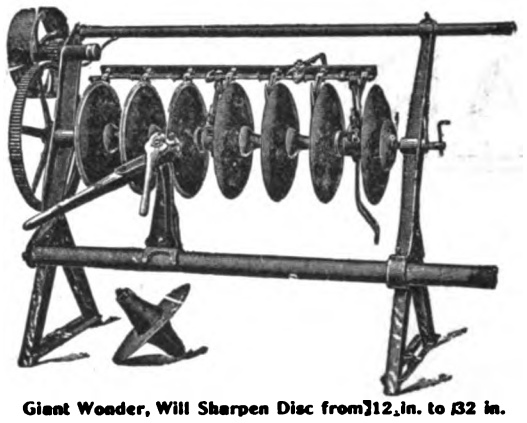
Write today for particulars. If your dealer cannot supply you, send your name and address and that of your dealer, and we will send you our catalog on these machines, also letters of satisfied users all over the world.

A. E. DURNER, Sole Manufacturer.

Address All Communications to

Main Office, EVANSVILLE, WISCONSIN.

Canadian Branch, BRANDON, MAN., CANADA.


Giant Wonder, Will Sharpen Disc from 12 in. to 32 in.

Save Time and Money



The experienced blacksmith who is extra hard to please in rasps will stop short of nothing but the best. He will always

Use NICHOLSON RASPS

TRADE NICHOLSON U.S.A. MARK

See that this brand is on every Rasp you buy

BY INVITATION MEMBER OF

NEW YORK, U.S.A.

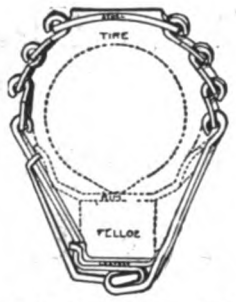
Over 50 years' experience, as well as special study of blacksmiths' needs, enter into the making of every one of these rasps.

Every NICHOLSON rasp is rigidly inspected for temper and cutting qualities before it is wrapped in our *rust-proof* paper, boxed and sealed.

SOLD BY LEADING DEALERS

Catalogue Sent Free on Request

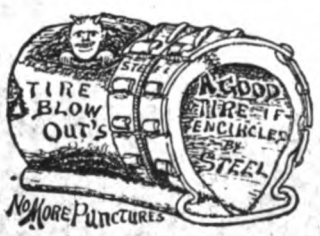
NICHOLSON FILE CO., Providence, R. I.



MUD CHAIN

Can be put on in a jiffy with one hand while standing on the run board. If you get in a mud hole, you will laugh out loud. Hook the ends together and pull the little lever and they are on tight. One or two will take you out of a hole. but it is better to use about 5 for continuous running. Good for blow-outs.

STEEL TIRE PROTECTORS



Tires can't wear out if covered with **Steel.** Try a few sections over any old blow-out. Tires are as flexible as ever. **Can't Skid.**

Special Inducements to Those in New Territory

KIMBALL TIRE CASE CO.

175 Broadway Council Bluffs, Iowa

Each Section 2 inches Wide, ⅛ inch Thick

Write for Prices and Full Particulars



PARKS' SINGLE and COMBINATION WOOD WORKING OUTFITS

We were the originators of the Circular Saw, Band Saw, Jointer combination; our latest improvement is the 6-inch jointer with under-cut attachment for sizing material—joints by passing material over the cutter and sizes it to thickness by passing it back under the cutter head. All parts of the machine ready for instant use.

Machines are made in large quantities which enables us to sell at the lowest prices and to make very prompt shipment.

This combination in your shop will make your woodwork a pleasure and at the same time reduce the cost of this work so that machine will soon pay for itself.

Write for Catalog.



PARKS BALL BEARING MACHINE CO.

North Side Station, Cincinnati, Ohio

Digitized by Google

"Buffalo"

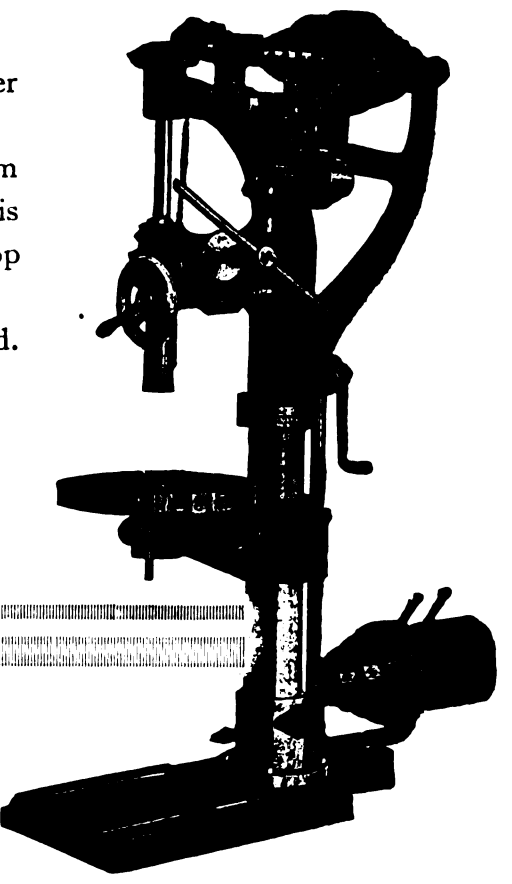
For the Auto Repair Shop

The repairing of automobiles calls for accurate workmanship and this means good tools

The Buffalo No. 5, 20-inch Back-Geared Drill is a machine tool designed for the very highest class of work that may be demanded in the repairing of automobiles. It can be changed instantly from plain to back-geared drive. Has eight speeds, three power feeds, together with hand and lever feed.

All gears are machine-cut; worm feed wheel runs in oil; crown gear is bronze brushed. Automatic feed stop insures accuracy.

All parts carefully made and fitted.



May we send you detailed information and prices?

Buffalo Forge Company, Buffalo, N. Y.

The Feeling of Content that is costing you dearly

The reason that you are without a Little Giant Punch and Shear is not the cost, because the machine soon pays for itself. Not that you couldn't use one, because small, medium and large sized shops are all making more profit with this machine.

The reason is that you content yourself to get along without it because you really don't know of the possibilities with one,

You have not fully realized

that it saves substantially on your fuel bill—cuts labor cost—punches and cuts six times faster than by the old hand method—helps build a reputation for prompt service and perfect work.



After you have used the Little Giant a month, you'll be like M. E. Maddox, of Texas, who says that he will never run a shop without one. Some day you will have a Little Giant paying you dearly instead of a feeling of content that is now costing you dearly. When will that day be?

LITTLE GIANT PUNCH & SHEAR CO.

Box 56 **Sparta, Ills.**

"E-Z" WELDING COMPOUND

is the best **BECAUSE**

It works Equally good on all **Kinds** of steel.

It welds at **lower heat** than **any** other.

It **sticks** to metal at a **very low** heat.

It leaves **no scale.**

PAT. MAY 27. 1902

USE IT ONCE AND YOU WILL ALWAYS WANT IT

Crescent Welding Compound

MAKES SMOOTHER WELDS THAN ANY OTHER

It is fine for plow work or where parts are fastened together before welding, or for making split welds, finishing heats, or for welding under dies, etc., etc.

CRESCENT WELDING COMPOUND TRADE MARK

It insures smooth finish and perfect welds on Toe Calks.

"Money back" from any jobber if "E-Z" or Crescent does not give perfect results.

We will send samples free of charge.

MADE ONLY BY

Anti-Borax Compound Co.

FT. WAYNE, IND.

Digitized by Google

LINDE OXYGEN

From Coast to Coast 65 Producing Plants and Distributing Stations provide an unlimited supply of Linde Oxygen for users everywhere.

LINDE SERVICE means no investment except for oxygen actually received—no expensive overhead or upkeep charges.

Linde Oxygen may be obtained from any of the following Linde Plants and Distributing Stations where a large supply of charged 100 to 200 cu. ft. cylinders is kept on hand constantly to insure immediate shipments.

Mail or telephone your order to THE LINDE AIR PRODUCTS CO., at the nearest point. **Shipments will be made on day order is received.**

PRODUCING PLANTS AND WAREHOUSES

Alabama
*Birmingham
10th Ave. & 28th St.
California
*Emeryville, Oakland
*Los Angeles
1405 Mission Road
Colorado
Denver
1017 17th Street
Connecticut
Hartford
1095 Main Street
District of Columbia
Washington
9th & Maryland Ave., S. W.
Georgia
*Atlanta
Flyant St. & Southern R. R.
Savannah
Ogeechee Canal, So. of Bay St.
Illinois
*Chicago
3633 Wall Street
East St. Louis
6th & Walnut Ave.
Indiana
*East Chicago
S. E. Cor. Kennedy & 145th St.
Fort Wayne
414 E. Columbia Street
*Indianapolis
2819 Roosevelt Ave.
Iowa
Davenport
118 Harrison Street
Des Moines
117 W. 5th Street
Kansas
Wichita
Rock Island Ave. & 2nd St.
Kentucky
Louisville
126 East Main St.
Louisiana
New Orleans
861 Fulton Street
Maryland
*Baltimore
25th & Montebello Ave.
Massachusetts
Cambridge
25 Waverly Street
Massachusetts
Springfield
Napier Street
*Worcester
961 Southbridge St.
Michigan
*Detroit
St. Aubin Ave. & Newton St.
Grand Rapids
Pearl Street by the Bridge
Minnesota
Duluth
Seventh Ave., West
*Minneapolis
1809 Hennepin Ave.
Missouri
*North Kansas City
14th & Charlotte St.
*St. Louis
4218 Forest Park Blvd.
Nebraska
Omaha
1007 Jones Street
New Jersey
*Elizabeth
Linden Ave.
Newark
354 Plane Street
New York
Albany
Montgomery & Colonie Sts.
*Brooklyn
475 Driggs Ave.
*Buffalo
155-183 Chandler St.
New York City
217 W. 29th St.
New York City (Bronx)
3168 Park Ave.
*Utica
Walnut & Schuyler Sts.
Ohio
*Cleveland
802 East 72nd Street
*Cincinnati
Stanton & Mellish Aves.
Columbus
310 Dublin Ave.
Dayton
521 E. First Street.
Lima
338 East High Street
Ohio
Toledo
441 South Erie Street
*Youngstown
601-621 Jones Street
Oklahoma
Oklahoma City
27 E. Grand Ave.
Tulsa
1 North Boulder St.
Oregon
Portland
15th & Hoyt Streets
Pennsylvania
Erie
1502 Sassafras Street
*Norristown
*No. Philadelphia
18th & Cambria Streets
Pittsburgh
16th & Pike Streets
*Trafford
Tennessee
Chattanooga
212-238 King Street
Memphis
203 Washington St.
Texas
*Dallas
Harwood & Coombs St.
Houston
Cedar & Baker Sts.
San Antonio
512 Dolorosa St.
Utah
Salt Lake City
112 West Second St., South
Virginia
Richmond
1709 E. Carey Street
Washington
Seattle
530 First Ave., South
Spokane
121-123 S. Madison St.
Wisconsin
Manitowoc
810 Quay Street
*Milwaukee
36th St. & National Ave.

(Star) * Designates Plants.

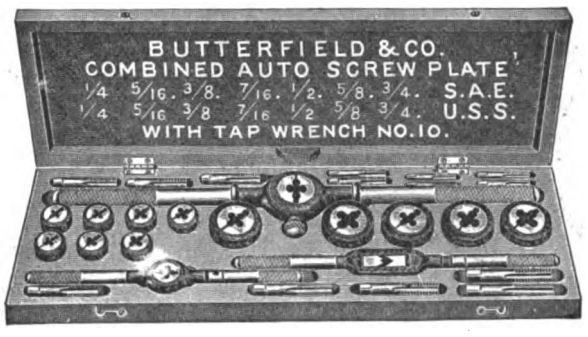
Other Plants and Distributing Stations are planned for other industrial centers throughout the country and will be established as fast as and wherever the local demand for oxygen warrants.

THE LINDE AIR PRODUCTS COMPANY

Largest Producers of Pure Oxygen in America

Forty-Second St. Building NEW YORK

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.
New York Store: 126 Chambers Street

The Horse Rasp of Quality

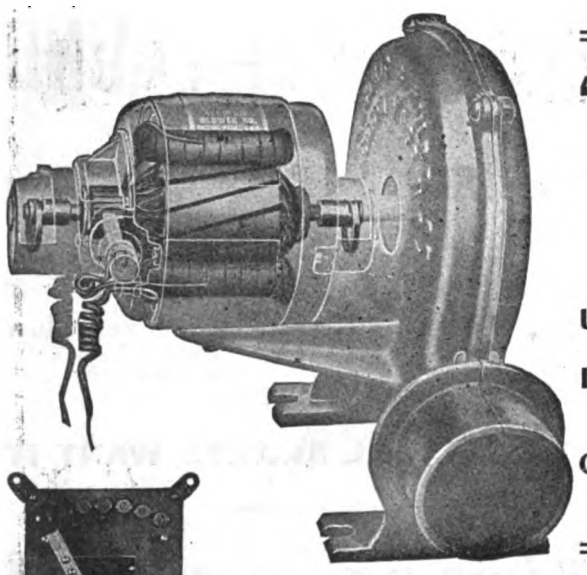


Ask your Dealer for the

IMPROVED HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, **"Slim," "Light," "Slim Light"** and **"Fine Cut."** Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial. New catalogue mailed free on application.

HELLER BROTHERS CO. *Established in 1836* **Newark, N. J.**



"ONE FIRE"

"MARVEL" $35.00

A. C. or D. C.
or
UNIVERSAL MOTORS

Extra Large
Ring Oil Bearings

Case Hardened
Armature Shaft

The cut above shows the inside design and mechanical construction of our OIL RING BEARING MOTORS used on our "ONE FIRE" MARVEL.

With the enlarged oil wells and CASE HARDENED SHAFT, you get long wearing qualities and ruggedness found only in a MARVEL BLOWER. As long as there is ANY oil in the oil-well, the RING revolving on the CASE-HARDENED SHAFT keeps a STREAM OF OIL on the bearings.

This prevents OLD AGE.

Show this cut to the best mechanical engineer you can find, and ask him his opinion regarding our claims.

You naturally want the BEST and the MOST that your money will buy, and in a Forge Blower you will find those qualities in a MARVEL.

Any of the LEADING HARDWARE FIRMS will ship you any one of our MARVEL BLOWERS on 30 days' trial.

NOW is the time to improve your shop equipment.

Ask YOUR Dealer to have us send you one on 30 days' free trial. Unless you get a RING OIL BEARING "MARVEL" Blower, you are not getting the MOST your money will buy.

15 Different Sizes. *Descriptive Circular Mailed on Request.*

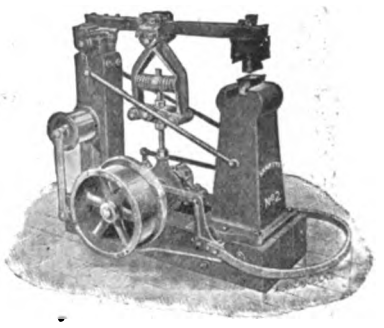
ASK YOUR DEALER.

ELECTRIC BLOWER CO.,

352 Atlantic Avenue, BOSTON, MASS.

The HAWKEYE HELVE HAMMER'S Built in Three Sizes.

12 years in successful operation. Fully guaranteed. Note the principle of stroke. Double the capacity of any upright hammer of the same weight and price.



For price and descriptive literature write,

The Hawkeye Mfg. Co.

CEDAR RAPIDS, IOWA, U. S. A.

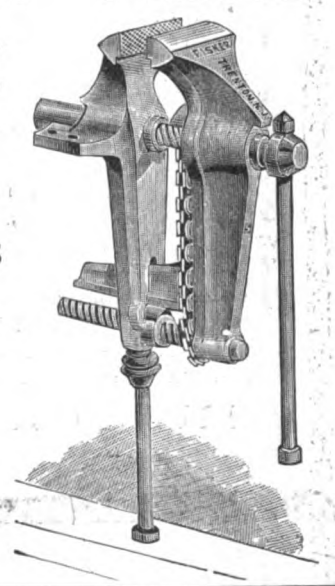
1843 # EAGLE ANVILS 1918

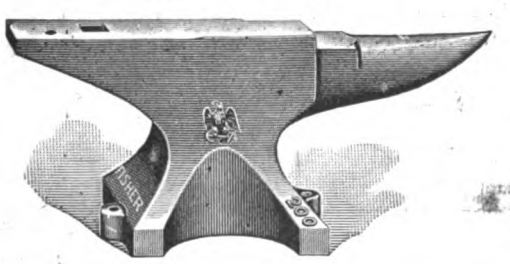
AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE NEW YORK
PUBLIC LIBRARY
813135 A
ASTOR, LENOX AND
TILDEN FOUNDATIONS
R 1936 L

THE

BLACKSMITH AND WHEELWRIGHT

Vol. LXXVII. No. 1. NEW YORK, JANUARY, 1918 TERMS ONE DOLLAR A YEAR

PLANNING FOR THE NEW YEAR.

Methods Preventing Waste and Suggestions for Increasing Profits.

Webster says that the fiscal year is the year by or for which accounts are reckoned, or the year between one annual time of settlement, or balancing of accounts, and another. Unless otherwise specified, the fiscal year regularly ends December 31. New Year's day is, therefore, suitable for the adoption of and carrying out of resolutions.

Profit by Mistakes.

How many of the readers of The Blacksmith and Wheelwright have given any consideration to the New Year, to the problems which will arise before the fiscal year is completed? How many of our readers will profit by the mistakes made during the past year? And how many will put into practice the resolutions adopted at the beginning of the New Year?

Varying from our annual custom, and perhaps risking criticism, we are advocating a number of resolutions for the New Year. The frontispiece of the present number, which begins the 77th volume and the 39th year of the existence of The Blacksmith and Wheelwright, shows the progressive smith who has profited by his mistakes of the fiscal year and who is writing down resolutions for the New Year. If we look closely we will note that "The Dead Beat," "Ruinous Prices," "Guess Work Methods" and "Long Credits" have been scrapped, thrown to the junk pile.



Resolutions for the New Year.

You will note that this smith has adopted a number of good resolutions for the coming year. We won't repeat the list, for it speaks for itself. But we do wish to say a few words on the various subjects indicated, particularly on that most important one dealing with prices.

The curse—if you may call it so—of the blacksmith and wheelwright industry has been the question of doing work at a price utterly incompatible with a fair profit on the transaction. Every shop, the large and the small, represents more or less of an investment in building material, stock, tools, machinery and good will. To this we may well add that most extremely valuable asset experience. Add to this the high cost of material and labor and we have a condition demanding higher prices.

Must Get Better Prices.

Of course, it is easier to suggest an increase in prices than to get them. The Blacksmith and Wheelwright has been advocating better prices for several years past; in fact, ever since the cost of living began to advance. The only way to get better prices is to get them. There will always be a few who will be afraid that an increase in prices

Digitized by Google

means the loss of custom. We have again and again heard blacksmiths say that they would run their business in their own way, charge as little or as much as they liked, and otherwise adopt whatever rules and plans they desired.

Why Better Prices.

And there is still another class of smiths who, if a customer states the price be too high and threatens to go elsewhere, will do work at the old price without any consideration for the advanced cost of material. We are glad to record that these workers are in the minority. In these days, when competition is the rule not the exception, and when time and labor saving tools, machinery and equipment mean a greater investment, better prices must obtain. It is very gratifying to note that the smiths of the country seem to be awakening to the importance of working together for trade betterment, and that several associations have considered the advanced cost of labor and material and have adopted prices which give the smith at least a living wage. Better prices can be obtained if the smiths work together; they cannot if they compete among themselves.

A Profitable Business.

The blacksmith business is and always has been profitable except in the cases of ruinous competition or where no effort has been made to keep abreast of the times in the use of power and up-to-date tools and machinery. No business can succeed by pursuing today the methods that were common and successful 25 years ago, and this applies to the blacksmith business as well as any other. But for the amount of capital invested and the amount of energy employed, no other business is likely to produce better returns than the blacksmith business.

Figure Your Costs.

How many smiths know the exact costs of their work? How many figure the cost of each piece of stock and material, add to the original cost that of the present market price, and further add the increased cost of the helper and the overhead expenses? Elsewhere in this issue is a striking example of how the average smith figures a job.

How many smiths figure the matter of overhead expense? Overhead expense is a most important factor in making a profit and must be seriously considered. For example: One buys a piece of machinery costing, say, $100. Now the interest on that money at four per cent. would be $4 a year. And to this we must add the cost of using that particular piece of machinery, for in time certain parts must be repaired or replaced with new. Then there is the matter of depreciation. By depreciation is meant that the machine, after several years of use, cannot be sold for $100 even if in good shape. Suppose it sells for $60 and has been used four years. That means $10 a year must be charged off.

The Item of Depreciation.

Now the interest on the money or that invested in tools, machines, etc., and the depreciation may amount to, say, $240 the year, or $20 the month. Now this $20 must be got back in some manner. It is by reckoning it in the per cent. profit that must be made to pay expenses. It may not be but a fraction of a cent on each job and again it may mean much more.

Reckoning Overhead Expense.

This overhead expense can be estimated in any line of business and therefore can be ascertained in the blacksmith business. It should be known and used as a basis in estimating the cost of work. For example: A man comes into the shop and wants several hundred irons made, submits a sample and asks for a price. Likely as not he has taken a similar set of the irons to your competitor. Now what you want to know is how much it is going to cost you to make those irons, how much stock will be needed, what it will cost, etc.

Work and No Profit.

Now if you figure the job without reckoning the overhead expense you may be depriving yourself of a certain percentage of profit, and if the work be a quantity job and if you bid a low price because it is a slack time of the year, you may find, when the job is completed, that you have merely changed your money from one pocket to another. Overhead expense is important and should not be lost sight of.

Value of System.

Inasmuch as the guess-work and "rule-of-thumb" methods of doing business cannot be carried on successfully today in the blacksmith and wheelwright business, some system for keeping track of the stock, material and labor should be adopted. There is such a thing as too much system. This we do not advocate, but we do believe that a simple, practical method of recording every item of material and labor is a decided advantage to both the smith and the customer. Time cards do not mean that a workman is not to be trusted. These cards, when properly handled, enable the employer to collect money for the odd minutes formerly given away. It is surprising how much time can be lost, especially between jobs. There is no doubt but many a shop doing an unprofitable business could be made to pay a profit if the numerous leaks were plugged.

Value of Good Tools.

The use of poor quality or otherwise inferior tools is another cause of much waste and loss in the blacksmith shop. As is aptly remarked, "A cheap tool is dear at any price." The difference between the cost of a good rasp and a poor one, a good hammer or a poor one, is very little, but the saving in the use of a good article, not only in the increased but better work it will do, often amounts to a good many dollars. The development of time and labor saving tools and machinery has kept pace with the development of man. Poor tools and out-of-date machines are what keep men poor. There is no higher economy than the purchase of the best tools and the best machines and then keeping them in good order.

Power vs. Muscle.

It has been truly said that the most expensive thing in the blacksmith shop is muscle and that the cheapest thing is mechanical power. In these days of labor and time saving methods, it hardly pays to run a shop without power. Where electricity is available one obtains a double advantage from its use, as light as well is provided. In sections where the current is not to be obtained the gasoline engine or the stationary heavy fuel engine can be relied upon to supply the necessary energy. Many of those smiths who toil hard from morning to night and obtain only a bare living should consider the latest tools, machines and equipment, for the time thus saved can be well utilized in working up new business.

Inasmuch as few kinds of business can succeed without advertising, we believe that it pays for the blacksmith and wheelwright to advertise. The smith need not advertise as does the merchant, but the smith should advertise in some form or manner, for it is a mistake for him to wait for the business to come to him. We do not suggest that he go to much expense in keeping his name before the public, and it is not often he will need other than a card in the local newspaper briefly stating his business, his name, and the statement that his work is good and prices reasonable.

The Pleased Customer Is—

The old saying that "A pleased customer is the best advertiser," will apply forcibly to the blacksmith business. The smith who pleases his clientele, gives satisfaction, enjoys the confidence of his customers, will receive the best kind of advertising. It is suggested that at certain times of the year, whenever the incoming season calls for special work, like the repair of vehicles or farm implements, or the calking of horseshoes, that it would be profitable to make use of the columns of the local newspaper. These announcements will serve to remind the farmer and others who always have more or less work to be done.

The Clean Shop.

Every smith should make an effort to maintain his shop in a clean and attractive condition. It does not cost any more to keep a shop well swept, and its tools and machines in their proper place, than to have it covered with litter and confusion. If a tool be always kept in one place no time ever need be lost in finding it. It costs no more time to sweep the shop before it has become covered with litter than after. An orderly and neat shop is a very good advertisement indeed. It gives the customer confidence in the character and quality of work of the owner.

Much could be said in favor of automobile repairing, but lack of space prevents us from other than recommending that those who have not considered automobile repairing should do so at once. Elsewhere in this issue will be found our views upon the subject, also expressions from those readers who have found that the automobile has considerably increased their profits.

Coming to the final resolution, that to be noted on the list of the progressive blacksmith referred to in the beginning of this article, we trust every reader will agree with us that it is a most appropriate one, a resolution worth keeping.

READING FOR PROFIT.

Don't forget to read a little for amusement, read a good deal more for instruction, but read most for profit.

You will find a good deal of profitable reading in the advertising pages of this magazine. You cannot keep up with the times unless you are posted on the new things in tools, machines and equipment coming out from month to month.

If the advertisements do not give all the information you wish—and advertising seldom does—write the advertisers for further particulars. It will cost you only two cents for a postal card.

If the advertisers had nothing to say to you that is important and of interest to you, they would not advertise. They do not advertise to please us, but to please themselves, to inform the readers of this magazine as to what they have got to sell that is of vital interest to the trade.

The Modern Gasoline Automobile.

The 1918 edition of the Modern Gasoline Automobile, by Victor Page, M. E., and dealing with its design, construction, operation and maintenance, has made its appearance. The new edition is much larger than its predecessor, considerable new material having been added, to say nothing of illustrations. A feature that should appeal to the laymen is the clearness with which the author presents his subjects. Much of the new material deals with tractors, plows, etc., bringing the contents of the book thoroughly up to date. The book is published by the Norman Henley Publishing Company, New York City and lists at $3.00.

WHY THE DELAY.

The editor desires to acknowledge the receipt of a large number of communications from readers, letters containing practical information and suggestions for the various departments. Many of these letters were received too late for publication in this number, but use will be made of the information in the following issue. This explanation is made for the benefit of those readers who fail to see their article in the present number.

LIKES HIS TRADE.

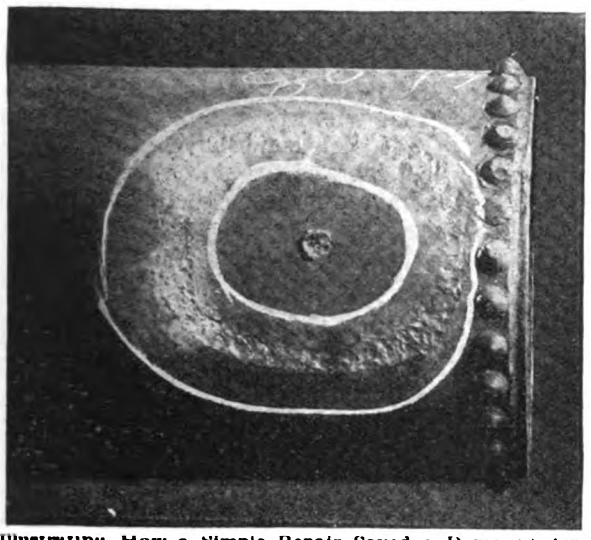
It is pleasing to note the expression of one of our old subscribers who writes that money could not buy his place as long as he is able to work, that he is delighted with his trade. Although having passed the half century mark, this smith finds his vocation a pleasure. It is needless to remark that he is successful.

Digitized by Google

WELDING SAVES METAL.

Practicability and Profit Possible by Using Oxy-Acetylene Flame.

Under the title of "Turning Waste Into Profit" and the sub-title "Putting the Scrap Pile to Work," the Prest-O-Lite Company, Indianapolis, Ind., is issuing a book which



Illustrating How a Simple Repair Saved a Damaged Air Tank.—The Patch Was Welded and the Strength Is Greater Than Ever.—This Demonstrates the Value of Oxy-Acetylene Welding for Repairing Sheet Metal Equipment.

deals with the conservation of metal as well as explains the possibilities of reclaiming broken and worn machinery and metal parts by the oxy-acetylene process. Containing 82 illustrations, several of which are reproduced herewith by permission of the company, the book gives striking evidence of the practicability and profit to be derived through the use of oxy-acetylene welding and cutting in all lines of business.

The day of discarding expensive machine parts and other metal equipment to the "scrap pile" because of a break, worn spot or defect, is quickly passing. With it is going one of the most wasteful and profit-reducing practices which modern efficiency and engineering have ever overthrown.

Until the development of modern welding processes, the "scrap pile" cost American business millions of dollars annually. Machine shops, forging plants, foundries, textile mills, paper mills, steam and electric railways, mines, ship yards—discarded thousands of costly metal parts as "junk" lacking a satisfactory way of repairing breaks or worn spots which had forced the parts out of service.

Oxy-acetylene welding has obviated this waste. Savings of hundreds and even thousands of dollars yearly are now being made by such firms in restoring damaged equipment to service by the employment of the oxy-acetylene process.

The possibilities for profitably reclaiming and repairing metal parts are literally without number. Wherever metal parts are to be united, oxy-acetylene welding will perform the work cheaply, quickly and efficiently. In fact, in the case of broken and worn machinery, oxy-acetylene welding is usually the only really satisfactory method of repair.

Textile mills reclaim loom frames, shuttle boxes, quadrant gears, switch gears, shafts and hundreds of other damaged parts that were formerly discarded as scrap.

Paper mills weld broken paper cores and scores of machine parts. Steam railways restore broken locomotive and car frames, wheels, cylinders, machine tools; and repair damaged fire boxes, boilers, tenders, and air cylinders. Electric railways save expensive armature shafts, journal boxes, bronze bearings, brush holders and other brass parts by welding breaks and building up worn spots.

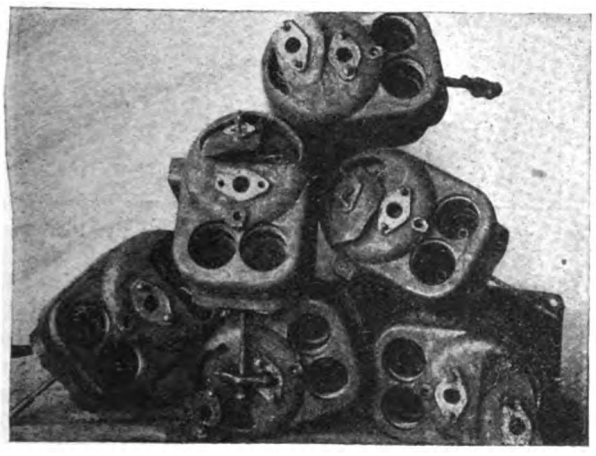
Mines that formerly accumulated huge "scrap piles" are now welding and putting back into service such expensive equipment as gears, spiders, jack arms, fly wheels, crusher wedges, tram buckets, dollies and dies.

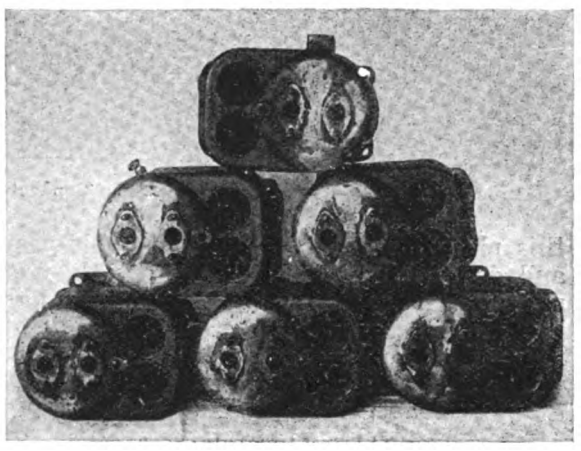
Shipyards are finding the welding process extremely valuable in repairing broken propeller blades, anchors, davits, damaged engine parts, and in building up corrosion on hulls, boilers, etc.

Foundries that formerly scrapped defective castings, thereby losing the cost of molding them, are now filling blow-holes and checks, welding cracks, and building up thin places, caused by core movement, by the oxy-acetylene process, making the castings perfect.

Machine shops are effecting great savings by welding parts and castings that are found to have flaws after much expensive machining has been done. The welding outfits also make possible speedy repairs to broken machinery, thus saving costly tie-ups.

Under any conditions there are very few instances where welding of broken or worn parts does not effect a large actual saving over the cost of new parts. Not infrequently the welding cost is as low as 5 per cent. of the cost of a new part—seldom is it more than 50 per cent. When it is considered that properly welded parts are as serviceable as new, the great savings are perfectly evident. With metal prices soaring to heretofore unknown heights, due to war demands, the proportions of savings are more than doubled.

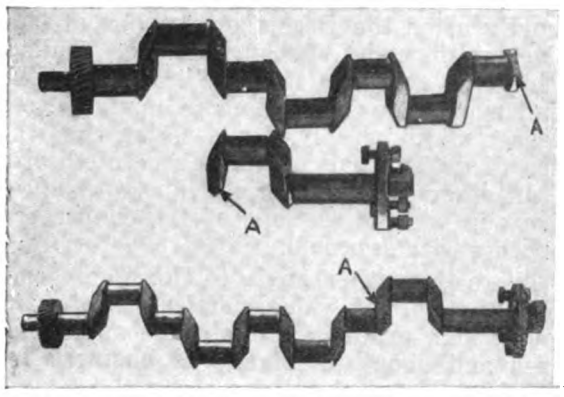




The Jackets of These Clyinders Were Broken by the Water Freezing—The Cylinders Were Restored and Made as Good as New by Welding.—The Illustration at Right Shows the Completed Work.

Before the advent of welding, many manufacturers carried large stocks of reserve parts to replace broken and worn parts. The possibilities for making immediate repairs by oxy-acetylene welding, make it unnecessary to carry this investment. In many cases the interest on such investment for one month has been large enough to pay for a welding outfit.

Frequently the making of a quick repair and getting equipment back into operation is of greater moment than the cost of the repair. In any plant or mill where the production is maintained on a schedule, sudden break-downs to equipment can easily prove costly in handicapping production unless repairs are promptly made. This is especially true under conditions where production on all sides is trained to the limit and new machinery or repair parts are not to be had within a reasonable length of time at any price.



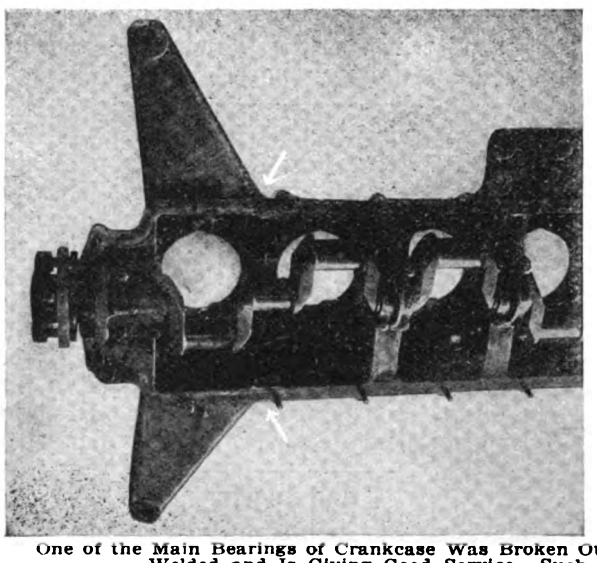
This Automobile Crankshaft Was Broken and Welded as Shown by the Reference Marks, Thus Saving the Cost of a New Shaft.—The Weld Was Machine Finished and the Shaft Replaced in Immediate Service.

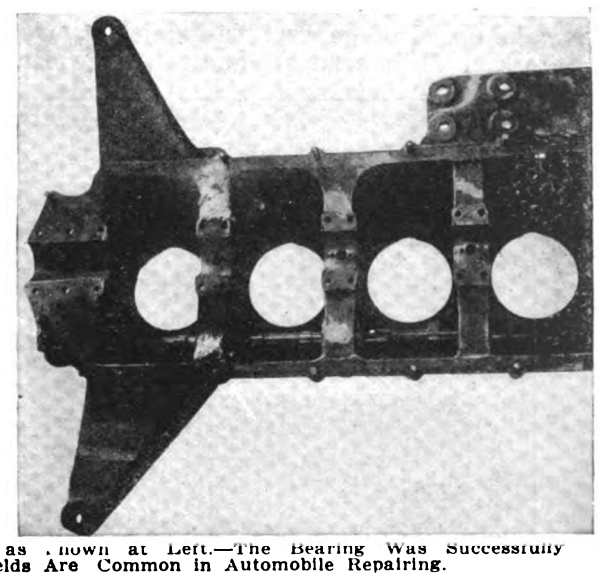
With an oxy-acetylene welding outfit repairs are quickly made and often right on the spot. There are no delays or tie-ups of machinery awaiting receipt of new parts. Even if it would cost as much to weld broken parts as to replace them with new ones, the large savings of time alone would make the welding equipment invaluable to every manufacturer. The economy, neatness and strength of the welded joint is fast replacing the riveted joint and threaded coupling in the manufacture of metal products, from large tanks to small articles.

Wherever it is desired to unite metals the possibilities of the oxy-acetylene process extend. This is a scientifically developed process for the welding and cutting of metals. It involves the use of Prest-O-Lite dissolved acetylene and compressed oxygen, both gases in portable cylinders. These gases burned in a suitable blow-pipe, produce a flame temperature of approximately 6,300 degrees Fahr., which is capable of bringing metal to a molten state very rapidly.

The Prest-O-Lite Process of welding is commonly used wherever it is desired to unite pieces of metal, as in manufacturing metal products or repairing broken parts. It is also used to add new metal, as in the building up of worn parts. All of the commercial metals can be successfully welded, including wrought iron, steel, cast iron, malleable cast iron, aluminum, brass and copper.

The welding process consists of heating the pieces of metal to be joined at the point of weld to a molten state by means of the oxy-acetylene flame, causing them to run together or "fuse" into one homogeneous piece. A rod or stick of special metal (commonly called filler rod) is used to fill in the gap caused by a fracture or between pieces of new metal being welded together. This material is also used in the building up of metal parts by fusing it on to the surface which has first been brought to a molten state.





One of the Main Bearings of Crankcase Was Broken Out as shown at Left.—The Bearing Was Successfully Welded and Is Giving Good Service.—Such Welds Are Common in Automobile Repairing.

Digitized by Google

PRIZE PHOTO CONTEST.

Why Readers Should Participate in Novel Contest in 1918.

Everybody likes to start the New Year right, but good resolutions are worthless unless kept. Evidently a large number of our readers decided to start the New Year right by entering our prize photo contest, for we received many letters and photographs shortly after the December number of The Blacksmith and Wheelwright was mailed. While the response is very gratifying, the kind expressions prevailing in many letters pleases us immensely, for it shows that the idea of getting our readers acquainted with each other, by publishing illustrations of shops in various sections of the country, is meeting with approval.

There is another angle to this photo contest and one of value particularly to the young man graduating from the apprentice class and about to engage in business for himself. Several of the readers sending in photographs of their shop have included in the description of it some excellent advice for the young man as well as for the more experienced and older smith. No one is too old to learn. And no one knows it all in any profession. The saying "that you can't teach an old dog new tricks" doesn't apply to the blacksmiths, for they are learning new methods every day. For example, note the number of smiths who are taking up automobile repairing and making a success of it.

Start the New Year Right.

It is because of these reasons and many others that every reader of The Blacksmith and Wheelwright should start the New Year right by taking a resolution he will send a photograph of his shop to us and include in the letter a few words of advice for the young man about to take up the profession of blacksmithing. And it will not be amiss to give the older and more experienced smith the benefit of your experience. As has been previously pointed out, the main object of the contest is to get our readers acquainted with each other, to promote good fellowship among the craft. There is no reason why the readers of The Blacksmith and Wheelwright should not be welded into one great big family, each member of which aiding each other member to make progress during the coming year and the years to come.

Just a word or two relative to the prize photo contest. We received so many photographs last month that we cannot use all of them or publish all of the stories in this issue, but those who are disappointed in this number will see their contributions in the following issue. The editor notes that one or two readers have expressed themselves quite forcibly on the matter of prices and other equally as important subjects, and trusts that others will do likewise, as the columns of The Blacksmith and Wheelwright are open for the discussion of all subjects of interest to the blacksmith, wheelwright and wagon maker.

Prize Photo No. 5.

From P. A. Walker, Kansas.—I am sending a photograph of my shop which I have occupied for the past five years. I have plenty of work and keep one man the entire year



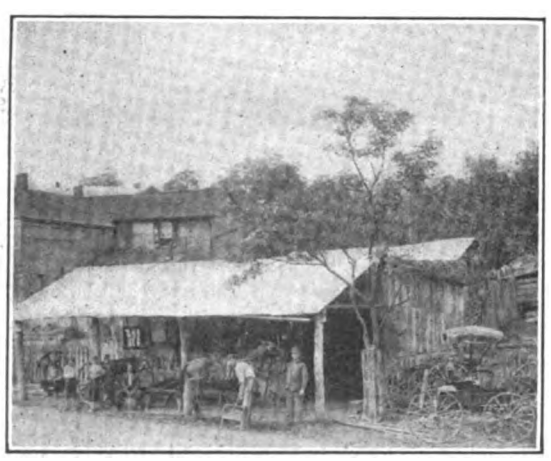
Illustrating the Shop Occupied by P. A. Walker, a Kansas Smith.—He Is Shown at Extreme Right Holding the Horse.

and employ two others part of the time. I have been a reader of The Blacksmith and Wheelwright for some time and like it. It is splendid. I am shown at the right, holding a horse, in the picture.

Prize Photo No. 6.

From Edgar F. Jacobs, West Virginia.—Am sending you a photograph of my shop which, although 18x32 feet, is much too small for my needs. I am seriously contemplating building an addition to it in the near future. I have been in the business for about six years and the building shown in the picture is the one where we both started and together.

I might say that I was almost raised in a blacksmith shop, as my father worked at the trade for about 35 years, and when he quit I started in for myself. I agree with other smiths that prices are much too low and I am afraid they will continue low until we wake up. I do general blacksmithing, woodwork in all its branches and painting. I also



Showing the Shop of Edgar F. Jacobs, a West Virginia Smith Who Says Prices Are Too Low.

handle wall paper and sell stock food as a side line. I quite agree with Mr. Charles H. Schism, whose letter in the November issue of The Blacksmith and Wheelwright as to prices is right to the point. At the present time it is hard to get what is due you for your work, let alone working for nothing.

Prize Photo No. 7.

From Frank Harsen, Michigan.—I am sending you two photographs of my shop, an outside and an inside view. I have been in



An Action Picture of the Interior of the Shop Conducted by Frank Harsen.

this place for about one and one-half years and do all kinds of blacksmith work, from shoeing horses to supplying electric light work for the town. Also manufacture potato crates. Have plenty of work the year round.

The only thing lacking in this community



Exterior View of Shop Owned by Frank Harsen.

is a little rise in prices, as we are a trifle under the average. I have been a reader of The Blacksmith and Wheelwright for several years and find many interesting things between its covers. I will be much pleased to have the cut of my shop.

How to Pick a Horse.

Edwin F. Geers, the famous driver of harness horses, who is now 58 years old, 30 of which have been spent in the development of trotters and pacers, in speaking about the selection of horses for track purposes, says:

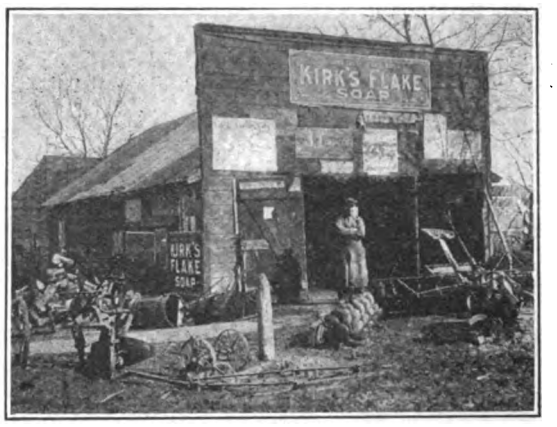
"The only way to pick a horse is just the way you would pick a friend. Beauty doesn't count. You look at him square in the face, and if he has a good head, full face, a fine eye, and a good matured ear, he is all right. If he looks like a convict, let him alone."

A Sad Awakening.

The Boss Blacksmith of a large horseshoeing establishment came upon one of the employees fast asleep alongside the forge. Eyeing the man with a stern smile, he said: "Slape on, ye idle bum, slape on, slape on. So long as ye slape ye've got a job, but when ye wake up ye're out of work."—U. S. Booster.

Prize Photo No. 8.

From J. S. Shultz, Iowa.—The accompanying illustration shows the shop of J. S. Shultz, a blacksmith of Iowa. The structure is approximately 28 years old, having been built in March, 1890, for the present occupant, Mr.



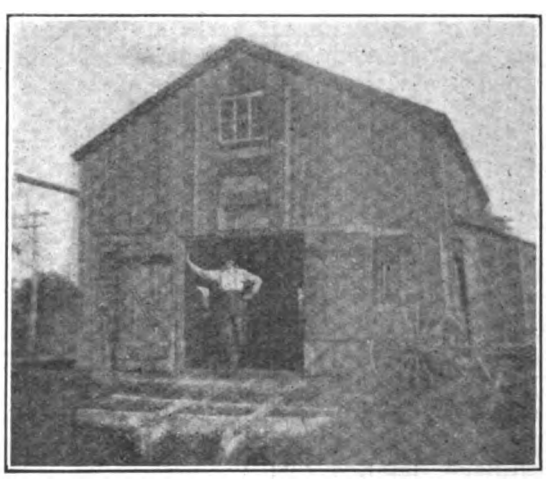
Showing the Shop of J. S. Shultz and Its Owner Standing in the Doorway.

Shultz. "I have worked in it ever since," writes Mr. Shultz, "and I could not find a better place if I looked over the entire state of Iowa. Money cannot buy my place as long as I work at my trade. I am 50 years old now and I hope to hang out another 20 years more, as I am delighted with the work."

Elsewhere in this issue is a report of an association of blacksmiths of which Mr. Shultz in president. The report has to do with prices and those adopted are also given.

Prize Photo No. 9.

From W. F. Scheerer, Illinois.—W. F. Scheerer, whose shop is shown herewith, says that it was built about 1854; that is, he believes it was, as his father began work in it in 1856. This makes the structure a pretty old one, and as Mr. Scheerer puts it, "the looks do not deceive one as to its age." The building is 24x18 feet. Its present occupant believes in good tools, for he writes that he is well equipped, but not so much so



Mr. Scheerer's Shop Was Built About 1854 and Although Aged in Appearance Is Equipped With Modern Tools.

that he cannot find room for new and improved tools. "I see something in each issue of The Blacksmith and Wheelwright that I want to get and I intend to get them," writes Mr. Scheerer.

Digitized by Google

OKLAHOMA SMITHS MEET.

d Ninth Annual Convention and Plan for Coming Year.

he blacksmiths and horseshoers of Oklaa, as represented by the Blacksmiths' Horseshoers' Association, plan a busy r for 1918. At the ninth annual convenof the association held at Okmulgee, Okma, November 19 and 20, the members ded to work together and to obtain a ıter degree of efficiency during the comyear. It was also voted to send out an ınizer to preach the gospel of the asso.on and to increase the membership. t. Bradshaw, of Okmulgee, was selected. ıe convention opened with President R. 'arks in the chair, and in addition to the ine business transacted there were many ects of vital interest discussed. Among e who spoke on timely topics were James iffitt, Beck & Corbitt Iron Co., and C. W. on, Capewell Horse Nail Co.

ıe following officers were elected for the ng year: President, William Hilins, yetta; vice-president, R. E. Wise, Okee; secretary, A. R. Bradshaw, Okmul- The tenth annual convention will be at Durant. While the convention was cided success, the social features were ss so. The visiting delegates were met ıe train, and during the meetings the ılgee smiths proved excellent enterrs.

Iowa Smiths Raise Prices.

e smiths of Kossuth, Humboldt and Poıtas counties, Iowa, have organized, inas prices are concerned. At the last ng, held at Algona, 41 smiths were pres- In addition to the business transacted, present had a most enjoyable social which included refreshments.

e next meeting will take place at Banand J. S. Shultz, president of the asion, and to whom The Blacksmith and lwright is indebted for the report of ice list reproduced herewith, issues an tion for all smith to attend the meeting. pe," writes President Shultz, "that all smiths will get together, organize and the prices they deserve. Our orıtion has been in effect for over three and we are obtaining new members time to time."

ıe of the prices obtained by the associre as follows:

Shoeing and Repair Work.

ing shoes, each	$0.50
er shoes, each	.60
lugs, each	.75
g stallion	1.50
lips	1.00
axles	5.00
tongues	4.00
each	.35
s	2.00
nners, put in	3.00
s, front or rear	3.00

IS A BIG FACTOR IN WAR.

asten, Vice-President of N. B. H. & W. A., Eulogizes the Smith.

ıe eleventh annual convention of the ka Blacksmiths', Horseshoers' and rights' Association, the question as to blacksmith can best serve his counether at the anvil or in the army, ussed. Among those who took part liscussion were Vice-President G. C. Secretary-Treasurer C. C. Good and ethman.

President Casten said in part: "How ıan best serve his country at this home, or at the anvil, or with the To my mind, laying aside prejudice ssion, there is no doubt as to the lace for the blacksmith, mechanic or of men who with the brawny muscle he hammer and handles the tongs, and making the plowshare and then, be, pounding them back into the r transferring them into the right- et, which speeds its way to all races, not for justice, mercy or humanity.

"Since the time of Tubal Cain the artificer of cunning workmanship in metals, has been foremost in the ranks of commerce. From my point of view, the smith is the most essential: First, the sturdy farmer could not follow the advice of Mr. Hoover, if he was unable to have his plow pointed, or sharpened, his cultivator shovel sharpened and shaped, his binder or, in fact, all of his farming equipment adjusted, welded, shaped and hammered into perfection. As to commercial value the private with his gun (all honor



Jens Miller, North Bend, Neb., the new President of the Nebraska Blacksmiths', Horseshoers' and Wheelwrights' Association.

to him) draws $30.00 per month, while the blacksmith gets $65.00, both occupying an important part in the great drama of war.

"Let me cite you Russia, with over 40,000,000 soldiers, did not and cannot make any showing as a war factor. Why? Lack of equipment. From whence comes this equipment? From the sturdy arm and the keen eye of the mechanic and the smith. Little Belgium, with a handful of soldiers, stood off the boasted Kaiser, and why? With the equipment forged and hammered out of steel by the men who know how to shape the steel that the boys in blue handle so effectually, and further, when you have one smith, you have one thousand boys who can do their part, in carrying the gun and wielding the sword. Let me say I do not speak only as a patriot, and I fully believe it is our duty to weld all metals for the use of mankind, so that when the time comes, that the dove of peace shall reign eternally. All honor to the soldier, seaman and the smith."

Dick Spethman, of Grand Island, an ex-



C. C. Good, Recently Re-elected Secretary-Treasurer of the Nebraska Blacksmiths', Horseshoers' and Wheelwrights' Association.

president of the association, and for 49 years a blacksmith, said in part: Brother craftsmen, I have a son in the army. I gave my son a good education and his choice of a vocation, but he decided to start to work in my shop. As time went on he became an excellent workman, so much so that his services are worth $125 the month, at the least. I gave him up to Uncle Sam for $30 the month, for I believe the army needs such men.

"We have entered a war that can be won only by sacrificing our sons and by our getting behind the wheel and doing our part. I know that the members of this association have sons who will acquit themselves honorably and who can do their part, for they are rugged, strong in character, willing and have those qualities making for victory in this war."

Secretary-Treasurer C. C. Good also spoke very interestingly on the subject, laying great stress upon the ability and necessity of the blacksmith doing his share towards winning the war.

The association is mailing through its secretary notices of the prices adopted at the annual convention. These give the finished smith and horseshoer 40 cents the hour and the apprentices 20 cents the hour. After six months' steady work, the rate for the apprentice is increased to 25 cents the hour.

Says Prices Are Uncertain.

C. L. Shaw, who conducts a general blacksmith shop in the state of Oregon, sends The Blacksmith and Wheelwright his price list, believing it will be of value to other smiths in these days of the high cost of material and labor.

"Material prices are so uncertain," he writes, "that I can hardly keep track of the prices on lots of the work. When I am in doubt I call up the hardware man and find out his prices before quoting prices to my customer." The prices in effect at the time Mr. Shaw's letter was received are as follows:

Shoeing.

Shoes or plates up to No. 4	$2.00
Shoes or plates up to No. 6	2.25
Shoes or plates up to No. 7 and 8	2.50
Rubber shoes up to No. 4, per foot	1.00
Rubber shoes up to No. 6, per foot	1.25
Rubber shoes up to No. 7, per foot	1.35
Bar shoes, each, to No. 4	1.00
Bar shoes, each, larger	1.25

Tires.

1½-inch tires, each	$1.00
1½-inch tires, set	3.00
3 -inch tires, each	1.25
3 -inch tires, set	4.00

Buggy tires same as 1½-inch.

Plow Work.

12-inch plow share, sharpened	$0.25
Larger plow share, sharpened	.35
Road plow	.50
New point on plow	1.00
New point on road plow	1.50

Other Work.

Sharpen picks, both ends	$0.10
Iron hoes, both ends	.25
Drawing out axle	.50
Drills, for rock work	.10
Buggy axle set	1.00
New bolster, front and hind end in old irons	3.50
King bolt	.50 to .75
Tongue cap	1.00
Doubletrees, common	1.25
Mowing machines, odd work, per hour	.50

Marshall, Minn., Smiths Organize.

The blacksmiths of Marshall, Minn., and vicinity met and organized recently. The following officers were elected: President, Mr. Fickbohm, Canby; vice-president, Carl Nordlin, Cottonwood; secretary, Albert F. Gits. Although in its infancy, the new organization gives every promise of becoming a large association and is to join the state organization.

The prices in effect are as follows:

New shoes, common	$0.75
Resetting, each	.40
Calking, extra	.05
Stallion shoes, set	5.00
Bar shoes, common plate	1.00
Calks	.25
Neverslip shoes, new	1.00
Neverslip shoes, reset	.40
Neverslip calks, each	.10
Neverslip calks, 2 for 15, 4 for	.30
Steel plug shoes, each	.90
Leather pads and packing, each	.50
Rubber pads, each and upward	1.50
Shoeing fractious horse, extra	2.00

Digitized by Google



In this department our readers are invited to contribute articles explaining how they solve the various problems arising from day to day in the shop. You may have developed a method whereby a piece of work is finished quicker, easier and better than formerly, but when you have done so why not give your fellow-craftsman the benefit of your experience? No matter how simple the job may appear to you it may be one that is bothering the other fellow, so make a rough sketch of it, write a few words of explanation and send it to the editor of this department. He will have the sketch remade by an artist and fix up the article. We want every reader to join in making this department one of the features of our publication. Any suggestion for lightening one's labors in the shop will be welcomed and appreciated by your fellow-craftsman.

Disagrees With Mr. Holt.

From B. M. Wentworth, New Hampshire.—I was quite amused while reading the article on page 836 of the December issue of The Blacksmith and Wheelwright in regard to the setting of axles. The writer sets his axles by the plumb spoke, a good many other blacksmiths do the same, but a plumb spoke has no more to do with the proper setting of an axle than the price of coal has. I would like to ask Mr. Holt what he would do about setting an axle where some fool blacksmith had dished the wheel about four inches instead of one inch, or, for instance, the right hand wheel had been dished one inch and the left hand one four inches, or if one wheel was dished out and the other was dished in?

I have been setting axles 42 years. Don't know it all now, but do know that the plumb spoke has nothing to do with a good running wagon. A good running wagon is one where the wheels roll or trundle freely, do not run against either collar or nut, and all the team has to do is to keep the wheels rolling. But if the wheels try to go towards the fences or try to go towards the horse's path, it is a hard running wagon. It is working on the same principle as a disc harrow.

I set all my axles with the bottom of the

Showing How B. M. Wentworth Sets Axles.—Distances at Arrow Points Exactly Alike.

spindles exactly level or on a line with each other, as shown in the accompanying drawing. Then I put just enough gather in them so to be sure they don't hang back. It differs with different axles and according to the amount of taper there is in the spindle; that is, on heavy axles having a wood stock, and on coach axles that have no wood stock, I do put a very little drop on the outer end of the spindles to offset the spring of the heads when loaded. On an axle set that way you will hear it "talk," as the saying is. The wheels will click against the collar and nut when loaded because they are free to do so, but if the outer ends of the spindle are down the wheels will run against the collars, and if the outer ends are up the wheels will run against the nuts and you will hear them "talk." A wagon that "talks" is running easy. A wagon that doesn't "talk" is running wrong, unless there are washers on the axles. I have axles brought to me from long distances out of the woods and axles I have never seen, but I set them just the same and they run all right.

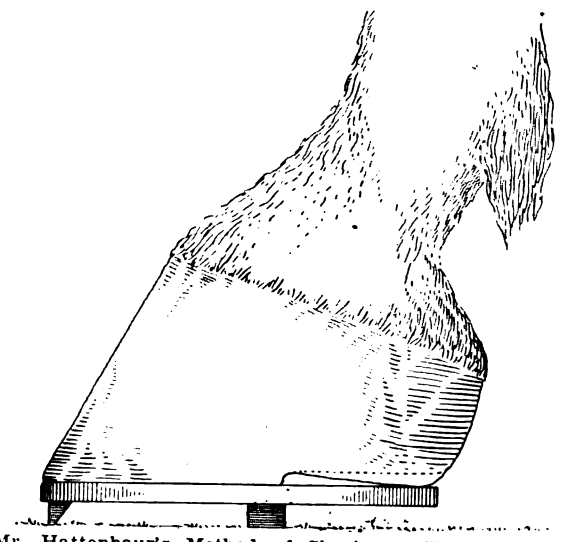
Shoeing a Horse With Corns.

From G. A. Hattenhaur, Colorado.—In a recent issue of your paper I saw an article on shoeing for corns and a sketch showing how pressure was taken off of heel by cutting away the foot from the quarter back until it does not come in contact with the shoe. This method of shoeing will give a temporary relief to the horse, but I object to it for other reasons.

If continued it will cause a downward curve to the wall at the heel and curve the coronet down until the horse has no heel and smiths say the horse has a weak heel. The foot of a horse is very elastic. A man can spring it with his hands and when a shoe is put on that does not come in contact with the heel the foot will conform to the shoe.

The smiths I have worked for and with that had the most success used a bar shoe on horses with corns.

I have always had success with bar shoes on horses with corns. A bar shoe should



Mr. Hattenhaur's Method of Shoeing a Horse Having Corns.

be put on so that a part of the weight is carried on the frog pad. Pressure on the frog of the foot has a tendency to liven it up by using it as nature intended and broadening it. This broadening the foot at the heel gives more room around the rear points of the coffin bone, removing the cause of corns and giving lasting relief.

Some time ago I noticed an article, by a brother smith, in The Blacksmith and Wheelwright, saying he nailed a shoe on a horse so solid that when the horse caught the shoe and partly pulled it he pulled the sides or heel of his foot down. For this, so he states, he leveled the shoe and returned to the foot and found the foot unlevel. A brother smith criticizes him and said he could not have had the foot level in the first place. The first man is nearer right than the second in my opinion, although they are both wrong.

As I said before, the foot of a horse is very elastic and the shoe being bent away from the heel the foot conformed to the shape of the shoe to some extent and was curved downward at the heel by the weight of the horse in traveling and standing.

This curving of the wall of the foot caused by traveling on bent shoes has lamed many a horse by throwing too much strain on the tendons and tissues of the foot. The method of shoeing for corns referred to in this letter has the same effect as a bent shoe. One is an unlevel foot, the other an unlevel shoe.

If any smith doubts the accuracy of this statement in regards to a bent shoe and the foot conforming to it, let him test the method. Nail a shoe on a level foot, then pull down on one side enough to loosen the heel. Nail and bend the shoe and let the horse go for a week. Remove the shoe and level it up again and try it on the foot. He will find the foot out of level. Don't level the foot but just nail the level shoe on the foot again and let it remain a week and look at it again. He has a level shoe and foot.

I don't think it is a good policy to level a foot before returning a shoe that has been bent and releveled. It should be put on the unlevel foot caused by walking on a bent shoe and thus level the foot by returning it to its natural shape.

I hope every smith who tests the foregoing statement will let me hear from him in this paper. Please criticize all you like.

Large Engine Cheaper.

From Mark E. Hall, Michigan.—Answering W. Shaw of Fairfax, Manitoba, in regard to fuel consumption of a gasoline engine, would say that the larger engine will be cheapest, as the three horsepower will be too light for shop work. I have a six horsepower and a 1½ horsepower and the larger engine will run my drill or lathe for three hours on about as little gas as the smaller engine, and when I want to do a big job I have the power.

I would like to say that I like The Blacksmith and Wheelwright very much. It is a welcome visitor to my shop. I have not a photo of my shop, but hope to have one later to send for publishing.

Ford Body Patterns.

From a Blacksmith, Illinois.—In the December issue Brother Olson of North Dakota asks where he can get some designs for a Ford racing body. I noted an advertisement of a Will Wand, Onarga, Ill., which says he has blueprints, patterns, etc., for a speedster body. Do not know anything about the party, but Brother Smith can write and find out.

Does Not Favor Shoeing Method.

From Mark E. Hall, Michigan.—I saw a cut showing the foot of a horse in the November issue of The Blacksmith and Wheelwright, an article by J. P. Weatherby of Ohio, on treating corns. Now I do not say it is not a good plan, but I do say that it does not look good to me.

Brother smiths, if you look at the cut you will see that where the heel calk is it is in front of the horse's leg. I mean if you should set a square on the floor the weight of the horse would be all on front part of the leg which would certainly tie the cords of the leg and cause worse soreness than the corn.

Now the way I handle a case of this kind is as follows: I fit the foot level and if the walls of the foot are thick I shoe with a long side calk with just enough spring to relieve the pressure on the heel. If the wall be thin, I shoe with a bar shoe, putting the weight on the frog. Never cut the walls of the heel away, as they grow very slow. Just pare the corn down low.

Another Remedy for Corns.

From W. J. Ott, California.—Allow me to reply to the article in the November issue of The Blacksmith and Wheelwright, the article by Brother J. P. Weatherby of Ohio. In regards to shoeing a horse having corns, will say that after 34 years' experience in practical shoeing of horses and mules I never found but one mule that had a corn in his hoof and but few horses having corns in their hind feet.

It is very evident that Brother Weatherby does not realize when he pares the hoof of the horse, as he advises, also welds a lug on as stated, that he throws the pastern joint, the small one, out of alignment as shown in the drawing at Fig. 1, A.

My practice and success has been to pare the foot level and cut out the corn. The corn

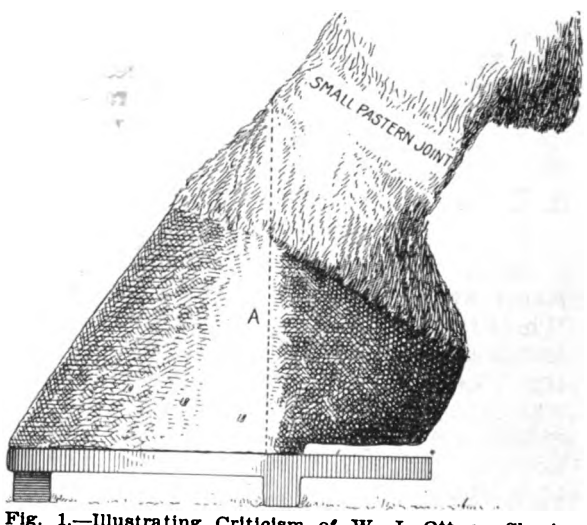
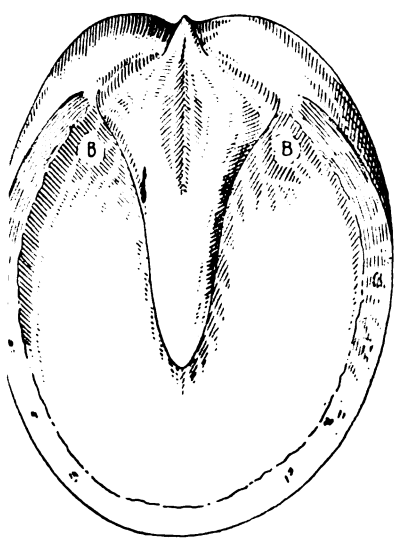


Fig. 1.—Illustrating Criticism of W. J. Ott on Shoeing Horse with Corn.

is shown at Fig. 2, B. I dig or cut out quite deep, leaving the sides level. Next I fill the hole or dug out part full of old-style brown sugar. Next I heat a ½-inch round iron and with its flat end I burn the sugar until it makes a tar. I leave this in the hole and if the burned sugar does not come level I put a little cotton on top of the tar-like matter. I do this to prevent gravel, etc., from getting in. Do this and Mr. Corn will "vamoose,"

Digitized by Google

Mexicans say. My method is a remedy
ie and effect. Remove the cause and
ect will go with it. Of course, the shoe
not be allowed to remain on all sum-
Set it every 60 days at least.
's a suggestion for the use of horse
Watch your horse and see if he
w or high. There is no rule for telling,
atch your horse. If he pulls high up,



2.—W. J. Ott's Method of Treating Corns.

your harness accordingly and at the
he pulls low down, lower your har-
the top.

Concerning Hogs.

me to make a statement and I hope
l publish it. Now, see here, Mr.
you and your brother farmers are
nds. Your interests are mine. If
re no farmers I could not blacksmith
the barber, grocery man, hotel man,
pool hall man do not produce any-
They just make money out of what
ners produce.
want to warn you farmers that the
iness is like every other business
ie dairy business. Butter, cream and
standard about all the time. But
different. Look back at the hog
Hogs were high in the years 1856,
57, 1873, 1878, 1884, 1895 and 1900.
will note that between these dates,
between 1856 and 1862, 1867 and
'8 and 1884, and 1895 and 1900, we
ee sixes and one five, making a cycle
id six years.
will go down in all ordinary years
times). Hogs will be high again
and six years, or in 1922 and 1928,
ire as you farmers live. They will
in price until 1922. They have
four cents a pound already. Put
ires down and watch the cycle five
It will come as before and will come

---

te.—The statement made by Mr.
y interesting, but it would appear
e are other factors influencing
ch as the number of hogs raised,
s a well-known fact that a recent
of hog cholera resulted in a very
to breeders.

---

ays Charges Are Too Small.

L. K. Lee, Connecticut.—I note W.
Massachusetts wants to know what
ent or tools will cost to fit him up
ng autos. Now, Brother W. E. P.,
a list and prices of what is needed
to handle all kinds of auto work
e you, both the quantity and the

not have to spend a lot of money.
dy have tools in your shop that
ed on the work. If the editor of
smith and Wheelwright will give
ldress I will send you a list of tools
g a start and they will not break

to the prices to charge. You are
Brother W. E. P., very much
ie magnificent sum of 60 cents the
right in some places, perhaps, but
ber if you start in with charging
e hour you will have to stick to it.
You won't find it so easy to raise your prices in this new business of yours because automobilists are queer "animiles." You take my advice and think it over carefully before you decide to charge less than 60 cents. Probably the High Cost of Living hasn't hit you in the solar plexus yet. If it has you will take that piece of chalk of yours and spread it over your walls doing a little figuring.

Another Answer for Mr. Meyers.

From L. Ott, California.—In answer to Brother J. D. Meyers, of Rhode Island, I will say that my father has a shop and I do smith work in a way, although I do not like it. But I do care for automobile repairing. Here is my experience in auto repairing and which may be of value to Brother Meyers.

1.—In starting in the automobile repairing business the first thing is cash.

2.—If I repair a car O. K. my time is worth one dollar the hour. If I do not fix the machine all is well, for I receive a little experience but no money.

3.—Satisfy the customer and he will tell his friends. That means more business.

4.—Do good work and as neat as possible.

5.—Be honest and do not bulldoze the customer.

How to Sell Cars.

Car selling is good, but how many men come out on top? A good car handled right and pushed along on its merits will be O. K. In answer to the points raised by Brother Meyers, would say:

1.—Cash is what talks. If you do a good job of work amounting to one dollar and the customer says, "Oh, charge it," and if you do get it all is well, but if you don't you have lost everything.

2.—Experience is what every one must have, and if it were not for experience you would not be in the smith business today.

3.—Satisfied customers is your best asset in any business.

4.—Good work means steady customers.

5.—Honesty is the best policy. Your customer trusts you and has confidence in your work. He should not be obliged to stand over you while you are doing his work.

As to starting in the repair business, get an old car, and as you say, if it is a Ford, all the better. Get one and tear it down, watching every movement in so doing. If you can get some friend to help you all the better. All cars are alike except minor adjustments, etc. The principle has to be there or it will not work. Confidence, care and ablity are your best friends.

I have outlined the principles as best I can. If there is anything you want to ask, Brother Meyers, do so and I will be pleased to answer you. I might state, in closing, that I am making good in automobile repairing.

Is Going to Tackle Auto Repairing.

From J. D. Meyers.—When I asked for some plain talk about selling cars and auto repairing in the November number of The Blacksmith and Wheelwright I did not think I would get such a lot of good advice. I wish you would print my thanks to Brother Lee of Connecticut for his information in the December number of your paper. If Brother Lee talks as good as he writes I sure would like to grasp his hand and listen to him tell of his experiences, for he must have had a barrel of them else he would not write as he does.

To be perfectly frank, I have been considering this auto business for some time, over a year, and I buzz everyone who knows or thinks he knows anything about automobiles. I have been at the smith business so long that I am like lots of others in the craft and who hesitate to take up the auto repairing. But I guess it's a case of the repairing coming to us, not we going to it. I find lots of my customers using "flivvers" and other light makes of autos, and more than once they have asked me why I did not learn autos and get the business. To which I replied that I did not know a thing about the pesky things. One of my customers, a pretty shrewd old chap, and who has two autos, bothered me so much about my learning the auto that I finally asked him point blank if he would be willing to have an old-time smith who didn't know anything about gas engines monkey with his car.

Trusts the Smith.

"Ed," he said, "I have known you for 25 years and during that time you have never given me anything but a truthful answer when I asked about my work. You have proved up as honest and square. If you tackled my car and busted something and didn't know how to fix it, I know you would tell me the truth. If you did $10 worth of work and billed me up $10 I know the work would be in the car."

"That's fine of you," I replied, "but while you may be willing to have me learn autos at your expense, there's lots around here who won't."

"Wrong again," said he. "When it comes to paying for education or for learning to find out the whys and wherefores, you will find that your trade has more confidence in a man they know than those auto repair shops which have young chaps learning at your expense."

Is Going to Try.

This and several other things set me thinking. And so I am going to start in auto repairing. I do some little work, such as we smiths do, but I am going to learn what's inside the gasoline buggy, why it is inside and what it does. Brother Lee gave me some good advice and I am going to profit by it, for I don't want to see some whipper-snapper of a boy come in my town and take some of my old customers away from me even if it is only for auto repairing. Maybe I will get that experience that Brother Lee tells about. I hope to and it is not unlikely that I will be bothering Brother Lee for some more information.

Ed. Note.—As has been previously stated in these columns, The Blacksmith and Wheelwright has engaged the services of a well-known automobile expert, one who served his time in the overalls and jumpers in repairing motor vehicles. This expert will answer any and all questions submitted by the readers of The Blacksmith and Wheelwright.

Answers to questions will be published whenever the reply contains information of value to the readers, but the name of the person asking for information will not be used if subscriber so requests. If an answer by mail is desired, it must be so stated in the letter.

The automobile expert of The Blacksmith and Wheelwright is prepared to supply advice to those smiths considering taking up automobile repairing as well as aid any reader seeking information as to how to best arrange and equip his shop for the work. This service is FREE and is at the disposal of subscribers of The Blacksmith and Wheelwright.

Says Water Is Heaviest.

From Z. K. Brown, Vermont.—Noticing the question of J. De Veney, Texas, as to which is the heaviest, a gallon of water or a gallon of gasoline, I am sending you the information I obtained from a motoring paper, the Automobile Dealer and Repairer, which I take and which gives me lots of good pointers in repairing work.

A gallon of pure water at 62 degrees Fahrenheit weighs 8.3356 pounds. The temperature given is the standard figure. The usual number or weight is 8.33, as all water is not pure. Gasoline weighs about seven pounds to the gallon and kerosene about 7.9. This is authentic and will settle that bet.

To Harden Iron.

From Peter Van Dyken, Michigan.—To harden iron, take some salt and hoof cut from the hoof and mix together. Heat the iron as for welding and dip into the mixture of salt and hoof for a minute. Cool in water. This is a handy method for hardening when a shoe is to be made for a horse that wears the shoe more on the outside than on the inside, and saves welding a calk on. The iron will get very hard when treated as above explained.

Digitized by Google

The Blacksmith and Wheelwright

The Pioneer Journal of Its Class in the World.
Member of the Audit Bureau of Circulations.
PUBLISHED MONTHLY BY
M. T. RICHARDSON COMPANY,
71-73 MURRAY STREET, NEW YORK.
POST OFFICE BOX, 654. TELEPHONE—7377-7378 BARCLAY
CHICAGO OFFICE, 608 SOUTH DEARBORN STREET.

M. T. RICHARDSON, President and Treasurer
F. R. WHITTEN, Secretary
C. P. SHATTUCK, Managing Editor

F. R. WHITTEN, Advertising Manager.
F. M. DAMPMAN, Eastern Representative
H. F. LUDINGTON, Western Representative

AGENT FOR GREAT BRITAIN:
ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance..$1.00
One Copy, six months, in advance.....60 cents
Single Number .....10 cents
Canadian subscriptions .....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English money.
Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

COMMUNICATIONS.

Communications on subjects appropriate for our columns solicited from all quarters. We want practical information. If you KNOW something that will benefit our readers, we shall be glad to have you write it out and send it to us for publication. All communications of this nature should be addressed to the Editor of THE BLACKSMITH AND WHEELWRIGHT, P. O. Box 654, New York.

CHANGE OF ADDRESS.

Subscribers who desire the address of their paper changed will please send the old as well as the new address.
Newsdealers can obtain THE BLACKSMITH AND WHEELWRIGHT from the news companies with whom they deal regularly.

ADVERTISING RATES SUPPLIED ON APPLICATION.

Entered as second-class mail matter at the Post Office in New York City.

SPECIAL NOTICE.—When subscribers fail to receive THE BLACKSMITH AND WHEELWRIGHT regularly, we shall take it as a favor if they will notify us to that effect.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

The Blacksmith and Wheelwright in New Zealand.

Mr. R. Hill, Matlock House, Devonport, Auckland, New Zealand, is our accredited representative in New Zealand for obtaining new subscriptions.

☞ **When you change your place of residence always write to us and give your new address.**

JANUARY, 1918

TABLE OF CONTENTS.

	PAGE.
Classified Buyers' Guide	24
Index to Advertisers	24
Want Advertisements	25
Planning for the New Year	9
Likes His Trade	10
Why the Delay	10
Welding Saves Metal	11
Prize Photo Contest	12
How to Pick a Horse	12
A Sad Awakening	12
Oklahoma Smiths Meet	13
Iowa Smiths Raise Prices	13
Marshall, Minn., Smiths Organize	13
Is a Big Factor in War	13
Says Prices Are Uncertain	13
Workshop Experience	14
Shoeing a Horse With Corns	14
Says Charges Are Too Small	15
Is Going to Tackle Auto Repairing	15
Another Answer for Mr. Meyers	15
Says Water Is Heaviest	15
Editorials	16
Taking an Inventory	17
Value of System	18
Ohio Smiths Raise Prices	19
The Hansen Tire Tool	19
Questions for Our Readers	19
Recutting Files	19
Turning Eye in Hoe	19
Constructing a Lathe	20
Issues Annual Report	21
Women Conduct Hospital	21
Minnesota Smiths Organize	21
Lathe Work	22
The Machine Shop	22
Will Meet in Cincinnati	22
Among the Michigan Shops	23
Why the Liberty Bond	24

A HEARTFELT WISH.

A Merry Christmas and a Happy New Year to all our readers. May we succeed in helping you prosper to the full, and may you contribute to your prosperity by doing collectively that which you cannot do individually.

A FEW WORDS WITH OUR READERS.

Every progressive blacksmith needs just such a publication as The Blacksmith and Wheelwright has been for the blacksmiths of the country for 38 years, and will continue to be, let us hope, for a similar period in the future.

Sometimes we get a letter to the effect that dollars are scarce, and the writer feels that he must economize, to the extent of stopping his subscription for a year or more.

Economy in knowledge is always the poorest kind of economy. We can economize in a variety of ways, if we have to, without serious injury to ourselves or our business; but for a blacksmith to economize in connection with such a valuable and practical publication as The Blacksmith and Wheelwright is the height of unwisdom.

It is by no means uncommon for a blacksmith to write us that a single article has been worth to him the subscription price of the paper for several years to come. In the very next issue of The Blacksmith and Wheelwright after a man has stopped his subscription, might be found an article which would be of almost priceless value to him. If he has stopped, of course he never sees the article.

It is the time of year when most people are renewing their subscriptions to various periodicals. Some we can always get along without. But those that are specially edited to promote business—the business we are engaged in—should never be dispensed with.

We are compelled to state that all premiums of every description have been withdrawn. The Post Office Department objects to anything of this sort for the increase o subscription lists.

The best premium that we can possibly give our subscribers is to furnish material of real value to them in their workshops and that is what we are trying to do, more, if possible, than we ever did before. Merit is the best premium that can be offered by a publisher as a reason for subscribing to his paper or magazine.

Those of our readers who have not yet sent in their subscriptions for the current year, are requested to do so promptly. We are still supplying The Blacksmith and Wheelwright at a dollar a year, and shall continue to do so for a few months longer, although if the new postage rates really go into effect the first of next July, there would seem to be no way out of the matter except an increase of 50 per cent., and maybe more. Even at $1.50 or $2.00 a year, The Blacksmith and Wheelwright would be cheap. Those who wish to send us $1.75 can have their subscriptions extended for two years. Beyond that we cannot afford to go.

In another article in this issue we have explained the matter of the iniquitous law passed at the last session of Congress, and have requested our readers to write to their Congressmen and Senators and protest against it, and to call for its repeal.

EXPRESSES DISSATISFACTION.

We are in receipt of a letter from a reader who states he will not renew his subscription for 1918 because The Blacksmith and Wheelwright "is largely in the interest of automobile repairing, and that a blacksmith has no business tinkering with autos."

Exception is taken to the first statement. Of the 40,000 or more words of the average issue less than five per cent. represent automobile articles, and an analysis of the recent issues reveals the interesting fact that over 50 per cent. of the space devoted to automobile subjects consisted of contributions from our readers, smiths who are achieving success in automobile repairing.

The Blacksmith and Wheelwright was the pioneer publication of its kind to advocate the study of automobile repairing, to urge its readers to become familiar with the motor propelled vehicle, for it was our sincere belief that the horse and wagon and carriage would eventually divide business with the automobile. We also argued that the smith and wheelwright should get in line for whatever work the automobile makes in the way of repair or replacement, for it properly belonged to them.

We are pleased to state that the present issue contains more articles on the practicability of repairing automobiles by the smith than the preceding numbers, and that the greater part of the information is supplied by smiths who have found automobile repairing practical and profitable.

We are also pleased to announce that arrangements have been perfected whereby The Blacksmith and Wheelwright will present to its readers a series of articles on the automobile, its construction, operation, maintenance and repair. These articles will be written by a well known expert and will take the form of a series of written lectures.

The articles are to be prepared especially for the blacksmith not familiar with the motor car. They will be written in simple, elementary style so as to be easily understood. Each part and its relation to another part will be discussed. Numerous illustrations will be utilized to show each step of the construction, etc. Another feature, one that cannot but fail to be of immense value to our readers, is the arrangement made with the expert whereby he will answer by mail all questions dealing with each article. Complete details will be announced with the first article of the series, which will begin in the February issue.

NEW BUSINESS.

War affects many industries. It disturbs the law of supply and demand. War, however, does not affect one important industry and that is the manufacture of baby carriages. The demand for the perambulator is constantly increasing as the world's population increases.

It is extremely doubtful if any of our readers have ever considered the repair of baby carriages as coming within the zone of the blacksmith's work. The baby carriage is a vehicle. It is constructed of metal, wood, leather, etc., as are horse-drawn and motor propelled vehicles. The baby carriage must be repaired, and some designs require repainting, for although stored away today its services may be required tomorrow.

The maintaining of the carriage in serviceable condition is work that rightly belongs to the smith, carriage man and painter. It comes under the head of new business, new business to be cultivated during the new year. It should not be difficult to obtain this profitable work. A small circular or card enclosed with the mailing matter, a small advertisement in the local paper, or, best of all, the personal solicitation. The automobile may be responsible for the decrease in the use of horse-drawn vehicles, but it will never affect the pushcart type of vehicle, the baby carriage.

DO IT NOW.

If you wish to continue to read your favorite paper or magazine at the present subscription rate, write to your Representative in Congress and the two Senators from your State and insist upon a repeal of the unfair and obnoxious zone postage law on second-class publications jammed through Congress at its last session without proper consideration.

This is not so much a law for revenue as to deprive the people of cheap reading matter. Many Congressmen take the ground that there are too many publications which can be bought at a low price. They lose sight of the fact that any publication that can secure a satisfactory subscription list, which people are enough interested in to order and pay for, is doing a good work.

The Postmaster General at Washington admits that his department made a profit last year of over $9,000,000. So the new

Digitized by Google

not needed because of a deficiency
'ostoffice Department.
zone system of postage is the very
hat could have been devised, as it
ll sections of the country distant from
it publishing centers at a serious dis-
ge. By the new law the postage to
st remote zone will be ultimately 10
pound—a most outrageous rate.
urse the publishers cannot stand a
this sort without passing it along to
ers, with the result that subscrip-
es in some instances will have to be
or more. The public as well as the
rs of the country are interested in
this unfair and iniquitous law re-
nd second-class postage continued at
ent rate of a cent a pound.
reader will write to his Representa-
Congress and to his two Senators
est against this excessive rate, which
iously increase the cost of his read-
er, it will go a long way towards
about a repeal of the law.
blishers of the country are entirely
o pay their share of the war tax,
new postage will practically place
n double taxation.
islation calculated to produce such
d distress both to the public and
s, as well as to the entire printing
he country, has probably ever been
the statute books by Congress.
protest against this law should go
ll over the country.
don't know the full name of your
ative, ask your Postmaster.
Representatives at the House of
atives, Washington, D. C., and
at the Senate Chamber, Washing-

AFTER 39 YEARS.

ue begins the 77th volume of The
n and Wheelwright and the 39th
s existence. This period is con-
more than the average duration
ation—the average life of all who
ge of infancy.
of The Blacksmith and Wheel-
ar beyond the average age of pub-
n fact, of the thousands of peri-
ne country probably not more than
re than 35 years old, and far less
e have been constantly guided dur-
iod by the same brain and hand.
mith and Wheelwright enjoys the
action of being the pioneer pub-
e oldest of its kind in the world.

AKING AN INVENTORY.

s and Suggestions for Completing the Work.

FRANK FARRINGTON.

you expect to know about your
gross profits, your stock on hand,
worth, the depreciation in your
success of your business unless
y at least once every year? And
s, "Nothing."
n inventory once a year, you can-
w much fire insurance you ought
ng or how much you ought to
our stock is destroyed by fire.
know whether you are carrying
an your business requires. You
any kind of an intelligent state-
banker when you want to show
are entitled to credit. Unless
w much stock you have and how
with last year's, your finances
guess-work.

Profits or Losses.

ess may easily be paying so lit-
not profitable for you to keep
ied up in it, and yet you may
unless you inventory regularly,
ave been plenty of instances
was bankrupted by his ignor-
t before he really found it out.
u guess at the value of your
ss $100, out of the way. You
guess that much too high the
and as much too low the first
n in a small stock a good sized variation might take place unnoticed. It is not uncommon for a smith to reason that he keeps about the same stock year in and year out and that he is not going to be far wrong in guessing at it as about the same after once taking an inventory. There never was a time when you could follow that method and know anything about what you were doing, and nowadays you simply could not tell anything about it.

How Stock Varies.

If your stock may vary $100 in a year, you may easily have a loss of $100 without realizing it. Of course, theoretically you might have a corresponding gain, but men who take no inventories are rarely the kind of business men to make much of a gain.

More or less depreciation in values of stock takes place where it will not be discovered if you take no inventories. It takes an inventory to find out what is happening in the dark corners and in the back part of shelves and boxes. For the man who has not taken an inventory in 10 years, and I have heard some men boast of that fact, there are going to be some unpleasant surprises when the inventory is taken. Selling out on an inventory basis is often a disappointment to the man who takes his first inventory then.

Stock and Insurance.

How are you planning to get your insurance money in case of a fire? Do you suppose any insurance company will insure a stock expecting, in case of fire, to pay for stuff they are not sure was burned? Not in a thousand years! You will have to show the insurance adjuster that you had the stuff and that it was burned. They don't adjust fire insurance on the guess basis. The man who does the adjusting is a different chap from the friendly agent who wrote the insurance and who may be your neighbor. These adjuster fellows are as hard as nails and they purpose to pay insurance according to the loss, not according to the amount of the policy.

And the Bad Bills.

In addition to inventorying your goods, inventory your book accounts too. Otherwise you cannot know how much you ought to write off for poor and uncollectible accounts and you may be surprised to find that all your profits are tied up in bills you cannot collect easily.

If you have failed to take proper inventories, it has not been so much that you don't want to know as that it is too much trouble to find out. Isn't that so? You haven't thought the knowledge worth the work. Well, most of the worth-while parts of the day's work are tiresome and sometimes the things most worth while are the hardest and most tiresome. I don't blame any man for dreading to take an inventory. I have dreaded it myself as most men. But that is not a sufficient excuse for neglecting it. You can't expect business to be a joy-ride, anyway. Call inventorying taking medicine, if you wish, but admit the need of the dose and take it and have it over with and get the benefits as soon as you can.

Needs Application.

Inventorying is a job that should never be allowed to drag. Put enough pep into it so it will move right along. Work at it hard while it is under way and get it finished up with the least possible delay.

Don't hold up the work of getting the inventory on paper by waiting to carry out prices and foot up columns as you go along. Get it all down as fast as you can and then you can take your time afterwards to the arithmetic part of it, or you can turn the book over to an accountant and let him figure it up for you.

How to Figure.

It is not worth while to try to get every item exact to a hair's breadth. Variations of a few cents in total sums are not worth the hours of figuring required for them. You can make your inventory right, without making it infinitesimally exact.

One mistake that is commonly made in the haste to get the job out of the way is that of "lumping" certain parts of the stock. Estimating the value or even figuring out the value of a certain set of shelves and setting down on the list "Contents of five shelves next door, $25," is not going to be what the insurance company want. They want to know what was on those shelves. Their contents may have been $25 when inventoried, but how do they know they weren't down to $2.50 when the fire occurred? There have been sales and purchases and unless there is some better way of getting at the result than taking the $25 and "guessing" that about as much stock was added to those shelves as was sold, you and the adjuster will disagree right there. The insurance adjuster can be a devil if he likes, so make your plans accordingly. Keep that fire insurance money in your mind all the while you are inventorying the stock.

Honest Values Best.

Boil the list down to the goods you are sure have a value and whose value is not questionable. You cannot gain anything by fooling yourself into the belief that you have more than you really possess, and you are not going to fool anybody else by putting fictitious values on stock.

If you are dishonest with yourself in inventorying, you are just laying pipe for trouble later. Even if you could make yourself think you have a bigger stock than you actually have, what is the advantage? The facts have to come to light sooner or later—either while you are still running the business or after it becomes your estate. If there are losses in stock, take them now instead of allowing them to accumulate to be written off in a bunch.

Suggested Methods.

If you want to make inventorying easier while allowing several to work at it at once, putting it all into one book in the end, work with a loose leaf book, the various workers taking separate leaves and putting them all in the common binder later. This will be more satisfactory and more convenient in the end than having several separate books.

By taking sheets with three columns before the stock item and three sets of dollars and cents columns after it, the same book may be used for three inventories, thus allowing an easy comparison of amounts of stock in separate years and saving writing down the individual items after the first time.

Two persons working together will take inventory faster than each working separately. In the former way one counts stock and the other writes down the items and each may work rapidly. The writing is thus done by a man whose paper may be on a proper support, while his hands are not constantly getting dirty and soiling the record. If one man counts and writes, he has to change jobs every time and he will be writing on top of a ladder or under a table and the result will be a mess, perhaps not even legible in parts. A short cut to getting the item cost of an article on which a gross price is given is simply to multiply the gross price by .007. Simple and quick!

Computing Prices.

Here is a plan for making a table for computing the prices of various parts of a dozen where the dozen price is known. In a column right down the left hand side of the page put the various dozen prices to be considered, beginning with the cheapest goods, say 25 cents a dozen. The prices might run something like .24, .30, .35, and so on up. Following this column rule 12 columns and number the heads of them consecutively from 1 to 12, beginning at the left. In the first of these columns, under the "1," place opposite the top or lowest price figure, the price of 1/12 dozen of an item costing that price per dozen. If that price were 24 cents a dozen, in this column you would write .02. In the second column put the price of 1/6 dozen, or .04, and so on down the line, doing this with each cost price. When this table is once made up, it will save a lot of figuring in carrying out the inventory prices, and it can be kept for reference indefinitely. The inventory is the foundation of all business figures and if it does not pay to take one yearly, then all known business rules are a lie.

Digitized by Google

VALUE OF SYSTEM.

Accurate Cost Figures Essential and How to Obtain Them.

BY FRED. A. ORCUTT.

If there be on this earth a poorer class of business men than the blacksmiths and wagon repair men it has been my good fortune not to have known about them. The writer, although not a blacksmith, has charge of the business end of a blacksmith shop, and thinks he follows more nearly the accepted methods of successful business practice than most blacksmiths do. And the failure of attaining satisfactory results in other departments of the business, where similar methods are practiced, very materially tends to reduce any abnormal growth of the cranium.

The Hit or Miss Method.

What kind of an opinion would even the blacksmiths have of a grocery man who didn't have a set of scales to weigh his sugar, crackers, cheese, etc.? Suppose when he had a call for sugar he would grab a paper bag that was about the right size and would put in more or less sugar according to what seemed right in his judgment. If you were to ask him for a pound of cheese would you be satisfied to see him cut off a slab and wrap it up without weighing? If you would be satisfied at this way of doing business it is more than probable that the grocer would not long be satisfied after he figured his annual returns, assuming that he had some way of knowing, occasionally, at least, whether he was making a dollar or losing several.

If a farmer drove up to the grocery store and called for a barrel of flour, a couple of shovels, a whole ham, a gallon of molasses and half a dozen other items, and if, when the things were all piled into the wagon, the grocer looked them over and said, "Well, give me $15; everything's going up, you know," what would the blacksmith think of him?

How the Smith Does.

And yet similar practices to these are the common practices in many a blacksmith shop.

A customer drove up to a blacksmith shop recently and wanted a shaft iron repaired while he waited. The blacksmith immediately went to work, took out the anti-rattlers, turned off the two tight-fitting nuts on the shackle bolts, which, as usual, projected through the nuts about one-half inch; had to take off both front wheels to get the shackle bolts out; took the shafts into the shop and laid them bottom up on his trestle; turned off eight nuts from the bolts; cut off two more nuts with hammer and cold chisel because the bolts turned when trying to turn off the nuts with a wrench; removed the shaft iron and found the tee nearly broken off and had been badly burned when someone had previously tried to repair it.

Uses Up Stock.

So he took a new piece of iron, "only" seven inches long, heated and scarfed one end of it, heated, upset and scarfed the other end; then he upset and scarfed the main plate where the tee was to be welded. Another heat was then taken of both parts this time, and the two were welded together and the edges beveled off and smoothed up a little, in workmanlike manner. But the iron had to be warmed up once more to get the center of the tee to line up with the centers of the bolt holes in the crossbar. Then it was cooled off and clamped on to the shafts and the tee was marked with a scratch-awl for the holes for the two bolts through the crossbar.

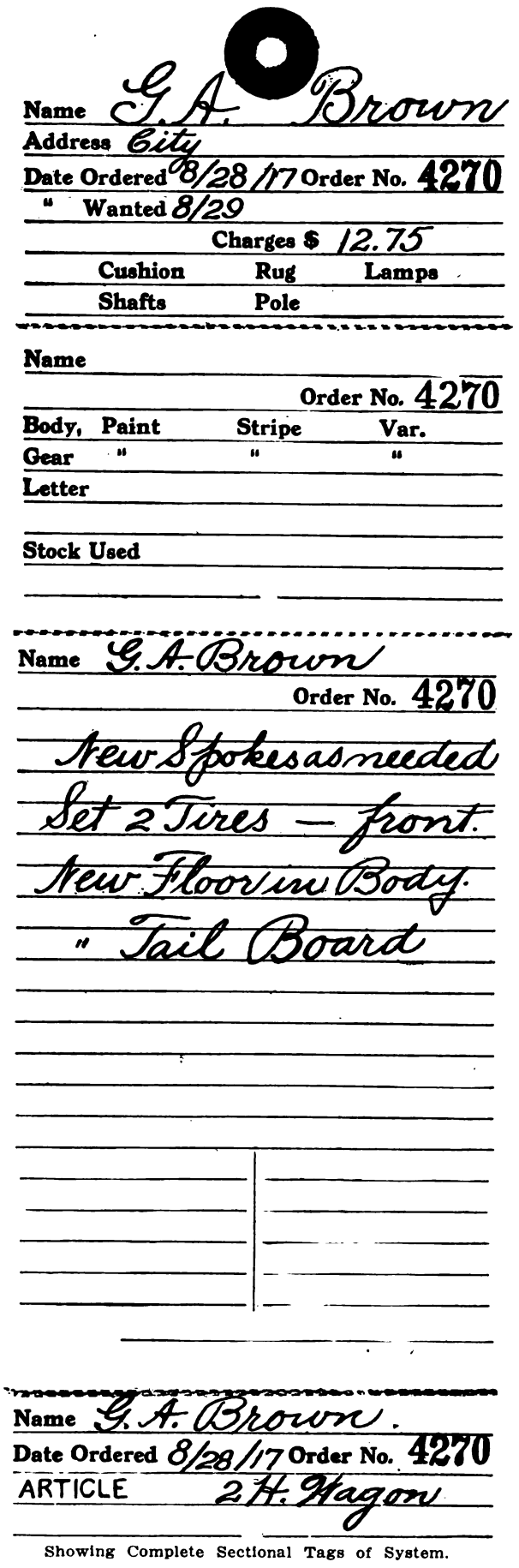
Onto the anvil she goes again and the center punch is quickly applied to the marks on the tee; the motor is started and the holes are soon drilled. He then placed the iron on the shafts, drove the ten bolts through and began "catching on" the nuts. The file had to be applied to the corners of several of the bolt ends before the nuts would catch. He had to put in two new bolts to replace some that were too poor to bother with, and then all were tightened with the wrench. The ends of the two new bolts were trimmed off and the ends of all the bolts were lightly tapped with a hammer to smooth down the sharp burrs and to keep the nuts from loosening.

Guesses the Price.

Then out into the yard again; the shackle bolts were driven in and the nuts turned up, with the use of two wrenches, of course; the anti-rattlers were driven in, the wheels were slipped back on and the axle nuts tightened.

"That's a good job," said the customer. "How much do I owe you?" "Well, I guess I must have worked a half hour. Give me 35 cents."

Yes, he worked a half hour, and 20 minutes more; gave away 20 minutes of hard labor, 10 cents worth of iron, eight cents worth of bolts, two or three cents worth of electricity and about 10 cents worth of overhead expense.



Showing Complete Sectional Tags of System.

It is commonly known that a large part of the blacksmiths do business, or rather conduct their affairs in the manner described in this incident. What degree of foolish qualities would the grocer be said to possess if he sold flour and sugar without knowing what they cost him?

The blacksmiths have the habit regularly, and yet how easily they could conduct a real business in substitution of their common game of chance. Take the case just referred to, for illustration. When the blacksmith left the job he was working on to go out and look at that shaft iron he should have made a quick notation of the time by the clock. Then he should have taken out with him an order blank and written down the order. Now perhaps some reader may think that order business is all tomfoolery and a waste of valuable time and good paper, but there are several reason why I don't, and the first and best reason why I don't is because I've tried both ways and know.

Value of System.

An accompanying sketch shows a form of order tag we use and we consider its use very profitable. It was planned and printed especially for the wagon repair business.

For such jobs as the shaft iron, which we have been considering, of course it would not be necessary to fill out the second section of the tag, which is for jobs that are going into the paint shop; and in case there were no paint shop connected with the business, this part of the tag might be dispensed with. Also, in cases like the one we are considering, where it is evident the job is to be cash and taken away when completed, it is not necessary to fill out the first section, but do use the third and fourth sections, tearing off the fourth section and inserting it on a pin in some safe place. These fourth sections, or stubs as we call them, serve the highly important purpose of checks on all work done. When the day is over, or at any chosen time, by referring to this collection of stubs, you can check off and be sure that every job done has been paid or charged. For this purpose alone the tag or order system will more than pay for its initial cost and all the time that will be necessary to keep it in practice. When a job is to remain on hand an indefinite length of time it is advisable to fill out the first section of the tag and leave it attached to the wagon, inserting in the proper place the amount of the charge, after the work has been completed.

Use Written Orders.

Another valuable feature of this system is having the written order available to anyone connected with the business, for it is not always the man who takes the order who does the work. Also, when there are several things to be done on the vehicle the memory of the tag is more reliable than that of the human, and this, too, frequently adds shekels to the income and credit to the system. Still another convenient feature—in case of a cash job done by someone not authorized to fix the price—he makes notations on the order of the time spent and stock used, and then the waiting cash customer may take the order to the proper person, who will then have the necessary facts for determining the charge. When cases like this occur the tag is marked paid, the amount being specified, and you then have a material reminder of an entry to be made on your cash book.

Accurate Cost Figures.

Well, it has been quite a while since our blacksmith made out the order to repair that shaft iron and we will assume that he has gone through the processes, previously described, and has finished the job, and now, since he has adopted some system, he looks at the clock again and finds he has worked 50 minutes on the job. So he takes his pencil (he didn't have one formerly) and sets down "50 min. Lab.," then he recalls the drilling and sets down "5 min. Motor." Good! He's getting the system into his system finally. Then he considers the stock that he used, and now don't be shocked, for he actually knows how much that little piece of iron weighed, because he has now got some scales nearby, and weighs every piece of iron he uses. "Iron 10c," "2 Bolts 8c."

The rate of labor has a considerable range of variety among readers of The Blacksmith and Wheelwright, but to take what is probably somewhere near the average rate, we will assume that our modern blacksmith in this case figured his time at 75 cents per hour. So he called his own labor 65 cents and the motor labor 15 cents, making a total

Digitized by Google

ts for the job, and he called it 90 make it even money.

Small vs. Large Charges.

ghly probable that at the present 0 or even $2.00 will be charged for b in large city shops, but the ob- is article is to promote the practice in the blacksmith business, and onsidered illustrates the difference in returns on a small job, where ent guesswork was the only rule, in the other event business sys- he practice. In the first event 35 received and in the other 90 cents, e of 55 cents. Let's see if we can the profits. The cost of labor is, the largest item of expense, and ssume that the rate of wages is er hour or 33 2/3 cents for the 50 here was not quite a pound of the he cost was so near a nickel he y a postage stamp with what was vo bolts cost 5 cents and the elec- l have to consider as a copper; nts.

Overhead Expenses.

re is also the overhead expense. blacksmith did this particular job ake much stock in this overhead iness; he had heard a little some- it, but guessed it didn't amount his business. However, at the cluded to adopt some system for his business, he realized that pense in his small shop was just ercentage as it was in a much ess. To be sure, he didn't have ve office help, nor plate glass high salaried superintendents v produced nothing, nor an ex- ing plant, but when his one as- sick a whole month, and he could to take his place, with a conse- ion of about 50 per cent in the usiness done, he saw there was n which the big shop had a de- age over him.

Question of Buying.

nsidered the advantage they had pplies in large quantities and n in orderly places where any e could be readily found; where- drop his work, clean up just nyway, and go down street to e store nearly every time he of iron, a half dozen of bolts e of screws; losing thereby, cent. of the shop's output while and paying more for the goods r competitor. Therefore, under f this reasoning, together with read in the trade papers, he erhead expense was probably as age as the other fellow's and figure it was 25 per cent. of se.

rcentage of Profit.

ase we have under considera- and stock are 75 per cent. of job and the overhead expense g 25 per cent.; in other words, per cent. of 60 cents, which is job for which he charged 35 ofits in this case are mani- tomer's and not the black-

consider the case where this lone after our blacksmith had ess system. The cost of do- he same as in the first event, reason of his enlightenment gets 90 cents for it, which of 30 cents, and reduced to 3 1/3, figuring on the gross asis for estimating the profit.

uring Percentage.

and one-third sounds pretty lacksmith could maintain this ld soon be able to sell out P. M. and retire for life; but can't do it and we can't tell it, either. We are in very position as the author of a n conducting a paint shop. w paint shops are conducted another paragraph he says the painters should figure profits at 50 per cent. It immediately struck us that there is pretty nearly an unfathomable abyss between no profits, or less, and 50 per cent. profit, at any rate, that's a problem in mathematics too difficult for us to solve; but if this chapter shall seem to merit another we will try to give you a little more "system" that may help you along towards 10 per cent. profit, which will abundantly satisfy most of us, and we will leave it to the painters to devise a system for netting 50 per cent.

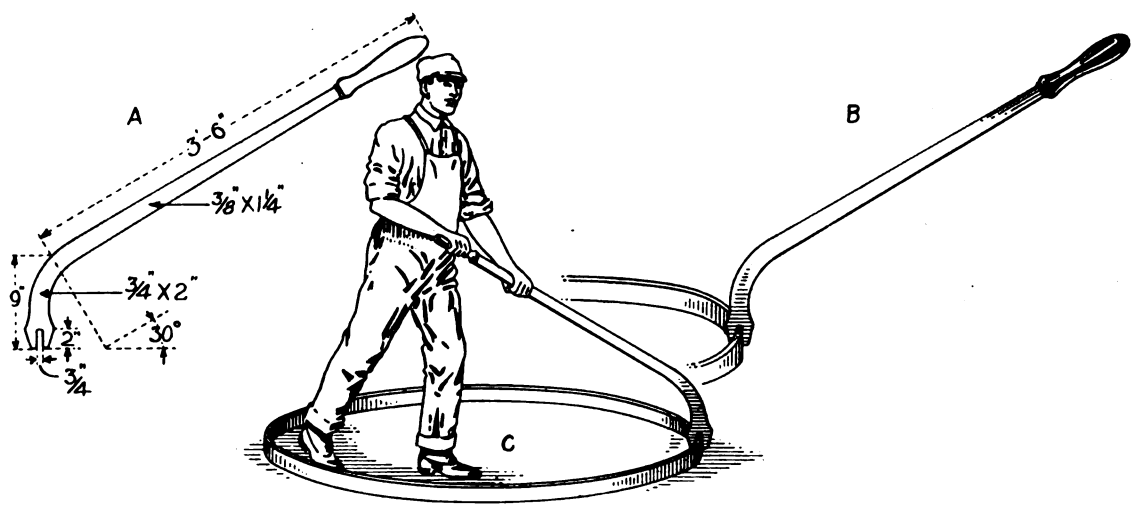
Ohio Smiths Raise Prices.

The smiths of Urbana, O., are meeting the high cost of living by increasing prices. The price of shoeing a horse all around is now $1.75, or 25 cents more than formerly. This is for light horses and light shoes. To shoe a heavy horse with heavy shoes costs the customer 25 cents more, the price having been advanced to $2. The heaviest shoe price is $2.25.

Prices for toeing, repairing and resetting shoes have been advanced. For small sized shoes the smiths now charge $1, while the larger sizes come at $1.20 and $1.40. There is no change in the price of calks, but pads have been raised to 50 and 75 cents. As Never Slip and drive calks have gone up, they now cost the customer three, four and five dollars per set, depending on the size.

The Hansen Tire Tool.

From Heber K. Hansen, Utah.—I have a tire tool which I made up myself and which makes easy the work of setting wagon tires. It may interest some of my brother smiths and if they make and use one I am sure they will never regret it. The accompanying illustration shows the tool in detail. The tool is made of mild steel. The sketch at A shows the tool in detail, all dimensions being given.



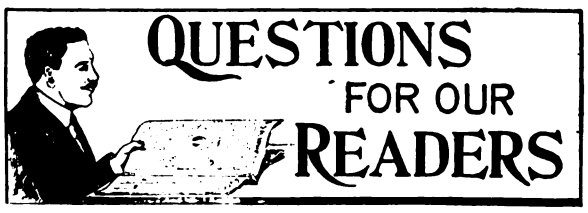
[Tire Tool Designed and Used by Heber K. Hansen.—With It Light and Heavy Heated Tires Can Be Handled Easily and Safely.

I set my wagon tires outside, heating them in an open fire and place the tires on top of each other, the small ones inside of the larger ones. When the tires are ready to be removed I place the tire tool on the outside tire, press the handle towards the ground and until the opposite or free side of the tire is clear of the other tires. I then draw it from the fire and as shown at B. Next I step inside of the tire and apply the tool as shown at C and place the tire on the wheel.

Light tires can be picked up out of the fire and carried to the wheel without changing the grip, but with heavy tires it is necessary to get on the inside. By getting inside you can carry the tire as far as desired, it being held in the tool by gravity, and being always balanced you can carry it with one hand. With my tool you avoid the possibility of burning your hands, scorching your face with the heat, and one can make one of these tools in about an hour.

The 2.10 List Is Growing.

Thirteen three-year-old trotters earned records of 2:10 or better in 1917, making a total of 92 now in the list. Ten of the lot are sons and daughters of Peter the Great, 2:07¼, and 23 trace to Bingen, 2:06¼, in the direct male line, while four more are from daughters of that horse. The Harvester, 2:01, 12 years old, is the sire of three in the list this year, with aggregate earnings of more than $20,000.



In this department our readers are invited to ask questions about anything concerning which they need information. There is no charge connected with it. It is as free as air. Questions require answers, and these often are as valuable to other readers as to the ones asking the questions. We urge all to make free use of this privilege. Fire all the questions at us you please. The more the better.

Making Use of Department.

As has been previously stated, this department is for the benefit of our readers and we want every reader to feel that he is at liberty to ask for information on any subject. For the benefit of new subscribers, it is explained that this department was inaugurated to assist our readers, give them information not readily and easily obtained elsewhere. The questions are published and answer is made in the department entitled Workshop Experience. That these departments are appreciated by the readers of The Blacksmith and Wheelwright is proven by the increasing number of questions received and the large number of answers published each month. Any reader is welcome to ask as many questions as he desires. Send in your questions at once.

Wants to Harden Nickel Steel.

From A. E. Schultz, Ohio.—I would like to know if there is any solution or compound for hardening 3½ per cent. nickel steel. If any of the craftsmen know of a solution or compound I will appreciate knowing of same.

Concerning Electric Motors.

From John Sefeik, Kansas.—What is the best make of electric motor and what horsepower will be needed to drive a trip hammer, emery wheel, drill, rip raw and disc roller?

Recutting Files.

From George Stiefvater, Missouri.—I have been a silent reader of your paper for some time, and as I need advice, am applying for same. Some time ago I saw a receipt of a solution for recutting old and greasy files. I mislaid this receipt and do not remember it. I will appreciate if you will publish same. I have been in the business since I was 13 years old and am now 22. I own and run my shop.

Turning Eye in Hoe.

From H. B. L., Kentucky.—Will some brother smith please explain how to turn an eye to a hoe? I mean the old fashioned hoe such as our grandfathers made and used.

It is better to buy an umbrella before it rains than it is to get wet before you decide as to whether you will need it or not.

A starved horse is not likely to pull anything heavier than himself, unless a stimulant is applied to the wrong side of his hide.

Digitized by Google

CONSTRUCTING A LATHE.

Final Installment and Dealing With Power, Drive and Speed.

BY W. O. MANN, M. E.

For some jobs it is necessary to have a face-plate with a screw center. This is made in the same way as the face-plate already described, except that it is about twice as thick and the hole that screws over the spindle nose does not go any deeper than is necessary for the threads to get a good hold. A wood screw of a size suitable for the work is put into the plate exactly at the center, putting it through from the back so that when the plate is in place on the spindle the point and thread of the screw will project and a piece of wood to be turned can be screwed to it and so held flat against the face-plate without a mark anywhere except in the center at the back. If it should be desired to work on a piece of wood without marking it in any way it can be attached to the face-plate with a few touches of glue, which will hold it firm enough for the purpose. A mere touch of glue is enough; too good a gluing job would prove embarrassing when it came to getting the block off the plate.

For turning comparatively long pieces that must be held between the centers a spur center is needed as a driver, to go in the headstock spindle, and a cup center for the tailstock. The simplest kind of a spur center is made by spreading out the large end of an ordinary center blank to, say, twice its original diametrical measurement and then grinding or filing it to a rather dull chisel edge divided into three points, one in the center and one on each side. The best kind of a spur center is made with a miniature face-plate about an inch in diameter, on the end of a taper center blank; at four equidistant points near the edge of the little disc, pointing toward the tailstock, are little pointed spurs, say, three-sixteenths long. These take a fine grip on the wood and drive well, but cannot sink in too far because the end of the work is stopped by the little plate. There are various other kinds of drivers, but this will serve to give an idea of the principles involved.

Turning the Cup Center.

The cup center for the tailstock may be turned from a blank center in the headstock spindle hole. The end of the center is simply formed into a little cup, but exactly in the center a spur projects, rising a little out of the cup, so that it enters the end of the wood first. Half an inch is a good diameter for a cup center, and the spur projecting from the cup may be about quarter of an inch long.

It will probably be found that it will pay better to buy these centers than to make them. It is no joke to turn tool steel, of which they must be made. Anyway, it is difficult to turn the tapers, and if the blanks are bought with the tapers already turned it will cost but little more to get the centers complete.

The same may be said of an iron face-plate. Ordinarily it is by no means an indispensable appliance; but if it should be wanted the best plan is to buy one in the shape of a rough casting and have it turned and threaded in a machine shop. In a general way the same remarks apply to the tools used for turning wood or metal. Many —in fact, most—of these can be made, but it is better for the man who is not familiar with lathe tools to buy his first ones and get a good start. For the man who is familiar with lathe work much that is said here will be exceedingly kindergarten; he can simply skip it altogether.

Methods Vary.

Any mechanic will see for himself that the methods described for building a lathe may be varied greatly—so much so that doubtless the builder will make changes to suit himself. That is one of the good points of the system. Necessarily the description is more in the nature of a suggestion than a set of hard-and-fast rules. It may be remarked, however, that it took a lot of experimenting to arrive at the methods described, and it cost a lot of time and pipe-fittings and shafting and babbitt.

Construction Is Simple.

In a construction as simple as this it is not practicable to make the bearings adjustable. As they are very long, however, they will last for a surprising time without sufficient wear to interfere with the operation of the lathe. When the wear does become excessive it is by no means difficult to rebabbitt the spindle, the process being exactly the same as first except that the spindle nose can be held true by running a pointed center into the hole in the tailstock spindle, or a long shaft used and clamped in the tailstock.

For turning metal two pointed centers are used, entering little recesses made with a sharp center-punch or, better still, with a small drill and a countersink of the proper taper, in the ends of the piece to be turned. A dog or clamp is placed on the end nearest the headstock, the end of the dog resting against a stud projecting from the face-plate or, if the dog has a bent tail, the tail enters a slot or a hole in the edge of the plate. A little oil should be put on the running center, which is the tailstock center. It is to be assumed, however, that he who builds a lathe knows something about running one; besides, instructions for various turning jobs cannot be given in a few sentences, so having brought the machine to running condition we may as well let the owner do the rest himself.

We have come all this distance on the

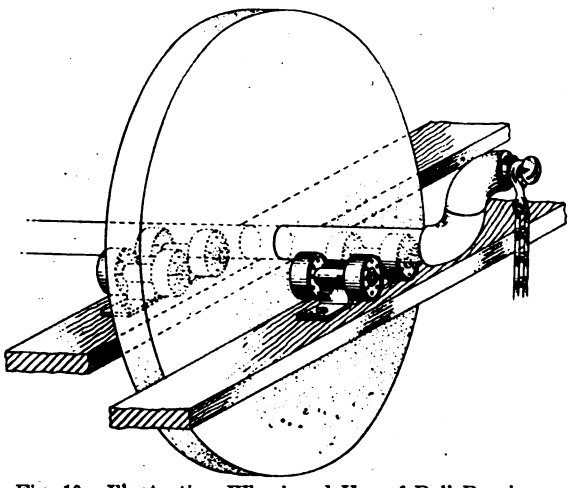


Fig. 10.—Illustrating Wheel and Use of Ball Bearings.

assumption that the builder has some sort of a foot-motion for running his lathe, or perhaps power. It often is the case that the foot-power part of the job is just as hard a nut to crack as the lathe proper, and it may be well to give a hint or two as to ways and means for making the wheels go round.

First it will be necessary to settle the question of the big driving wheel, and it is undeniable that it is quite a question. The price of a wheel or a heavy pulley of the proper size is a pretty serious matter, but if there already is one available a lot of bother will be avoided. It may be said that plenty of weight is necessary to keep up a steady motion under the retarding effect of the cutting tool; a light wheel will be too easily checked, and the result will be uneven motion which is as bad for the job in hand as it is tiring and exasperating for the turner. A diameter of 20 inches is about as small as it is practicable to use; but going to the other extreme, the wheel may be as large as can be placed in the lathe stand.

Making the Wheel.

Assuming that it is not desired to buy a wheel and there is none at hand, there are at least two ways in which wheels can be built. A good wheel can be built up of hardwood. Lay down side by side pieces of 1⅛-inch board enough to permit the marking out of a disc of the desired size. Mark the center and lay out the circumference with a pair of big compasses, or a stick with a nail for a center and a pencil stuck in a hole at the point marking the circumference; saw close to the lines. If you saw carefully you will have reason to congratulate yourself later on. Then do the same thing twice more—that is, make three discs. If the wheel is to be stepped, like the cone pulley on the spindle, make the same difference between the disc diameters that there is between the diameters of the steps on the cone. The middle disc will be two inches smaller than the biggest and the smallest will be two inches smaller than the middle one.

Before putting the disc together to form a single wheel bore the holes for the shaft, which is best made of one-inch steel pipe. Iron pipe is rather rough for this job and should be used only in a pinch. The reason for boring the holes before putting the boards together is that it is much easier to get the finished wheel true in this way than by boring afterwards. The pipe must be a tight fit in the hole. One-inch pipe measures, outside, 1.315 inches in diameter, which is a shade more than 1 5/16 inches. That is to say, such is theoretically the outside diameter. Actually it varies. Consequently it sometimes happens that a 1 5/16-inch bit will make a hole of exactly the right size for a tight fit, and sometimes it will not. The handiest tool to use under the circumstances is an expansion bit, with which the hole can be made exactly right by a little experimenting in odd bits of board.

Assembling the Wheel.

You will have to use some ingenuity in assembling the wheel. The simplest way is to set up the pipe shaft through a hole in a level bench, the pipe standing vertical and perfectly square with the bench; test with a square all round. Put the bored piece over it and lay the corresponding parts of one disc in position, and then over them put the parts of the second disc, but put them so that the grain of the wood runs at an angle of 45 degrees to the grain in the bottom disc—that is, half of a right angle. Put a layer of hot glue between and fasten the discs together with plenty of screws, being particularly careful to keep the edges of the pieces together as tightly as possible. Nails may be used, carefully clinched; but screws are better. Then put on the third layer at 45 degrees to the second, making sure that the grain of the last layer is at right angles to the grain of the first layer. Glue and screw, or nail, in the same way. Thus there will be grain running in three different directions, and there will be no danger of splitting or warping.

Steel Pipe for Shaft.

While the glue is drying the whole story of the shaft may be told. It is of steel pipe, as has been said, and the builder must decide upon the length in the light of other conditions. One end must be threaded and an ordinary elbow screwed on hard, and then secured by drilling and driving in a quarter-inch pin riveted over at both ends. Into the open end of the elbow screw another elbow, using a close nipple to make the connection and letting the open end face away from the shaft. This will be understood when it is explained that the two elbows are intended to form a crank. Screw a plug into the last elbow and drill and tap the plug for a ⅝-inch short cap-screw, which forms the crank-pin, a space of about half an inch being left between the plug and the head of the screw. A better crank arrangement couldn't be desired, and when it is connected with the treadle with a chain or a rod with a hook to catch over the crankpin it will work as smoothly and sweetly as if it cost ten times as much—which is what it would if it was gotten up in almost any other way. The object of using a chain or a hooked rod instead of a rigidly attached connecting rod is to prevent the squashing of one's toes should they accidentally get under the treadle while running, and also to prevent the smashing of some part of the machine should something more solid than one's foot get underneath. Of course, all the work ought to be done on the crank before the shaft is put into the wheel. Fig. 10 shows the assembly.

Ball-Bearing Wheel.

The wheel is to be hung between two bearings with the crank outside one of them, of course. About the smoothest and easiest running bearings that could be used on such a job can be made from an old pair of roller skates having ball-bearing wheels. Upon investigation it will be found that each pair

Digitized by Google

rith its axle is mounted on a steel
h can be removed in a unit from
nd the turned-up lugs of the plate
out flat to make a base. Upon
e supports for the shaft set two
ieels with their axles parallel, the
ictly opposite each other and a
bout half an inch between the
ie wheels at the nearest points.
od big stout wood-screw through
so that the rollers will be left
ve a little and adjust themselves
. It will be understood that this
it of two pairs of rollers or wheels
lace of one bearing or bushing.
s simply allowed to rest on the
wheels, so that it is carried by
ls altogether, and sixteen ball-
The friction in such an arrange-
slight that the wheel will rock
rth like a bicycle wheel with a
unbalanced weight. With the
ng close to one bearing, as it
the wheel of ample weight there
the slightest danger of raising
d of the shaft from its bearing

t Faces Must Be True.

on the wood wheel ought to be
time. Having the bearings all
t the wheel and shaft in place
e wheel over to see if the flat
ue. If they are true, so much
If not they will have to be made
ole through the wood wheel two
he shaft and parallel with it; the
tight for a ⅜-inch machine bolt.
es through the shaft, from side
is, through both walls of the
-inch eye-bolts long enough to
es on the machine bolt in the
ie nuts on the shaft on the far
haft.
n the shaft should be at a slight
while the eyes, through which
bolt passes, are against the
ds carrying the nuts are about
from the wood. The holes must
that by tightening the nut on
the wheel will be pulled in the
ded to true it, the other nut
se until this is done and then
d up; finally the nut on the
through the wheel is tightened,
le business is firmly tied to-
nly holding the wheel true but
it from turning on the shaft,
n would be insufficent to do.
heel subsequently get out of
tment can be made.

d Wheel Too Light.

heel will be too light to be of
driver, so it must be weighted
ay is at hand. Lead or iron
e bolted on, or, if facilities
iron rims might be put over
es, which, it should be added,
up with a turning tool, a block
ned to the floor serving as a
main thing is to get the face
running perfectly true, with-

lly excellent way to make a
is to cast it in concrete. In
concrete is poured around the
nas been drilled and two or
nch rods stuck through at the
e wheel is to be attached, pro-
five inches on each side. This
el practically one piece with
e difficult thing in making a
is to get the mold true and
with the mold. As to how
be made, it would be easy
f the cost was no object and
atus was available. In such a
there would be no need for a
so the maker must be left
r materials are at hand, and
It may be said that one very
heel was made in a clay mold
bottom, the shaft passing
in the bottom and being very
d up. The inner circumfer-
old was shaped with a flat
on the shaft itself, so that
wheel was compelled to true

with the center. As a matter of fact, this proved such a simple and satisfactory arrangement that it probably is as good as any. At any rate, the result was all that could be desired. A concrete wheel is plenty heavy enough without any extra weighting.

Figuring the Speed.

Now it is necessary to do a little mathematics. For satisfactory wood turning on small work it is necessary to have a speed of about 1,200 revolutions a minute of the headstock spindle. It is not comfortable to treadle more than about 60 strokes a minute, which means, of course, 60 revolutions a minute of the driving wheel. At this rate the spindle would have to make 20 turns to one turn of the driving wheel ($60 \times 20 = 1{,}200$), and it also means that the diameter of the driving wheel would have to be 20 times that of the smallest step on the cone pulley. As that step is two inches in diameter the wheel would have to be 40 inches in diameter, which is a mighty big wheel. In fact, it is almost out of the question. Higher spindle speed with a smaller wheel could be obtained by making the pulley smaller, but in a lathe for real work this is not advisable.

There is an alternative, and that is to make the driving wheel of convenient size—it should not be smaller than 20 inches, however—and drive to a countershaft and thence to the spindle. Moreover, if the driving wheel has a straight face, without steps, it will be essential to use a countershaft to get changes of speed and power. The countershaft may be mounted on bearings carried on arms extending back from the lathe stand, or it may be placed overhead. The only real difference is the difference in the cost of the belting. The countershaft may be of ⅝-inch steel shafting and will carry a cone pulley exactly like that on the headstock spindle, set, however, with the small step opposite the largest step on the spindle cone. There will have to be another pulley on the countershaft to take the belt from the big wheel, and the size of this must be determined.

Finding Size of Pulley.

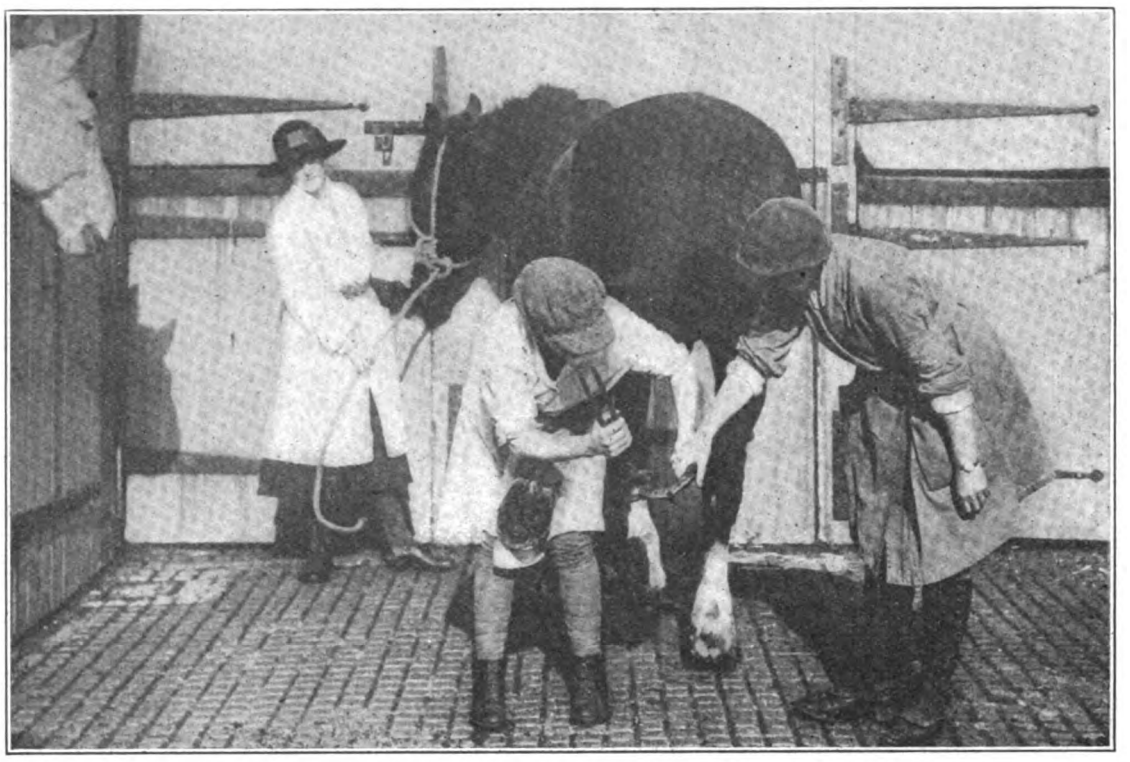
With the short belt on the smallest step of the lathe pulley and the largest step of the countershaft pulley and the spindle making 1,200 a minute, the countershaft pulley, being three times the diameter of the lathe pulley, will make one-third the speed, or 400 turns a minute. Now we want to find out what size pulley we want on the countershaft with a given size of driving wheel. Four hundred turns a minute will be 6.66 (or 6 2/3) turns for each revolution of the driving wheel. Therefore the driving wheel must be 6 2/3 times larger than the countershaft pulley. So if it is figured that the driving wheel is to be 24 inches in diameter, for instance, the pulley will be 3.6 inches in diameter. This is reached by dividing the diameter of the driving wheel by the number of turns of the countershaft for each turn of the driving wheel. Thus, $24 \div 6.6 = 3.6$. If the driving wheel can be but 20 inches in diameter the pulley will have to be three inches in diameter, and any other proportions can be easily figured in the same way. If two wheels belted together are of the same diameter they will run at the same speed. If one is twice as large as the other, the small one will run at twice the speed; if there is a a difference of eight times in the diameter there will be a difference of eight times in the speed.

Issues Annual Report.

The 45th annual report of the Carriage Builders' National Association of the United States is being distributed by that organization. It contains a very comprehensive report of the 45th annual convention held recently as well as a list of the officers, members, etc. The book is nicely printed and containing as it does over 124 pages should prove of unusual value to the members of the association.

Women Conduct Hospital.

England appreciates the role being played by horses in the war and the fact that horses must be given as good attention as the men in the army or navy. Numerous hospitals have been established for the treatment of wounded and injured horses, and an accompanying illustration shows English women enacting the role of veterinaries and removing a shoe from a sick horse. These women are employed at McNamara's horse hospital, the employees of which are women. The incident illustrates how women are taking up professions formerly practiced by men only.



English Women Veterinaries Removing Patient's Shoe.

Minnesota Men Organize.

At a meeting of organization held at Shakopee, Minn., the horseshoers of that section and towns in the vicinity were organized. At the meeting of organization the following officers were elected: President, Theodore Jaspers, Shakopee; secretary, H. R. Grosser, Jordan; treasurer, Peter Powers, Marystown. This local, which will be known as No. 814, is expected to increase rapidly, as the territory includes a large number of horseshoers. Meetings are planned at which the question of prices is to be threshed out. Among those represented at the meeting of organization were: G. L. Trimbo, Blakely; H. J. Dorn, Jordan; John F. Unze, Shakopee; A. W. Sticha, New Prague; Frank Pomje, New Prague; Frank Dvorak, New Prague; H. Paulson, New Jordan; R. P. Lynch, Belle Plain. The success of the organization is due to the enterprise of W. J. Horrigan.

Digitized by Google

THE MACHINE SHOP

Readers are requested to supply information and to ask questions in relation to matter for this department. The range of subjects must necessarily be broad, and it is hoped that it will improve and simplify small machine shop practice as well as make it more profitable. Its value will largely depend upon the co-operation extended by our readers.

LATHE WORK.

Face-Plate or Cross-Feed Turning—Turning a Cylinder or Disc.

BY TOM SCOTT.

No. X.

When a flat surface of considerable diameter is to be turned in a lathe and it be necessary to have said surface very true, straight or "level," as the carriage builder would term it, then extra precautions must needs be taken to keep the cutting tool up to its work. Failing to do so, the finished surface will prove to be anything but a true one

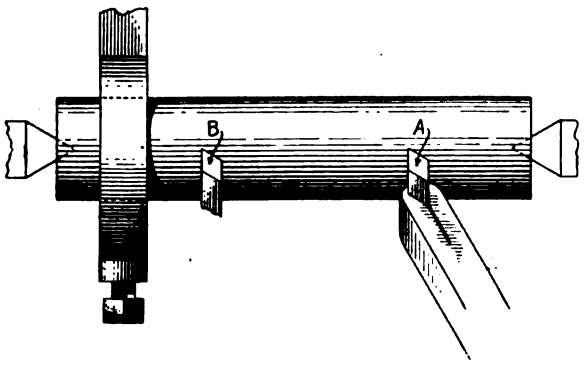


Fig. 1.—Showing Possibility of Increase in Diameter of Work When Turning.

when tested by a straightedge laid across it.

When a tool is cutting along the side of a straight piece of metal as shown at Fig. 1, then the tool is really cutting along the side of a cylinder and always reaches the metal at the same angle and at the same number of feet per minute. When the cutter wears a little, becomes slightly dulled, the diameter of the cylinder is slightly increased. This is about the only effect observed by the lathesman, who follows the cutting tool very closely with a pair of calipers or with a micrometer and who very quickly detects the increase in diameter.

When Diameter Increases.

Thus, when the tool has moved along from A to B, the only difference noted might be an increase in diameter of the cylinder of perhaps a quarter of a thousandth of an inch. This amount, you perhaps say, amounts to nothing. That is, it cannot be detected by any ordinary pair of calipers—but, here, you want to have a care as to what you are saying, for a quarter of a thousandth, which is .00025, may be easily detected by any ordinary pair of calipers, either spring or screw-set.

Mind, that I am not saying that so small an amount may be measured by the ordinary calipers, for it cannot. You can't tell what fraction of an inch lies between the points of the calipers, but you can tell that one end of the turned object is larger than the other.

Indeed, it is quite possible to detect that difference in diameter in the turned cylinder without the use of even calipers. The fingers will do the trick. All that is necessary is to place the thumb and forefinger lightly against the work, grasping it as though the thumb and fingers were the legs of a pair of calipers. Then, move the fingers along the work, pressing it lightly, and any increase or decrease of diameter as the fingers are moved along, will be detected instantly, and that, too, without any extra sensitiveness of the fingers. In fact, any blacksmith can easily do the trick, and without much if any practice.

Thus it is quite easy to detect tool wear when turning straight work, but when it is required to "face off" some surface of large diameter, then some factors enter the problem which the smith-machinist has not before been "up against."

Fig. 2 shows the new conditions. The problem is to start the tool at the edge of a disc and traverse the tool until it reaches the center and leaves behind the tool a smooth, true, flat surface. In this case the tool wear cannot be detected by the calipers. Should the tool be sharpened during its transit across the disc, there would be left a very different appearing surface after the sharpened tool had left a finished space behind it.

The position of the tool vertically also has a good deal to do with the manner of its cutting when working on a disc. On cylinder work the tool, however it has been set, may be depended upon to cut along in the same manner in which it started, to the end of the work if permitted to do so. But on disc work the tool behaves in an entirely different manner.

Should a tool be started to work, set as shown at C, it will be impossible to turn all the surface of the disc, for the tool will "run out" before it gets to the center, and there will be left an unturned space in the middle with a diameter twice as great as the vertical distance between the point of tool C and horizontal center line G.

Set Horizontally.

Thus it is made evident that for disc or face-plate turning, the tool must always be set horizontally upon the center line of the work and that any departure in the tool setting therefrom will leave an unfinished spot in the very center of the disc. It is necessary then, when setting a tool for disc turning, to always find the center of the work as shown at E, then bring the tool to this point, and having fastened the tool at that height, it may be traversed by means of the cross-feed screw to the edge of the disc.

Or, the turning may begin at the center and progress toward the outside. There is nothing to prevent, save that the tool may needs be set different for turning from the center instead of towards it. Still, it is quite possible to so grind a tool so that it will cut in either direction. Indeed, it is often done, so that one cut is taken toward the center, then the tool is advanced a bit and another cut is taken from the center of the work. To locate the center E, place the tool in its holder and bring it against the revolving work as close to the center as the eye can judge while the work is running. A small circle may be made by the tool, and then another setting of the tool will usually locate it "dead center."

Having thus properly located and set the tool, there are two other conditions to be met

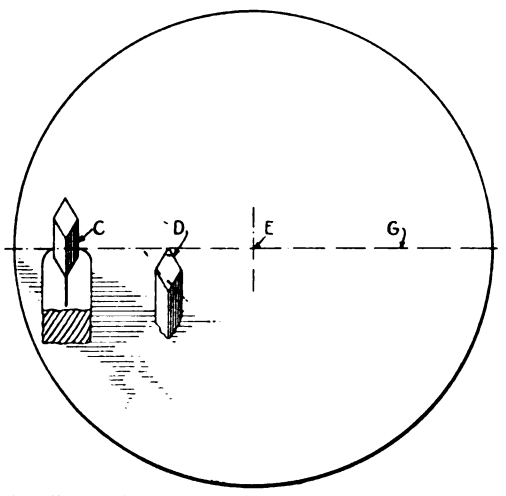


Fig. 2.—Illustrating Difficulties Experienced When Turning a Disc.

and these are: When turning near the outside edge of the work, as at C, the cutting speed will be much faster than when the tool has progressed to the point shown at D. And when the tool gets nearly to the center E, the cutting speed has been reduced nearly to zero, and the tool shows in its work the effect of this change in cutting speed. Sometimes the effect is shown in a very plain and undesirable manner.

How to get over this trouble is a problem which each smith-machinist must work out for himself, as best he can. When working on a small disc give the work as high a speed as possible and permit the tool to cut at the circumference of the work. By the time the tool has arrived at the center, the speed, although very slow, will be such that the tool will do its work after a fashion.

But should the disc be a very large one, then it would hardly pay to try to turn the central portion at the same slow speed necessary at the outer edge. Therefore the speed of the lathe spindle must needs be changed once or twice and every time the tool is traversed from circumference to center or back again, something one does not like to do, but very necessary nevertheless, in some cases.

Points to Be Considered.

But there is one more important point to be taken care of, and then the smith-machinist will be left to try the real work and to do the best he can under the foregoing instructions. The other thing is this. As the tool moves toward the center of the disc, it is being brought against the work at a different angle of approach and unless the tool be ground in a suitable manner it may be unable to meet the work at a constantly changing angle and perhaps be unable to cut at all.

Keep this matter well in mind when setting a lathe tool for face-plate work, and if necessary traverse the tool to the center of the work. With it there you can more easily see how the tool should best be ground so as to be able to take a cut straight ahead at the edge of the work, and "sidewise" to a greater extent, as the tool approaches the center of the work at E.

WILL MEET IN CINCINNATI.

Next Convention of C. B. N. A. to Be Held September 23-28.

At a meeting of the executive committee of the Carriage Builders' National Association it was decided to hold the 1918 convention at Cincinnati, O., that city having received the greater number of votes. It was also decided that only two regular sessions will be held, Tuesday and Thursday morning, September 24 and 26, and that Wednesday be given entirely to the accessory exhibit. It was also decided to hold a special meeting of the carriage builders on Wednesday afternoon of the convention.

P. E. Ebrenz was selected as a representative of the Carriage Builders' National Association, as national counselor in the National Chamber of Commerce. The following terms were arranged for the newly elected members of the executive committee: W. H. Roninger, Theodore Luth, W. R. Maxwell and Frank H. Delker to serve the regular term of three years; A. C. Hill to serve two years, to complete the unexpired term of T. M. Sechler; E. J. Schlamp and W. G. Norman, one year, completing the unexpired terms of C. O. Wrenn and J. D. Dort. One of the features in connection with the annual meeting of the executive committee was a banquet tendered to the members by the new president, Thomas M. Sechler.

Navy Air Service Wants Blacksmiths.

Blacksmiths are in demand for ground service in the Naval Flying Corps. An excellent opportunity is offered at the present time in order that the abilities of expert blacksmiths may be utilized in preparing and maintaining sea planes.

After instruction, enlisted men are eligible for appointment as first and second-class petty officers in the Naval Flying Corps. On the basis of 10 men to every flyer, about 8,000 men are needed to complete the organization of the corps. Navy recruiting officers are making a special effort to complete the personnel at an early date.

Enlistment as a mechanic in the Naval Flying Corps now stationed at Great Lakes, Ill., is by application to Lieut. Lee Hammond, Naval Flying Corps, U. S. Naval Training Station, Great Lakes, Ill.

Digitized by Google

MONG THE MICHIGAN SHOPS.

Arrangement of Bench Vises—Novel se of Lag Screws—Auto Work.

BY JAMES F. HOBART, M. E.

a Michigan smith working a cute ecently. He was putting up some angers in his shop and expected to take down the hangers now and then to make some pulley changes. The were to be put up with lag screws, smith, realizing the amount of work ig out screws eight inches long, made short cut as follows: He procured (coach) screws which were an inch nan was needed, cut the heads off, the cut-off ends and screwed on place of the heads. Whenever it is to remove a hanger the nuts can d off the lag screws and the hangers This is much easier than backing rews well bedded in solid floor joists.

Michigan Shop Kinks.

is a mighty fine little two-fire shop ayne county, which seems particu- fitted for doing good smith work. on may be because of the very ap- name possessed by the blacksmith and runs the shop. His name is id no other name could be more te.

op is built of concrete blocks with a oof covered with roofing felt. The cast-iron affairs, made with coal troughs attached. These are placed he chimneys which are built into of the shop and project therefrom ide of the shop wall and far enough mple flue area in the chimneys, ich has been built for each fire.

Catches Fire Gases.

tely above the level of the forge has been left in the chimney and openings the bricks have been bout five inches to form a slight catching fire gases. The bricks chimney opening were corbelled flush with the body of the chimney e a distance of two feet above the the fire opening or level with top e had been reached. This made it heat tires larger than 24 inches r, to roll them off the fire when vithout having to lift each tire order to get it past a hood or mass of brickwork.

ers are driven by built-in electric motor and blower being attached e base and enclosed in the same asing and upon the same shaft. s are placed close to the forges, t or two distant therefrom, and upon a narrow shelf built against the shop along the side where the and this shelf was broken only butted against the chimneys.

lf is shown at A and B. Each laced upon bench AB, and is con- ctly at the motor, which is thus thin easy reach of the smith as n working position by the forge. aining portions of the shelf, not the motors, is covered, as thickly with shoe nail boxes which, after re utilized for the supplies needed h. Nuts, washers and purchased kept in these nail boxes and are tly available. The box containing l articles can be taken from the rried directly to the job if neces- required number of pieces are ailable without search.

Handy Vise Benches.

e most noticeable features in this e vise benches which are joined gles to the wall bench as shown . The wall bench is made of a about 12 inches wide and the are of the same material.

two vise benches in this shop, four feet in length. Posts FF outer end of each vise bench. are set about two feet deep in floor and the earth underneath very rigid supports both for the vise benches and the leg vises which were attached to said benches as shown at H and L.

As shown, the vise at H is set at an angle with the bench C, the outer end of the plank being cut away at its outer corners to prevent any person or material from striking against said corners to their possible injury. The plank legs, EE, are placed under the junction of each vise bench with the wall bench as shown and further stiffened by a plank shelf at GG.

These shelves greatly stiffen the vise benches and form very convenient places whereupon tools can be kept. The tops of the several vise benches are reserved for tools and it is to the credit of this smith that no scrap or "junk" is to be seen upon the benches or anywhere else about the shop save in the places devoted to the keeping and storage of such scrap and other material. There is no cluttering up of benches in this shop, and the owner smilingly assented to the remark that narrow benches prevent the accumulation of a whole lot of things.

Tongs Racks.

At the side of each vise bench, at I and K, may be seen a rod of ¾-inch steel which was forged and bent as shown and fastened strongly to the benches. Upon these rods are kept the tongs which may not be in constant use upon the forge. They are always in full view, may be selected in an instant and without having to hunt through a pile of tongs either on the floor or in the slack tub, a very poor place for keeping tongs in the writer's estimation.

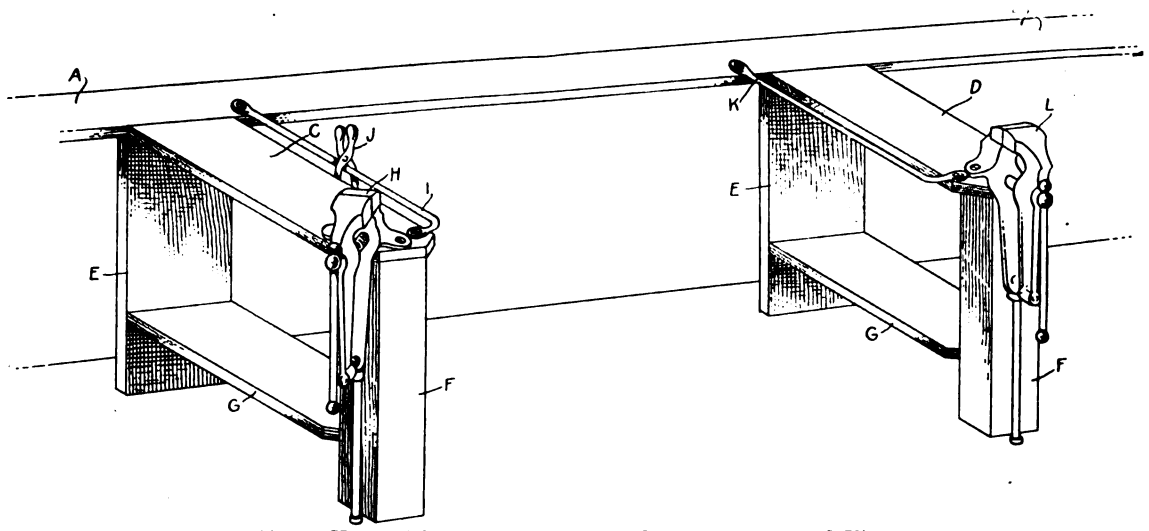
A pair of tongs is shown upon rod I at J left of the feet of an anvil placed upon the plank which was interposed between the anvil and the timbers described above. The anvil is securely pinned to the plank in the usual manner by pieces of round iron driven into the wood around the feet of the anvil.

The end of each anvil-plank which projected to the left is fitted with a piece of band iron, bent to fit the width of the plank and fastened to the end in such a manner as to form a clip on the end of the plank, its upper edge rising about three-quarters of an inch above the plank. The object of this clip is to prevent from falling off any articles which may be placed upon the plank.

The space thus fenced in is utilized for the keeping of such punches as are in constant use all the time at the anvil. With these punches at hand just where the left hand can find and grasp them easily and readily, quite a bit of time is saved from fumbling after punches which might be on the anvil block, upon the floor, or perhaps on the top of the forge, partly or wholly hidden in the coal and dust, etc. And, I noticed that Mr. Blacksmith Smith never spent much time in looking for or finding the tools he wanted. They always were where they belonged, and invariably that place seemed to be just where the tools were needed and were to be used.

Automobile Repairing.

The writer always likes to talk with the smiths, in whose shops he chances to visit, in regard to taking up automobile repairs. Noting a copy of The Blacksmith and Wheelwright on the desk, together with one or two



Shows How Michigan Smith Arranged Work Bench and Vises.

and a considerable number of pairs of tongs can be disposed along rods I and J, where nothing but tongs are permitted. The vises H and L are attached to the benches in different ways. Vise H is attached to one of the sawed-off corners of a bench, while vise L is set right against the end of the bench. This was done to allow a little more room past the end of bench C, while there was not the need of room economy at D, therefore that vise (L) was placed squarely against the end of its bench.

Anvil Mounting.

A peculiar method of anvil mounting was used in this shop. The anvils used being those made especially for shoe fitting, being made very long with a very narrow face and with the beak very heavy, thick at the large end and quite long. In fact, the whole length of the anvil from one end to the other is about 32 inches. The hardy hole is set back six inches or more from its end of the anvil. There are two holes about one-half inch or more in diameter through the anvil between the hardy hole and the end of the anvil, two small holes instead of the one which is usual to anvils, and each hole is placed near a corner of the anvil.

Each anvil seemed to be placed upon the upper end of two timbers, each about 7 by 10 inches, placed together flatwise and apparently securely fastened together. These timbers were evidently carried down some distance below the floor and bedded solidly in concrete.

On top of each pair of timbers which thus formed a fine anvil block is placed a piece of 2½-inch plank, about 12 inches wide and long enough to project at least 4 inches to the other trade journals, the writer asked Mr. Smith if he had ever done any automobile work or intended to get into that business.

"We may have to do it," he replied, "if the shoeing keeps falling off as it has done, for I am not doing nearly as much of that work as I used to do. Yes, I have an auto in here once in a while, but I don't have to go after that work, just take and do what comes to me. There are three garages in this town and I get a good bit of work from them—crooked axles, broken springs and all that sort of thing, you know."

"Yes, Mr. Smith, but that is the poorest part of automobile repairing; there is nothing in it for you except an hour or two of time. Why don't you put in an air pump and place a gasoline supply at the curb, then you can work into auto repairs and get that part of the business which pays much better than the straightening of axles or the mending of springs?"

"Yes, I suppose I could, but I don't see how I can attend to both kinds of business. By the time I would get at an automobile job two or three horses would come in to be shod and I would have to attend to them, so what would be the use of trying to do two things at the same time?"

"All the use in the world, Mr. Smith. You would need to have a man to help you in any case, and one man can shoe a horse or two, same as you are doing now, while the other man attends to the most pressing of the automobile work. See?"

"Yes, it might work out that way, but I don't feel like taking the risk with three other repair places in town. Think I had better stick to shoeing and wagon ironing

Digitized by Google

for a time longer, anyway, even if I don't do quite all I might handle."

Reading The Blacksmith and Wheelwright.

"You take The Blacksmith and Wheelwright, Mr. Smith, I see," said the writer. "Do you ever read the stories by James F. Hobart, in that paper?"

"By Hobart? No. Don't remember that I have. You see, I don't have much time to read so I don't look at the papers much. Suppose I ought to read it more, but you see I don't get the time," and then Mr. Smith stopped work at fitting a horseshoe and started to cut a thread on a brace-rod for a customer who entered the shop expecting to find the brace finished—but it was not!

The iron proved too small for a full thread with one die, and too large to enter the smaller die. Therefore the smith cut the thread with the larger die, then ran the smaller die over the thread which had already been cut to a different pitch, and thus succeeded in starting the smaller die-plate. Would you like this kind of a thread on any of your work?

WHY THE LIBERTY BOND.

Thrift, the Indispensable Prerequisite of Victory.

Nearly everyone will remember the ancient fable of King Midas, to whom it was vouchsafed that whatever he touched should turn to gold. Whereupon the venerable and greedy monarch approached the brink of the grave from starvation and was only saved at the last moment, when the gods withdrew his magic gift.

But a great many people still believe that gold, or money, can feed and clothe armies and navies, though King Midas couldn't live by it; can produce ships and shells and guns by some process of alchemy which they don't pretend to explain.

The fact is, of course, that money (and the same holds true of bonds, even Liberty bonds) produces no more than do poker chips or brass checks or any other convenient tally. It is equally as edible; it kindles no better fire; it can be shot from French 75's with about the same effect. Civilization has simply confused our minds with its complications. But if we go back to first principles the case becomes clear. No one ever accused the Indians of making war with wampum.

The things which are productive, which do count, whether in the support of King Midas or Uncle Sam, are goods and services, things to eat and wear and shoot and the human labor which produces and consumes them. Only, this labor must produce more than it consumes, since it is on this surplus alone that the army and navy and all related services, whether at home or in France, subsist and function. Every loaf of bread and bag of coal which our present economy provides is grist to their mills; every servant we can give up who might be employed in a munition plant or on the farm—and this applies to bootblacks and delivery boys and the many others who pander to the laziness of all of us, as well as to butlers and ladies' maids, etc.; and every minute of our own labor which we could make more productive strengthens the nation's fighting machine.

"The gospel of goods and services is the gospel which, in season and out of season, the National War Savings Committee has been preaching throughout Great Britain for the last 18 months. The war can be paid for only out of savings."

These are the words of Basil P. Blackett, of the British Treasury, in an address before American bankers last September. On this same occasion he also said:

"These resources cannot be increased by any juggling of finance. It does not matter to the gunner whether the shell which he is firing cost half as much or twice as much as it would have cost in 1913. What matters is that he should have the shell."

It is the duty of every man, woman and child in the United States to produce more and consume less, and then to pass over to Uncle Sam through the purchase of Liberty bonds the savings which he has effected in this two-fold manner. The next sale of Liberty bonds can be of no value to the Government unless those savings of goods and labor are now being made for which the money which the Government borrows can be exchanged.

In a war which is taxing the capacity of every nation engaged, thrift becomes the indispensable prerequisite of victory.

Index to Advertisers.

Akron-Selle Co., gears 29
American Calk Co., calks ..... Front cover
Anti-Borax Compound Co., welding compounds 7
Armstrong Mfg. Co., bolt dies 26
Armstrong-Blum Mfg. Co., punches and shears ..... Front cover
Bailey Co., Geo. D., ball thrust bearings 3
Barcus Mfg. Co., horse stocks 1
Bertschy-Bermo Co., welding plants, Front cover
Barnett, G. & H., Co., files and rasps, Front cover
Bicknell Mfg. & Supply Co., dies 4
Bradley, C. C., & Son, shaft coupler 30
Buffalo Forge Co., blacksmiths' tools 7
Burden Iron Works, horseshoes ..... 3d cover
Bush Motor Co., automobiles 29
Butterfield & Co., taps, dies and screw plates 8
Campbell Iron Co., supplies ..... Front cover
Canedy-Otto Mfg. Co., blacksmiths' tools 30
Champion Blower & Forge Co., blowers 3
Capewell Horse Nail Co., horse nails, Front cover
Champion Tool Co., blacksmiths' tools 28
Chandlee & Chandlee, patents 26
Columbus Anvil & Forging Co, anvils 26
Columbus Forge & Iron Co., anvils 32
Cortland Specialty Co., welding compound, 4th cover
Cortland Welding Compound Co., welding compounds 4
Cray Bros., blacksmiths' tools 27
Crescent Machine Co., woodworking machinery 29
Diamond Calk Horseshoe Co., horseshoes 2
Durner, A. E., disc sharpeners 6
E. D. Gear Mfg. Co., gears ..... Front cover
Edwards, C. D., shears ..... 4th cover
Electric Blower Co., blowers 8
Electric Wheel Co., wheels ..... Front cover
Empire Mfg. Co., wheels ..... 4th cover
Felton, Sibley & Co., paints 1
Firestone Tire & Rubber Co., tires ..... 2nd cover
Fisher & Norris, anvils and vises 8
Ford Relief Spring & Frame Supporter Co., spring supporters 30
Franklin Steel Works, toe calks ..... 2nd cover
General Welding Co., welding outfits, 4th cover
Giant Grip Horse Shoe Co., horse shoe calks 27
John A. Gifford & Son, carriage and wagon materials 32
Gillette Clipping Machine Co., clipping machines 26
Gogel Mfg. Co., tire heaters 26
Greenfield Tap & Die Corporation, screw plates and blacksmiths' machinery 4
Gwilliam Co., ball bearings ..... 4th cover
Hart Mfg. Co., stocks and dies ..... 4th cover
Harvey Spring & Forging Co., auto springs ..... 3rd cover
Hawkeye Mfg. Co., hammers 8
Hay-Budden Mfg. Co., anvils ..... 4th cover
Heller Bros., horse rasps, tools, etc 8
Higgins Spring & Axle Co., springs 2
House Cold Tire Setter Co., tire setters, hollow and spoke augers ..... 4th cover
Imperial Brass Mfg. Co., welding outfits 32
Jenner, H. W. T., patents 25
Kerrihard Co., hammers ..... 3rd cover
Kimball Tire Case Co., tire protectors 6
Linde Air Products Co., oxygen 8
L. S. P. Calking Machine Co., calking machines 3
Little Giant Punch & Shear Co., punches and shears 7
Lourie Mfg. Co., blacksmith tools 30
Macgowan & Finigan Cordage Co., hammers ..... Front cover
Mayer Bros., hammers 29
Mayer Bros. Co., hammers 2
Ness, Geo. M., Jr., steel stamps ..... Front cover
Neversiip Works, horseshoe calks 5
Nicholson File Co., files and rasps 6
Oneida National Chuck Co., chucks, Front cover
Parker, C. L., attorney ..... Front cover, 25
Parks Ball Bearing Machine Co., woodworking machinery 6
Peck, Stow & Wilcox Co., pincers 32
Phoenix Horseshoe Co., horseshoes and toe calks 31
Porter, H. K., bolt clipper ..... 4th cover
Prentiss Vise Co., vises ..... 4th cover
Radical Rubber Co., hoof pads ..... Front cover
Rosewater Electric Co., blowers ..... 3rd cover
Root-Heath Manufacturing Co., grinders 1
Sheldon Axle & Spring Co., axles 28
Skow Mfg. Co., disc sharpeners 26
Standard Horse Nail Co., horseshoe nails, 4th cover
Standard Horseshoe Co., horseshoes, 3rd cover
Star Mfg. Co., agricultural implements, 4th cover
Stokes Bros. Mfg. Co., rasps ..... Front cover
Superior Oxy-Acetylene Machine Co., welding outfits 26
Turner Brass Works, welding outfits 2
Thompson Tuyere Iron Co., tuyere iron, 4th cover
Union Horse Nail Co., horseshoe nails ..... —
United States Horseshoe Co., horseshoes, 2nd cover
Warren Tool & Forge Co., blacksmiths' tools ..... 4th cover
West Tire Setter Co., tire setters, hammers 27
Wheel, B., Top & Hardware Co., supplies 29
Whisler Mfg. Co., nut splitters, jointer heads ..... Front cover
Witte Engine Works, engines 29
Young, W. F., veterinary remedies 1

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co ..... 4th cover

Anvils
Columbus Anvil & Forging Co 26
Columbus Forge & Iron Co 32
Fisher & Norris 8
Hay-Budden Mfg. Co ..... 4th cover

Attorneys
Parker, C. L ..... Front cover, 25

Automobiles
Bush Motor Co 29

Automobile Springs
Harvey Spring & Forging Co ..... 3rd cover

Axles
Sheldon Axle & Spring Co 28

Ball Bearings
Gwilliam Co. ..... 4th cover

Blacksmiths' Tools
Buffalo Forge Co 7
Butterfield & Co 8
Canedy-Otto Mfg. Co 30
Champion Blower & Forge Co 3
Champion Tool Co 28
Cray Bros 27
Greeneld Tap & Die Corp 4
Heller Bros. Co 8
Lourie Mfg. Co 30
Nicholson File Co 6
Peck, Stow & Wilcox Co 32
Warren Tool & Forge Co ..... 4th cover

Blowers
Buffalo Forge Co 7
Champion Blower & Forge Co 3
Champion Tool Co 28
Electric Blower Co 8
Rosewater Electric Co ..... 3rd cover

Bolt Dies
Armstrong Mfg. Co 26
Greenfield Tap & Die Corp 4

Bolt and Rivet Clippers
Porter, H. K ..... 4th cover

Calking Machines
L. S. P. Calking Machine Co 3

Calks, Horseshoe
American Calk Co ..... Front cover

Calks, Toe
Franklin Steel Works ..... 2nd cover

Carriage and Wagon Materials
John A. Gifford & Son 32

Chisels
Champion Tool Co 28
Peck, Stow & Wilcox Co 32

Chucks
Buffalo Forge Co 7
Oneida National Chuck Co ..... Front cover

Clipping Machines
Gillette Clipping Machine Co 26

Dies
Bicknell Mfg. & Supply Co 4

Drills
Buffalo Forge Co 7
Champion Blower & Forge Co 3
Witte Engine Works 29

Disc Sharpeners
Durner, A. E 6
Mayer Bros. Co 2
Skow Mfg. Co 26

Farriers' Tools
Barnett, G. & H., Co ..... Front cover
Champion Tool Co 28
Heller Bros. Co 8
Peck, Stow & Wilcox Co 32

Files and Rasps
Barnett, G. & H., Co ..... Front cover
Nicholson File Co 6
Stokes Bros. Mfg. Co ..... Front cover

Forges
Buffalo Forge Co 7
Champion Blower & Forge Co 3

Gasoline Engines
Witte Engine Works 29

Gears
Akron-Selle Co. 29
E. D. Gear Co ..... Front cover

Grinders
Root-Heath Mfg. Co 1

Hammers
Champion Tool Co 28
Hawkeye Mfg. Co 8
Kerrihard Co. ..... 3rd cover
Macgowan & Finigan Cordage Co., Front cover
Peck, Stow & Wilcox Co 32
Mayer Bros. 29
Mayer Bros. Co 2
West Tire Setter Co 27

Hollow Augers
House Cold Tire Setter Co ..... 4th cover

Hoof Pads
Radical Rubber Co ..... Front cover

Hoof Parers
Champion Tool Co 28

Hoof Nippers
Champion Tool Co 28

Hoof Shears
Champion Tool Co 28

Horseshoes
Burden Iron Works ..... 3d cover
Diamond Calk Horseshoe Co 2
Phoenix Horseshoe Co 31
Standard Horseshoe Co ..... 3rd cover
United States Horseshoe Co ..... 2nd cover

Horseshoe Calks
Giant Grip Horse Shoe Co 27
Neversiip Works 5

Horseshoe Nails
Capewell Horse Nail Co ..... Front cover
Standard Horse Nail Co ..... 4th cover
Union Horse Nail Co ..... —

Horse Stocks
Barcus Mfg. Co 1

Nut Splitters
Whisler Mfg. Co ..... Front cover

Oxygen
Linde Air Products Co 8

Paints and Varnishes
Felton, Sibley & Co 1

Patents
Chandlee & Chandlee 26
Jenner, H. W. T 25
Parker, C. L ..... Front cover, 25

Pincers
Peck, Stow & Wilcox Co 32

Punches
Champion Blower & Forge Co 3

Punches and Shears
Armstrong-Blum Mfg. Co ..... Front cover
Little Giant Punch & Shear Co 7
Peck, Stow & Wilcox Co 32

Reamers
Greenfield Tap & Die Corp 4

Screw Plates
Butterfield & Co 8
Champion Blower & Forge Co 3
Greenfield Tap & Die Corp 4

Shaft Couplings
Bradley, C. C., & Son 30

Shears
Edwards, C. D ..... 4th cover

Spoke Augers
House Cold Tire Setter Co ..... 4th cover

Springs
Higgins Spring & Axle Co 2

Spring Supporters
Ford Relief Spring and Frame Supporter Co. 30

Steel Stamps
Ness, George M., Jr ..... Front cover

Stocks and Dies
Butterfield & Co 8
Champion Blower & Forge Co 3
Greenfield Tap & Die Corp 4
Hart Mfg. Co ..... 4th cover

Supplies
Campbell Iron Co ..... Front cover
Wheel, B., Top & Hardware Co 29

Swages
Champion Blower & Forge Co 3

Tap and Drill Sets
Greenfield Tap & Die Corp 4

Threading Machines
Greenfield Tap & Die Corp 4

Tires
Firestone Tire & Rubber Co ..... 2nd cover

Tire Bending Machines
Buffalo Forge Co 7
Champion Blower & Forge Co 3

Tire Heaters
Gogel Mfg. Co 26

Tire Menders
Greenfield Tap & Die Corp 4

Tire Protectors
Kimball Tire Case Co 6

Tire Setters
Buffalo Forge Co 7
House Cold Tire Setter Co ..... 4th cover
West Tire Setter Co 27

Tire Shrinkers
Buffalo Forge Co 7
Champion Blower & Forge Co 3

Tire Upsetters
Buffalo Forge Co 7
Champion Blower & Forge Co 3

Tongs
Champion Tool Co 28

Tool Grinders
Phoenix Horseshoe Co 31

Trucks
Akron-Selle Co. 29

Tuyere Irons
Buffalo Forge Co 7
Champion Blower & Forge Co 3
Thompson Tuyere Iron Co ..... 4th cover

Vises
Butterfield & Co 8
Fisher & Norris 8
Prentiss Vise Co ..... 4th cover

Veterinary Remedies
Young, W. F. 1

Wagons
Akron-Selle Co. 29

Welding Compounds
Anti-Borax Compound Co 7
Cortland Welding Compound Co 4

Welding Outfits
General Welding Co ..... 4th cover
Imperial Brass Mfg. Co 32
Superior Oxy-Acetylene Machine Co 26
Turner Brass Works 2

Welding Plants
Bertschy-Bermo Co ..... Front cover

Wheel Dishers
House Cold Tire Setter Co ..... 4th cover

Wheels
Electric Wheel Co ..... Front cover
Empire Mfg. Co ..... 4th cover

Woodworking Machinery
Buffalo Forge Co 7
Crescent Machine Co 29
Parks Ball Bearing Machine Co 6

Wrenches
Champion Tool Co 28

Wrenches (Knife Handle & Pipe)
Peck, Stow & Wilcox Co 32

Digitized by Google

/ANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

e inserted under this head at 3 cents a word, including the address, for each insertion, ble in advance; but no advertisement will be accepted for less than 60 cents, ver small.

Remittances may be made in postage stamps where the amount to be sent is less than . Address

M. T. RICHARDSON CO., 71-73 Murray St., New York.

PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT.

Patents

PATENTS FOR INVENTIONS.
W. T. JENNER, patent attorney and anical expert, 608 F Street, Washington, Established 1883. I make a free ex- ation and report if a patent can be had he exact cost. Send for full informa- Inventors assisted in developing ideas nventions. Trade-marks registered.

PATENTS.
L. PARKER, attorney-at-law, and so- of patents. American and foreign ts secured promptly. Handbook for tors sent free upon request. McGILL DING, Washington, D. C.

For Sale

FOR SALE.
oline tank and pump, 2" retreading ls and cash register. VANDERPOOL Springfield, O.

FOR SALE.
ce money easy. While business is Vulcanize tires. Our book tells you $1.00. VANDERPOOL CO., Spring- Ohio.

FOR SALE.
cksmith shop, with or without tools. location for horseshoer. Owing to poor h, I am obliged to retire. Write to NK RETTIG, Wahpeton, N. Dak.

FOR SALE
65x250, having wagon, blacksmith, working machine shop and seasoning ; 10,000 feet of lumber in oak plank, es, bolsters and maple axles. Iron tools and machines. Good location for manufacturing establishment. JOHN NN, Durand, Wis.

MACHINERY FOR SALE.
he: 16 in. by 6 ft. Ames S. C. com- rest, full equipment, no chuck, over- l, $200.00. Milling machine, Lincoln back geared, table 7 in. by 30 in., vise, and countershaft, price $90.00. Send notos. J. L. LUCAS & SON, 3 Fox St., eport, Conn.

SPOKE AND WHEEL MACHINERY FOR SALE.
sisting of West Cold Tire Setter, r Hub Boring and Boxing Machine, nce 60 Ton Hydraulic Wheel Press. ortising Machines, 3 Wood Turning s, 3 Spoke Lathes, 3 Tenoning Machines, Rounder, Felloe Polisher, Hub Reamer many other machines not mentioned, ner with Pulleys, Hangers, Couplings, Address, NESS BROTHERS & CO., Penna.

FOR SALE.
p and garage or will sell stock and and rent building. Work for two to men. Reason for selling, giving up ess. Will sell half interest to right Address, CLEM. STEVENS, Clifton,

FOR SALE.
narch Disc Sharpener. Barcus Shoeing Horseshoer's swelled Horn Anvil 158. tire shrinker. Champion 400 Blower lete. American Calking Machine. Ad- H. R. SITLER, Washington, Iowa.

FOR SALE
cksmith shop in a town of 1,200 A in if taken at once. Splendid location elding plant. Reason for selling, poor ght. Write to JAMES M. McGHIE, r, Nebraska.

ITE OAK WAGON POLES
' at Butt, 3"x3" at Point, 12 ft. Lengths
BOWN MFG. HOUSE, P. O. Box 500, PITTSBURGH, PA.

For Sale

FOR SALE—IMMEDIATE DELIVERY—NEW MACHINES.
5-in. Bench Jointers. $20.00; 9-in. Complete Jointer, No. 125, $35.00; 13-in. Complete Jointer, $55.00. Can you afford to build your own Jointer Table when you can get a good, complete Jointer at the above prices? If so, we can furnish you with Square or Circular style cutter heads, made especially for wood frame tables 5-in. to 17-inch cut and in price from $10.00 up. Catalogue for the asking. W. L. SHERWOOD, Kirksville, Mo.

FOR SALE
At Osceola, Ills., a Blacksmith Shop and Garage combined. Plenty of work for two men the year round. Rich farming country. Will sell cheap if taken at once. Address W. A. CRANE, Neponset, Ills.

FOR SALE
300 sets carriage and wagon hubs XX Elm and Oak, sizes 3½ x 6½ to 10 x 14. Big bargain to anyone who can use them. Address HARRY KLENERT, 325 East 124th Street, New York City.

FOR SALE
Wagon shop and wood-working establishments, equipped with lathes, planers, mortiser, boring machine, sander, etc. Location on Soo Line in good North Dakota town. Unlimited territory for institution of this kind. Absolute failure in health cause for exceedingly low price. Write J. M. BLISS, Register of Deeds Office, Minneapolis, for further information.

FOR SALE
Blacksmith shop for sale; good location. Will sell at invoice. Address S. P. GOLLER, Bryan, Ohio.

FOR SALE.
11-in. lathe, $75; 14-in. lathe, $250; 12-in. tool room lathe, $325; 20x12 lathe, $550; 24x16 lathe, $650; 18x6 lathe, $300; Davis Keyseater, $115; 40-in. power sq. shear, $250; milling machines, planers; 24-in. wood planer and matcher; 8-in 4-side moulder. BICKNELL MFG. & SUPPLY CO., Janesville, Wis.

Wanted

WANTED.
A blacksmith in each county of the United States to solicit subscriptions for The Blacksmith and Wheelwright; experienced mechanics who may be unable to work at their trade from ill-health or from being partially disabled by some accident can make a good living. For further particulars address M. T. RICHARDSON CO., 71-73 Murray Street, New York.

WANTED.
Second hand House Cold Tire Setter, with punch and shear, or with shear. Must be cheap. J. L. SCOTT, 4048 Laclede avenue, St. Louis, Mo.

WANTED.
Good all-around blacksmith. Young married man preferred. Top wages for right man. Address M. W. ABTS, Morrill, Nebr.

WANTED.
Blacksmith helpers and laborers, also one blacksmith, a young man desirous of learning our line of work preferred; must be steady and reliable; apply in person or by letter. THE COLUMBIANA BOILER CO., Columbiana, Ohio.

WANTED
Second-hand Little Giant Trip Hammer. Also Lawn Mower Grinder. Both must be in good condition and priced right. JNO. H. HAMMERAND, Portsmouth, Iowa.

WANTED
Blacksmith to begin work about March 15th. Must be sober and with a few years' experience in blacksmithing. Address OLE SLOTTO, Fillmore, N. D.

Tires

DOUBLE TREAD TIRES

GUARANTEED

SPECIAL OFFER TO AGENTS. Write for Catalogue

Get our special price on new tires

M. LIBEN & CO.

205-AK West 48th St. New York City

Miscellaneous

QUICK COLLECTIONS.
Send your accounts to-day to a live wire firm and get your money NOW! Established 25 years; collections made everywhere. WILLIAM H. DODD, 87 Nassau St., New York. Phone 6231 Cortland.

CHANCE TO MAKE SOME MONEY.
We want agents in all parts of the country to sell our books on horseshoeing, carriage building, carriage painting, etc. There are hundreds of mechanics (blacksmiths and wheelwrights) in different parts of the country unable, by reason of impaired health or age, to work at their trade, who could take hold of these books and make a good living out of them. A blacksmith can talk up a book on blacksmithing better, of course, than a man who knows nothing about the business. Write at once for terms and full particulars to M. T. RICHARDSON CO., publishers, 71-73 Murray Street, New York City.

PERSONAL
BROTHER—Quit harmful tobacco or degrading liquor habits, absolutely, easily and inexpensively, with nature's pleasant antidote. I'll gladly send necessary information. G. S. STOKES, Mohawk, Florida.

AUTOMOBILE REPAIRS
Blacksmiths who own automobiles or repair automobiles in their shops should subscribe for the AUTOMOBILE DEALER AND REPAIRER: 100-page illustrated monthly devoted exclusively to the care and repair of the car. It is the only magazine in the world devoted to the practical side of motoring. Many garages and repair shops subscribe for no other automobile magazine. The "Trouble Department" contains five pages of numbered questions each month from car owners and repairmen which are answered by experts on gasoline engine repairs, $1 per year; 15 cents per copy. Postals not answered. CHARLES D. SHERMAN, 52 Windsor Avenue, Hartford, Conn.

Gears

GEARS & SHAFTS

Transmission gears and shafts, differential gears and axle shafts in stock for over 125 makes (500 models) of pleasure cars and trucks. Obsolete, Orphan and Current models.

Dealers and repairmen, send for our 125-page price list and make a good profit on your repair work.

AUTO GEAR CO., Inc.

844 Eighth Avenue, New York, N. Y. — 1461 S. Michigan Ave., Chicago

275 Marietta St., Atlanta, Ga.

NO SECOND-HAND PARTS OR JUNK

Wonder Disc Sharpener.

Blacksmiths located in farming communities can make a great deal of extra money in their shops by installing disc sharpening machines, and for this purpose we can highly recommend the Wonder disc sharpener, which is manufactured by A. E. Durner, Evansville, Wis. Just now there is a particular demand for disc sharpening because the farmers will not buy new machinery if they can get their old machinery repaired, owing to the high prices prevailing in the machinery market. If your shop is not already provided with a good disc sharpener you should write for prices and full particulars direct to the manufacturer. This is a thoroughly reliable machine, does the work well and one of these machines will pay for itself in a short time in any shop.

Seventy Years' Experience in Supplying Blacksmiths.

John A. Gifford & Son, 25 Park Place and 22 Murray street, New York City, have been supplying blacksmiths with carriage and wagon materials for 70 years, as this firm was established in 1848. This firm also carries a large line of automobile hardware and trimmings. Readers who are interested should send for copy of the free anniversary catalogue issued by this concern. This will be sent free if you will write for it using your regular letter head or giving some other evidence of the fact that you are in business for yourself. The Gifford catalogue is a reference book which ought to be in the possession of every blacksmith in America.

The Ideal Lawn Mower Grinder.

The alert blacksmith in these days is open for any new line of business which will add to his income. There are thousands of blacksmiths throughout the country who have installed the Ideal Lawn Mower Grinder which is made by the Root-Heath Mfg. Co. of Plymouth, O. This machine grinds all makes of lawn mowers perfectly in 15 minutes without removing the wheels, ratchets or reel-knife. The machine also has a perfect skate sharpener attachment, enabling the blacksmith to utilize this machine all year round, because there is good money in sharpening skates when the lawn mower grinder is out of season. Readers who are interested should write immediately for free catalogue and full information direct to the manufacturers.

Ford Relief Spring and Frame Supporter.

Many of our readers have taken up automobile repair work and these will be interested in any good accessory for the Ford car. The Ford Relief Spring & Frame Supporter Co., 5-7 East 42nd street, New York City, makes a spring and frame supporter especially for the Ford which they state will double the capacity and prolong the life of this car. A Ford car equipped with this attachment will carry one ton if necessary. The attachment prevents striking and breaking the housing, axle and fenders. It also overcomes shearing of the center bolt and prevents sagging springs and tilting bodies. It saves the tires and acts as an ideal shock absorber. This device is made in two weights. No. 1 passenger cars, carrying up to 800 pounds, and No. 2 commercial cars, carrying up to 2,000 pounds. The quality of the article is fully guaranteed and money is refunded if it is found unsatisfactory. For a complete set the retail price is only $8.00. This is a quick seller and there are thousands of our readers who could act as agents for this specialty. Readers who are interested should write for prices and full particulars.

Neverslip Shoes and Calks.

The Red Tip line of horse and mule shoes and the Red Tip calks are so well known to most of our readers that exploitation in these columns is hardly necessary. The line of shoes comprises a line of patterns to select from that covers the entire field. Every shoe has been designed with the utmost care so that it will serve the special purposes for which it was intended. This is the height of the season for the use of calks in the snow belt, and any of our readers who are not fully stocked with Neverslip shoes and calks should send their orders to nearest jobber and also write direct to the Neverslip Works, New Brunswick, N. J. The Red Tip calks are made in screw and drive styles and all patterns.

Standard Horse and Mule Shoes.

A quality line of horse and mule shoes is manufactured by the Standard Horse Shoe Co., with main office at 131 State street, Boston, Mass., while the rolling mills and factory of this company are located at South Wareham, Mass. Standard shoes are sold by leading dealers from Maine to California. Readers of this publication who are interested should write for the free new catalogue, the No. 7, which is very interesting.

Phoenix Horse Shoes.

The Phoenix Horse Shoe Company, with main office at Chicago, Ill., and rolling mills at Joliet, Ill., and Poughkeepsie, N. Y., has the largest output of any horse shoe factory in the world. Their line includes the well known Phoenix horse shoe, also the Bull Dog toe calks. These lines are probably well known by most of our readers, but those who are not fully posted should write for literature and samples of these shoes and calks direct to the main office of the Phoenix Company at Chicago, Ill.

Northwestern Horse Nails.

Those needing a good horse shoe nail made of best quality material should get acquainted with the Northwestern horse nail made by the Union Horse Nail Co., Chicago, Ill. These nails are perfect in form and finish and will hold the shoe firmly to the horse's hoof and the reenforced point makes this an easy nail to drive and a safe one to use. Readers who are interested should write for literature and prices direct to the manufacturer.

Subscribe to THE BLACKSMITH AND WHEELWRIGHT. $1.00 per year.

Tires

UY EARLY AND SAVE MONEY

Double Tread Tires and Tubes

GUARANTEED

ne to the Tire Clearing House—here rices—clear cut and plain as daylight. uy wholesale the best "try out" Tires you get the benefit—you want truthful and truth is never crushed to earth if a square deal—real truth is puncture

SO ARE OUR TIRES.

Plain	Non-Skid	Tubes
$4.40	$4.95	$2.00
5.50	6.05	2.00
6.60	7.15	2.50
7.15	7.70	2.75
8.25	8.80	3.00
7.70	8.25	2.75
8.80	9.35	3.00
8.80	9.90	3.50
8.80	9.90	3.50
9.90	11.00	3.60

Get your order in quick for goods listed here—by all means get in touch with us for further information about our special process—it means money in your pocket. Get in right—write today—yes—today.

Look up rating in Dunn's or Bradstreet's.

Size	Plain	Non-Skid	Tubes
36x4	$9.90	$11.00	$3.60
32x4½	9.90	11.00	3.75
34x4½	11.00	12.10	4.00
35x4½	11.00	12.10	4.10
36x4½	11.00	12.10	4.25
37x4½	12.10	13.20	4.35
34x5	11.00	12.10	4.50
35x5	13.20	14.30	5.00
36x5	13.20	14.30	5.00
37x5	13.75	14.85	5.00

For (non-skid) sizes up to 32x4, 50c extra; all other sizes $1.00 extra.
For rebuilding your old tires we charge you 60% of the above prices.

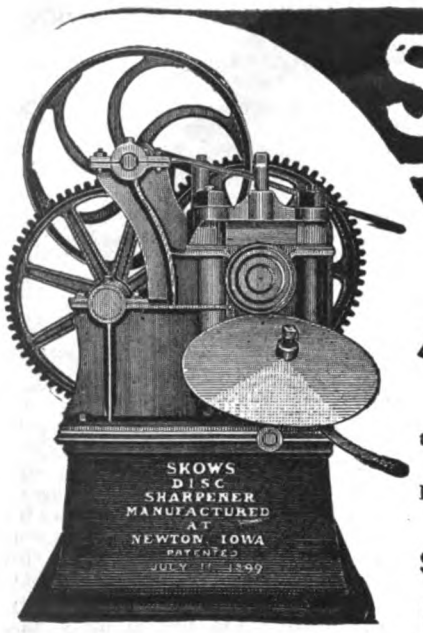
B. LIBEN & COMPANY

West 54th Street — NEW YORK CITY — 112-A East 110th Street

THE HOME OF DOUBLE TREAD TIRES

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google



SKOW'S ROTARY DISC SHARPENER

is a big Money Maker in any Shop.

MADE $229.50 IN A LITTLE OVER 2 MONTHS

We shipped this machine from factory on January 10th, 1914

SKOW MFG. CO., Newton, Iowa. Nora Springs, Iowa, March 18, 1914.

Dear Sirs:—We have sharpened 78 discs on our "Skow Roller" to date, which brings us $229.50 and the end is not yet. Now can you make us a casting like No. 15 with the shank straight up for rolling coulters. We have tried them on the roller and it is O. K., but should have the casting No. 15 as above mentioned. Let us hear from you if you can make us one. Send us your bill and we will remit for same. VOLKMAN & SEAMAN.

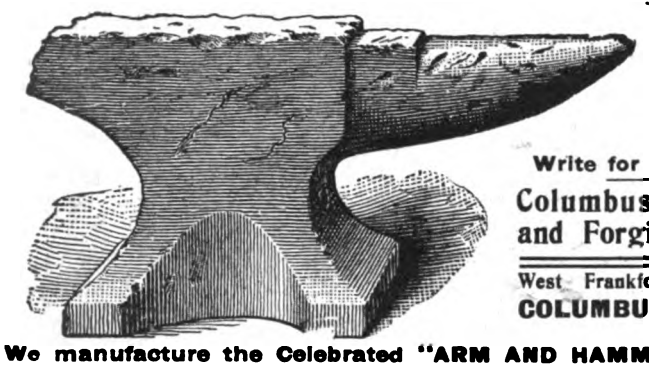
700 of these machines in use. Sharpens cultivator and plow discs of all sizes by cold rolling. Gives a better and more permanent sharp edge than is possiblle by any other method.

Ask Your Jobber For Skow's Disc Sharpener. *Write Us For Descriptive Circulars.*

SKOW MANUFACTURING CO., - Newton, Iowa, U. S. A.

No matter how badly they are broken we can repair them in good shape

LOOK AT THIS THEN AT THIS

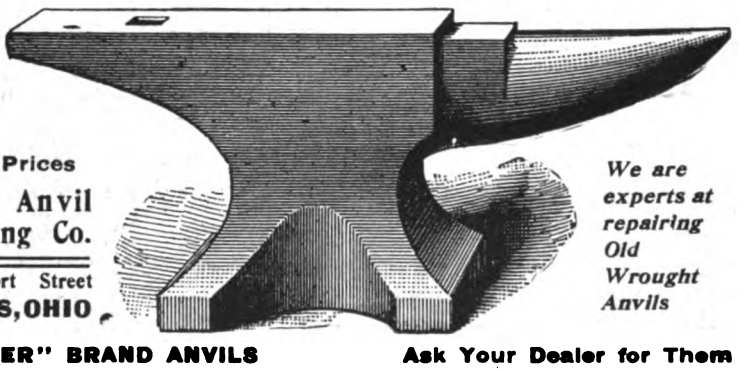


Write for Prices

Columbus Anvil and Forging Co.

West Frankfort Street

COLUMBUS, OHIO



We are experts at repairing Old Wrought Anvils

We manufacture the Celebrated "ARM AND HAMMER" BRAND ANVILS **Ask Your Dealer for Them**

ATTENTION, BLACKSMITHS

Superior Oxy-Acetylene Welding and Cutting equipment, especially designed for the Blacksmith.

Welding and Cutting Torches, Regulators and Gauges, Acetylene Generators and Welding Supplies.

Write for catalog and money saving proposition. Every Article positively guaranteed.

AGENTS WANTED.

SUPERIOR OXY-ACETYLENE MACHINE COMPANY
HAMILTON, OHIO

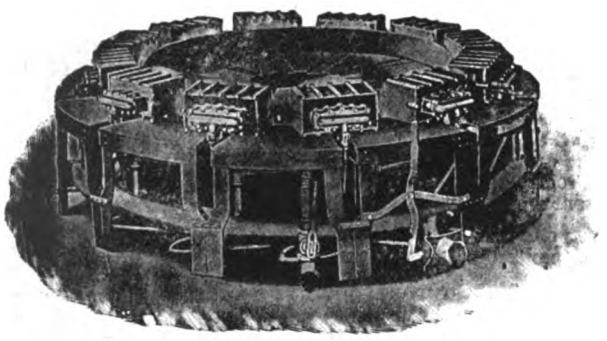


Inventions Wanted!

Manufacturers constantly writing us for patents. List of inventions actually requested and book "How to Obtain a Patent" sent free. Send rough sketch for free report regarding patentability. Special assistance given our clients in selling patents. Write for details of interest to every inventor.

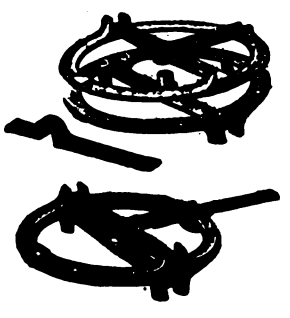
Chandlee & Chandlee, Patent Attorneys
Est. 21 Years 587 7th St., Washington, D.C.

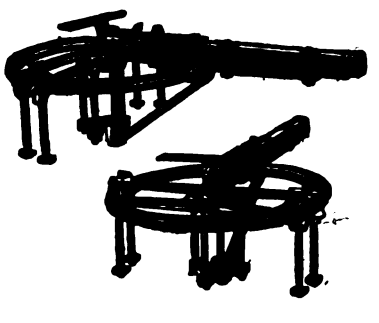
Subscribe to THE BLACKSMITH AND WHEELWRIGHT. $1.00 per year.



TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.

OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.





Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE COCEL MFG. CO., TOLEDO, OHIO.



Gillette Portable Electric Clipping, Shearing and Grooming Machine for Direct or Alternating Currents.

"Gillette" Clipping, Grooming and Sheep Shearing Machines

Experience of a quarter-century in making flexible shaft Hand and Power Machines for Clipping Horses, Mules, Dogs, Cows and for shearing Sheep, Etc., has given us an expert knowledge of this art.

"GILLETTE" Clipping machines and parts are guaranteed as to materials and workmanship.

"GILLETTE" cutters are unexcelled and can be used on any stated make of flexible shaft clipping machine. Efficiency is our aim.

Grinding and repairing is our specialty.

Renewal and repair parts carried on hand.

Gillette Clipping Machine Co.

129-131 West 31st Street

NEW YORK, N. Y.

Illustrated Price List Free.
Order Direct or Through Your Dealer



"Gillette" Cutter and Handle.

THE ARMSTRONG MFG. COMPANY

BRIDGEPORT CONN., U.S.A. **NEW YORK OFFICE 248 CANAL STREET**

like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



"Makers of the Genuine ARMSTRONG Stocks and Dies."

ADVERTISING RATES IN THE BLACKSMITH AND WHEELWRIGHT MADE KNOWN ON APPLICATION.

straight up for rolling coulters. We have tried them on the roller and it is O. K., but should have the casting No. 15 as above mentioned. Let us hear from you if you can make us one. Send us your bill and we will remit for same.

VOLKMAN & SEAMAN.

Seven hundred of these Rotary disc sharpeners are already in use throughout the country. This machine sharpens cultivator and plow discs of all sizes by cold rolling and gives a better and more permanent sharp edge than is possible by any other method. Write for prices and descriptive circular direct to the manufacturer, the Skow Manufacturing Co., Newton, Iowa.

Absorbine for Rheumatism.

This is the time of year when horses are subject to rheumatism. An excellent remedy for this trouble is Absorbine, manufactured by W. F. Young, P.D.F., 55 Temple street, Springfield, Mass. For rheumatism in the horse's shoulders, loins or muscles, rub in Absorbine, cover with a blanket wrung out of hot water, put a dry one over it and let it steam for two hours and repeat until the animal is relieved. Follow with three or four applications of Absorbine every day until a complete cure has been effected. Also give the horse on the first day 10 drops of aconite on the tongue every hour. On the second day and until cured give 10 drops of Rhus toxicodendron 3X on the tongue three times a day and with the feed Young's kidney and nerve powders, tablespoonful three times a day. Many blacksmiths are acting successfully as agents for Absorbine and the sale of this remedy can be made quite an important item of income. Readers who are interested should write for free pamphlet describing Absorbine and other remedies direct to the manufacturers, W. F. Young, P.D.F., 55 Temple street, Springfield, Mass. Absorbine is carried in stock by most druggists or a sample bottle will be sent postpaid to any address on receipt of $2.00.

Skow's Rotary Disc Sharpener.

This excellent machine which is illustrated in our advertising columns is a money-maker in any shop. One user of this machine writes as follows:

Nora Springs, Iowa, March 18, 1914.
Skow Mfg. Co.,
Newton, Iowa.

Dear Sirs:—We have sharpened 78 discs on our "Skow Roller" to date, which brings us $229.50, and the end is not yet. Now can you make us a casting like No. 15 with the shank

Interesting Engine Catalogue.

We wish to acknowledge receipt of a very interesting catalogue which has been sent to us by the Witte Engine Works, Kansas City, Mo. The catalogue is entitled How to Judge Engines, and it contains valuable information which ought to be placed in the hands of our readers. It tells the various kinds of work an engine should do and the kind of engine best adapted for general use for all kinds of fuel. We understand that this will be sent free of charge to any of our readers who will take the trouble to write for it, and in writing, correspondence should be addressed to Ed. H. Witte, president Witte Engine Works, 2440 Oakland avenue, Kansas City, Mo.

Spring Nut Locks.

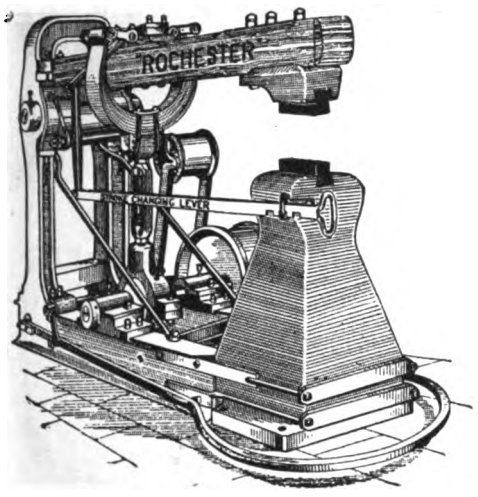
Many an accident has been brought about by a nut or bolt working loose, but if Spring nut locks are used such accidents cannot possibly occur. The Spring Nut Lock Co., 665 Transportation Building, Chicago, Ill., is manufacturing a spring nut lock which is absolutely reliable and every blacksmith should have a supply of these on hand to use for automobile and wagon repair work; also for machinery of almost every kind. Write for free catalogue and full particulars.

Automobile Agents Wanted.

The Bush Motor Co., Bush Temple, Chicago, Ill., desires to push sales of the well known Bush car in the country districts and for this purpose they are obtaining the services of country blacksmiths to act as agents, and there are many of our readers who could doubtless undertake this work successfully. Any who are interested should write at once to the Bush Motor Co. for their 48 page catalogue and all particulars in regard to the agency plan that they offer to the blacksmith.

Digitized by Google

ROCHESTER HELVE HAMMER



Made in six sizes, one of which is just adapted to your needs.

The sooner you put one of these to work for you, just that much earlier will it begin paying dividends on your investment.

Write us your requirements to-day. Our catalogue is free.

THE WEST TIRE SETTER COMPANY
Rochester, N. Y.



Free 512 PAGES OF BARGAINS

POST PAID

WE WANT TO SEND YOU THIS 512 PACE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

Tells how you can work up a profitable auto supply and repair business.

Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories
1117 W. 11th Street, Cleveland, Ohio, U. S. A.

For Ford Repair Work.

Blacksmiths repairing Ford cars will be interested in the advertisement which appears in this issue from Geo. D. Bailey Co., 1124 So. Michigan avenue, Chicago, Ill.

This company manufactures the Bailey ball thrust which is designed to prevent rear axle trouble on the Ford car. Whenever a car owner comes to you because of rear axle trouble, as a rule you will find that the flat thrust washers at left or gear side of the differential have worn thin, causing drive and pinion gears to get out of mesh and break, but the Bailey ball thrust bearing, an exact replacement for these flat washers, will not wear thin and will positively keep gears in proper mesh, make them run smoothly, and last indefinitely. The list price of this useful device is $3.75, and a regular dealer discount will be allowed to all blacksmiths. Readers should write for full particulars direct to the manufacturers.

Star Steel Shapes.

The Star Mfg. Co., Carpentersville, Ill., makes a complete list of steel shapes for agricultural implement repair work. This line includes plowshares, listershares, moldboards, landside plates, landside points, shovel points, plow points, seeder points, subsoilers, cultivator shovels and drill points. Readers who are interested should write for a complete catalogue and price list, which is issued by this company, and which we understand will be furnished free to any of our readers.

Linde Oxygen.

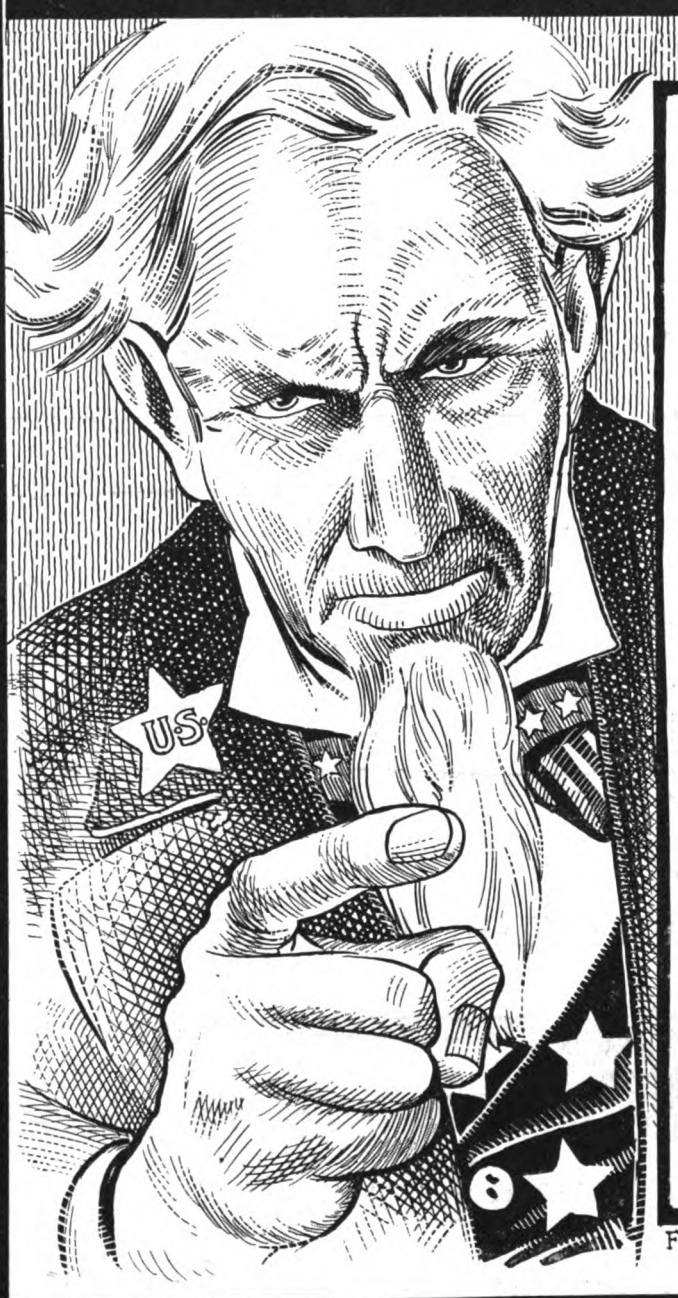
Many of our readers have taken up the business of oxy-acetylene welding and no doubt those will be interested in the fact that the Linde Air Products Co. is in a position to supply oxygen from the 64 producing plants and distributing stations owned by this company. Oxygen is supplied by this corporation in 100 to 200 cubic feet cylinders and there is no delay in the delivery of these cylinders. In the advertisement which appears in this issue of our magazine a complete list of the distributing stations maintained by this company will be found. The main office of the company is in the Forty-second Street Building, New York City.

Start The New Year Right

SUBSCRIBE FOR
The Blacksmith and Wheelwright

$1.00 The Year

"I'LL TAKE CARE OF THE WAR YOU BOYS WHO CAN'T GO—MUST TEND TO BIZNESS"



F.M.

and there's no better way of attending to business than to stock up on

GIANT GRIP SHOES, CALKS, and TOOLS.

With MEN, business will go right along just the same as ever—molly-coddles don't count.

Giant Grip Calks you'll find to be a separation of the real from the apparent—the permanent Genuine Calk from the ordinary.

There is no effective substitute for that long and practical experience which is father of safe and conservative initiative. Many years of Shoe, Calk, and Tool making enables us to surely maintain certain advantages over others.

Don't let Progress catch you walking backward!—Write us to-day for literature.

GIANT GRIP HORSE SHOE CO.

Manufacturers of the original Drive Calk.

OSHKOSH, WISCONSIN

Advertising Rates in The Blacksmith and Wheelwright made known on application

Digitized by Google

WAGON BUILDING

"Build me a wagon that will last forever."

"Sorry, Sir, but 'axle troubles' (due to wear—wear on the spindle, or on the box, or both) make it impossible."

You've often received a specification like that and been obliged to give that answer—haven't you?

The Sheldon "TON-DON"—an axle that will not wear, run hot or break—allows your meeting the requirements of the man who wants a wagon to last forever, **and we have told him so.**

The Sheldon "TON-DON" was originally made for buggies and carriages. Its success was so instantaneous and pronounced that we were deluged with requests for an axle embodying the same principle for use on Delivery, on Business and on Express Wagons.

Hence, the "TON-DON" CONCORD EXPRESS.
In EFFICIENCY—The HIGHEST.
In CONSTRUCTION—The SIMPLEST.
In SERVICE—The MOST SATISFACTORY.

The Spindle of the Sheldon Ton-Don Axle

Ordinary axles wear flat on the bottom of the spindle because the bottom side is the point of contact and where the wear of the spindle is concentrated. It takes a spindle of unusual hardness to resist this wear—greater hardness than any ordinary axle affords. The spindle of the "TON-DON" is hardened by a special process, producing a wearing surface of such hardness that a fine file makes no impression on it—yet the center remains soft or "natural."

The Phosphor-Bronze Lined Box

The peculiarity of this box lining is that while somewhat softer than the spindle, there is no perceptible wear after thousands of miles of running, but becomes harder and more wear-resisting with use.

Phosphor-Bronze (of a mixture which increases its toughness, smoothness under friction, and wear-resisting qualities) is a metal used for making the propellers of ocean steamships, bearings for locomotives, crank-shaft bearings for automobiles and other fine machinery. Imagine what a metal must be to meet such conditions, and you will grasp the advantages of applying such metal to axle purposes.

THESE AXLES CARRIED IN STOCK BY THE FOLLOWING JOBBERS AND CAN BE OBTAINED AT MANUFACTURERS' PRICES.

Baltimore, Md.....E. Scott Payne Co.	Providence, R. I....Congdon & Carpenter Co.
Boston, Mass.....E. P. Sanderson Co.	Rochester, N. Y.....Burke Iron & Steel Co.
Buffalo, N. Y.....H. D. Taylor Co.	San Francisco, Cal....Waterhouse & Lester Co.
Chicago, Ill.....E. D. Kimball Co.	Scranton, Pa.....Bittenbender & Co.
Cincinnati, O.....G. B. Schulte Sons Co.	Seattle, Wash.....Gray Bros. Co.
Indianapolis, Ind.....W. J. Holliday & Co.	Springfield, Mass.....Chas. C. Lewis & Co.
Los Angeles, Cal.....Percival Iron Co.	St. Louis, Mo.....Sligo Iron Store Co.
Milwaukee, Wis....Shadbolt & Boyd Iron Co.	Washington, D. C.....Louis Hartig
Pittsburgh, Pa.....McLean & McGinness	Wilmington, Del.....Delaware Hardware Co.
Portland, Oregon.....J. E. Haseltine & Co.	Bridgeport, Conn.....Chapman & Bangs Co.
Ft. Wayne, Ind.....Moesman, Yarnelle & Co.	San Antonio, Texas...Heusinger Hardware Co.
New Orleans, La.....Jos. Schwartz & Co.	

SHELDON

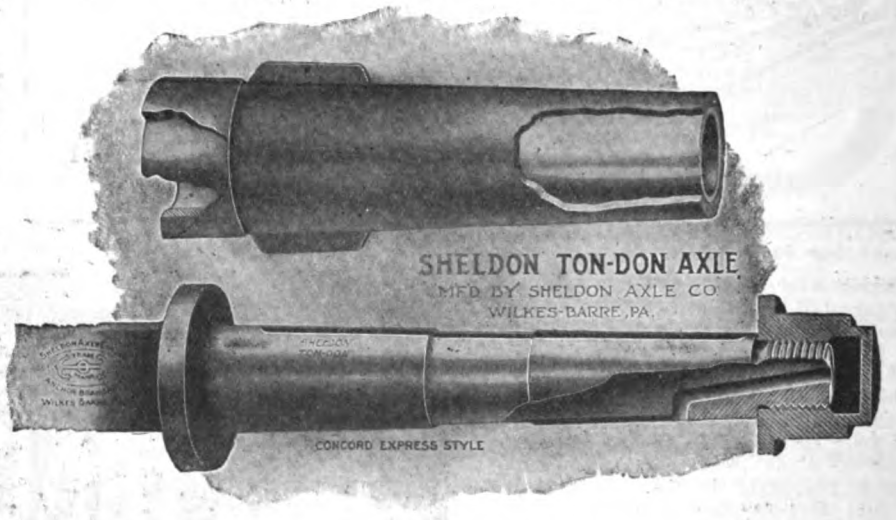
"TON-DON"

CONCORD EXPRESS STYLE

NOT A BALL OR ROLLER BEARING—BUT

ANTI-FRICTION—EVERLASTING—INTERCHANGEABLE

IT WILL NOT CUT, HEAT OR STICK



NOTICE THE PATENTED OILING DEVICE
HAS ALL THE ADVANTAGES OF FRICTION AND ANTI-FRICTION AXLES WITHOUT THEIR DISADVANTAGES
"TON-DON" MEANS KNOWN QUALITY WITHOUT FANCY PRICE
MADE ALSO FOR BUGGIES AND SURRIES

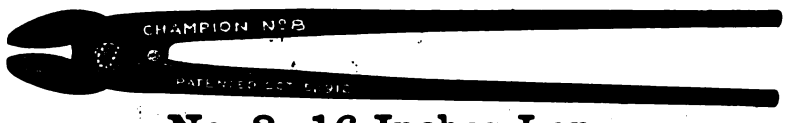
SHELDON AXLE & SPRING CO.,
WILKES-BARRE, PA.

LARGEST AXLE FACTORY IN THE WORLD.

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge

Nothing to get out of order.



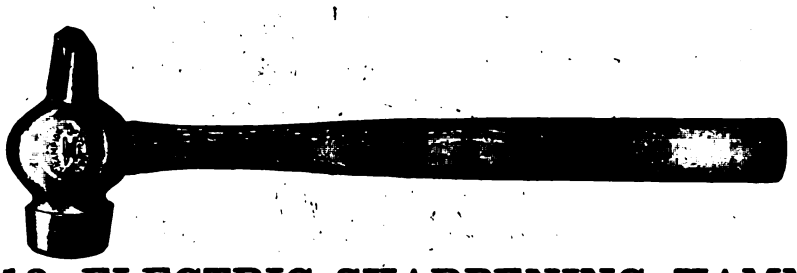
Will hold securely any size of shoe.

No. 8 16 Inches Long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

Weights, 1¾ to 3 lbs.

This Hammer is the most popular Sharpening Hammer on the market.

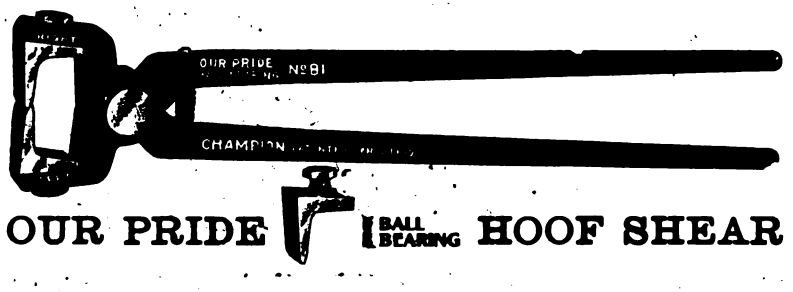


Corrugated Pein

IT GIVES RESULTS.

No. 12 ELECTRIC SHARPENING HAMMER

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.



OUR PRIDE BALL BEARING HOOF SHEAR

Blades easily replaced when worn out.

All parts interchangeable.

Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY, - Meadville, Pa., U. S. A.

THE LIVINGSTON CO., 131 E. 23rd Street, NEW YORK, Eastern Representatives

Digitized by Google



No. 244. BODY AND SEATS

Price, no seats ..... $8.25 and up
Price with seats..... 11.95 "



STICK SEAT BODY
$8.58 and up



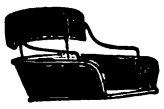
PIANO BODY
With seat..... $6.07 and up
Without seat..... 4.87 "

You can make $5.00 in a few hours to apply this Auto Roof Cover. Easy to apply. We furnish instructions

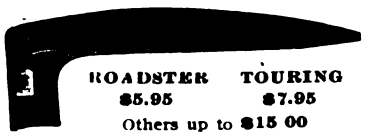
CURTAIN LIGHTS
Sticktite



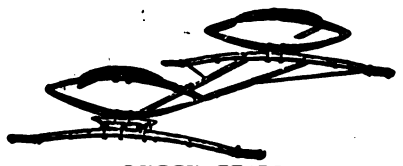
No sewing. Cost $1.00 and up. Parcel Post Paid. You can make 100% profit.



ROUND CORNER SEAT
Untrimmed..$3.00 and up
Trimmed..... 8.00 "



ROADSTER $5.95 TOURING $7.95
Others up to $15 00



BUGGY GEARS
Each $12.50
With Wheels and Shafts.. $26.90 and up

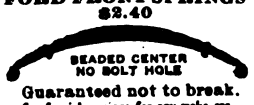
Parcel Post Paid

Discount in quantities.

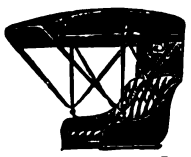
The time has come that it is to the Carriage Repairman's interest to do Auto Repairing as well as Carriage and Wagon Work.

Get our 36 page catalogue giving dealer's price on Tops, Wheels, Springs, Commercial Bodies, Trailers, Fenders, Seat Covers, Tires, etc. that will make you extra profit.

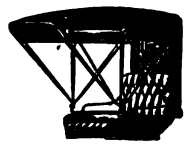
FORD FRONT SPRINGS
$2.40



Guaranteed not to break.
Can furnish springs for any make car.



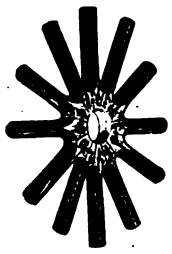
AUTO SEATS—Top Seats
Seat ..... $3.56 and up
Cushion and back... 7.63 "
Top ..... 12.84 "



TOP SETS
Seat ..... $1.55 and up
Cushion ..... 1.88 "
Back ..... 2.06 "
Top ..... 9.94 "



30 x 3 Tires sell for $12, cost you $10 delivered by Parcel Post. Other Sizes in proportion.



SPIDER WHEELS
Avoid delays in repairing broken Auto and Carriage Wheels.
Auto Spider $2.20 and up.
Buggy Spider $1.90 and up.



DOUBLE TREES WITH SINGLE TREES
Buggy and Surrey size..... Each 95c



POLES
In the white..... $3.90
Painted 4.90



BENT REACHES
Assorted sizes..... 10 for 75c



POLES
Buggy or Surrey size..... Per bundle, $7.50



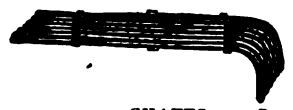
BUGGY AND WAGON AXLES
$1.95 and up
We carry all sizes.



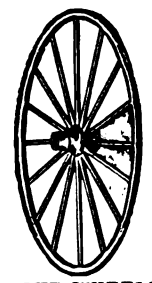
STRAIGHT REACHES
Assorted sizes..... 20 for 75c



AXLE BEDS
Assorted sizes—drop..... 14 for 60c
Assorted sizes—arch..... 8 for 60c



SHAFTS Per Bdl
Buggy size ..... XX, $8.90
Surrey size..... XX, 6.50



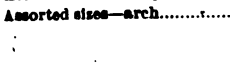
LIGHT WHEELS
With Steel Tire on, $7.80 and up
With Rubber Tire on, $16.80 and up
We make all sizes.
Auto Wheels with Demountable Rims $14.45



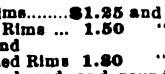
RIMS
We carry all sizes.
Plain Rims..... $1.25 and up
Beveled Rims ... 1.50 "
Bored and Rounded Rims 1.80 "
15 pieces bored and rounded rims, assorted sizes, for 75c



SHAFTS
Buggy size, white... $2.95
" painted... 3.80



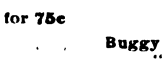
BUGGY AND SURREY SINGLE TREES
Assorted ..... 6 for 75c



WHEEL HEAD RIVETS
Assorted sizes
3 lbs. for..... 75c

BUGGY SPOKES

	Per 100
1 in., Sar. Pat.	$1.80
1 1/16 in., Sar. Pat.	2.10
1 1/16 in., C. B.	2.25
1 7/16 in., Sar. Pat.	3.50
15/16 in., Warner Pat.	1.25



Roadster Tops $18.90
Touring, $22 95
AUTO SEAT COVERS
$4.95 and up
We recover your old Auto Frame.
Send for sample of goods we use in our Tops and Seat Covers.

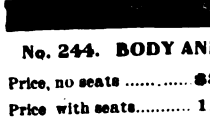
PRICES SUBJECT TO CHANGE OWING TO UNSETTLED CONDITIONS OF RAW MATERIAL MARKET. BETTER ORDER NOW.



Elliptic Springs
$1.10 and up

Send for our large **CATALOGUE**
On Carriage, Wagon and Auto Parts and learn how we do it.
Our freight offer will interest you.
Adjust your wants to the sizes and styles we furnish at the above prices and save money.

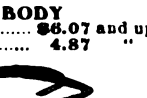
B. WHEEL, TOP & HDWE. CO.
1102 Sycamore Street CINCINNATI, OHIO



WOOD HUB SPOKES

	Per set
2 in.	$1.90
2¼ in.	2.10
2½ in.	2.90

HEAD BLOCKS
Assorted sizes, 8 for 75c



DASHES

20 in. drill	$0.20
17 in. leather	1.20
26 in. leather	1.20
24 in. leather	2.60

PARAMOUNT SPOKE WEDGES
1000 Assorted Sizes Spoke Wedges 60c



My Best Engine Offer

"50"

"50-50" means that I stand ready to meet you half way on engine prices—sell direct from factory—**Make Immediate Shipment**—save you **$15 to $200** according to size. I make nothing but engines—Kerosene and Gasoline—**2 to 22 H-P.**—give you the benefit of **31** years continuous, practical, engine-building experience. Write for latest price list—all styles—Stationary, Portable and Saw-Rig.

WITTE KERO-OIL ENGINES

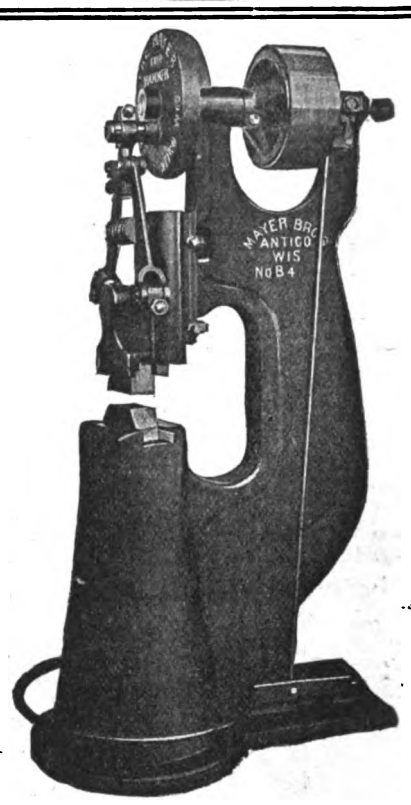


time-tried and time-tested—cut fuel cost 50 per cent, using kerosene—start as easy as a gasoline engine. My terms are **Cash, Payments, No Money Down**—90-Day Trial—5-Year Guarantee. Read my new illustrated book, **"How To Judge Engines"**, before you choose any engine. This is a book for the farm owner as well as the shop expert. By return mail—FREE.

ED. H. WITTE, Pres.,

WITTE ENGINE WORKS
2445 Oakland Ave., Kansas City, Mo.
2445 Empire Bldg., Pittsburgh, Pa.

"50"



The Mayer POWER HAMMER

Simplicity itself in construction and operation, small floor space.

Main frame solid semi-steel casting. ram or hammer head steel casting running in rigid adjustable V guides, is perfectly balanced, insuring accurate alignment of Dies for making forgings.

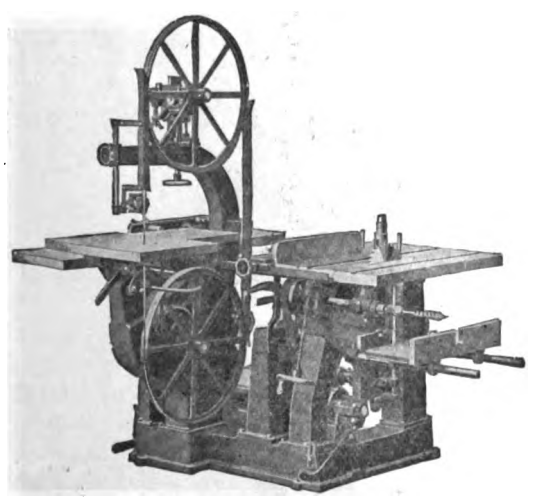
Has a Friction Drive Pulley and Can Be Belted Directly to Line Shaft.

Any parts breaking in one year, caused by defective material and workmanship, will be replaced without charge.

Write Today for Prices and Circular

MAYER BROS., Antigo, Wis.

CRESCENT UNIVERSAL WOOD WORKERS



are very popular right now as shortage of labor will soon be general, but there will be more work than ever to be done. The best solution to this vexatious problem is for you to install labor saving equipment such as may be had in the CRESCENT line of Universal wood workers, band saws, jointers, saw tables, planers, disk grinders, shapers, swing cut off saws, hollow chisel mortisers, borers, variety wood workers.

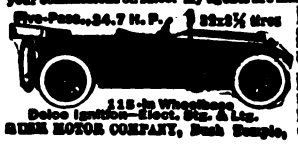
Today is the time for you to investigate the CRESCENT line.

SEND FOR OUR CATALOG.

The Crescent Machine Company
203 MAIN STREET LEETONIA, OHIO

Driver Agents Wanted

Drive and demonstrate the Bush Car. Pay for it out of your commissions on sales. My agents are making money. Shipments are prompt. Bush Cars guaranteed or money back. 1918 models ready. Write at once for my 48-page catalog and all particulars. Address



Five-Pass., 34.7 H. P., 112-in Wheelbase, 32x3½ tires
Delco Ignition—Electric Start & Lts.

H. Bush, Pres.
Dept. 1-TW
BUSH MOTOR COMPANY, Bush Temple, Chicago, Illinois

"GEARS AND WAGONS"

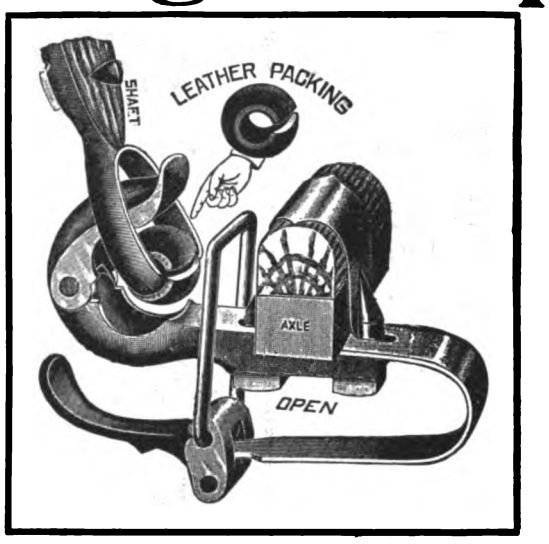
Selle Gears A quarter of a century of success has placed "Selle Gears" and Wagons in the hands of the largest wagon users in the world. Express and Transfer Companies, Department Stores, Fire Departments, etc., specify "Selle Gears" and will take no other after once tried.

230 Page Catalog Free.

THE AKRON-SELLE CO. Akron, Ohio

Digitized by Google

THE BRADLEY
BALL-BEARING
Carriage Coupler



All-Steel, Noiseless,
Quick Shifting, Ball Bearing

The ONLY Carriage Shaft Coupler that is furnished with a

One-Piece Moulded Leather Packing

A packing that will outwear any other packing ever made. It fits the ball and socket. It is held in place by a spring steel retaining ring. It may be put on and taken off in a jiffy, and it stays where it is put.

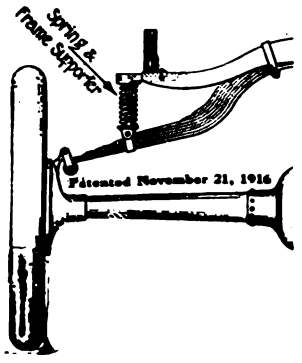
MADE IN FIVE SIZES.
Pony—Buggy—Surrey—Delivery—Express
To fit axles 3-4 inch to 2 1-4 inch
Your Jobber Can Supply You.

C. C. BRADLEY & SON, Syracuse, N. Y.

FORD RELIEF SPRING AND FRAME SUPPORTER

Will Double the Capacity and Prolong Life of Ford Cars.

CARRY ONE TON IF NECESSARY



Prevents striking and breaking housing and axle, overcomes shearing of center bolt, sagging springs and tilting bodies. Supports frame, improves appearance and riding qualities. Saves the tires. An Ideal Shock Absorber.

MADE IN TWO WEIGHTS

No. 1. Pleasure Cars, Carrying up to 800 lbs.
No. 2. Commercial Cars, Carrying up to 2000 lbs.

1913-1917 FORDS, $8.00 PER SET
1918 FORDS, - - 10.00 PER SET

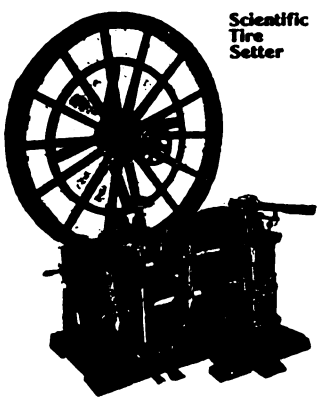
Guaranteed, and Money Refunded if Found Unsatisfactory.

To Strengthen Running Boards and Fenders. Send for Truss Rod Literature.

FORD RELIEF SPRING & FRAME SUPPORTER CO.
5 (B. W.) East 42nd Street, New York

VALUABLE BLACKSMITH TOOLS

The Very Best for Purpose Intended









No Smoke Forge Hood OPEN



No Smoke Forge Hood CLOSED

Write for Circulars and Prices

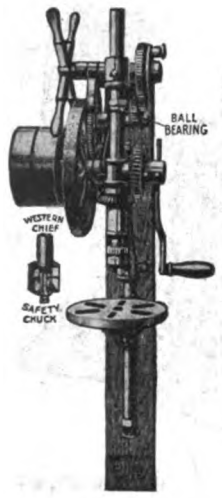
—MADE BY—

LOURIE MFG. CO., Springfield, Ill., U. S. A.

The Better Your Equipment The Bigger Your Profits

Buy CANEDY-OTTO
AND INCREASE YOUR INCOME

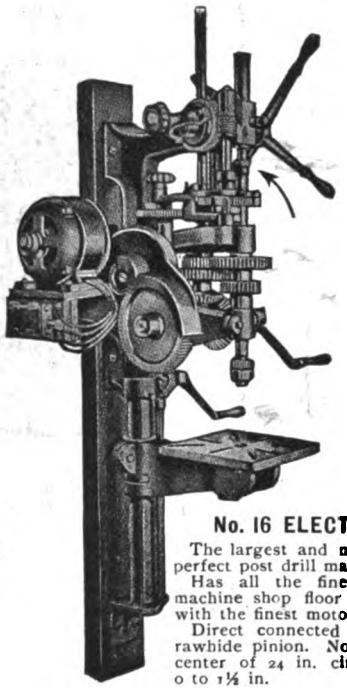
Once Tried, Always Used : There's a Reason—Quality



No. 19 DRILL

A low-priced combined hand and power self-feed drill.

Drills to center of 16½ in. circle.



No. 16 ELECTRIC DRILL

The largest and most mechanically perfect post drill manufactured.

Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.

Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1½ in.

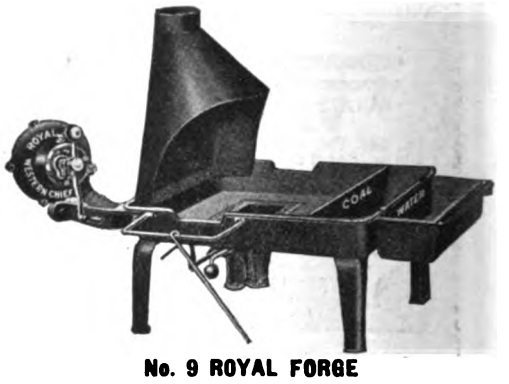
OVER 200 DIFFERENT STYLES

SEND FOR CATALOGUE No. 12



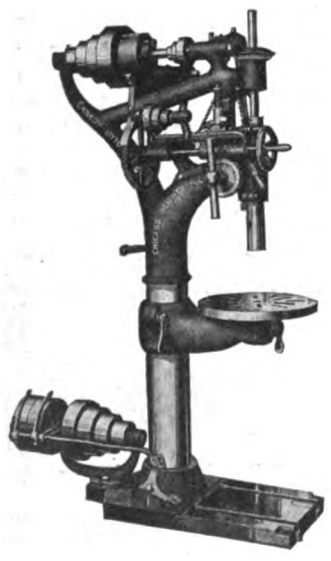
No. 100 ROYAL FORGE

The most popular forge ever made.
Fan, 12 in. Hearth, 31½x45½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x50 in. Blower, 12 in.



No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.

All machines are tested before leaving the factory, and guaranteed in every respect.

Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS



No. 1 1/2 SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



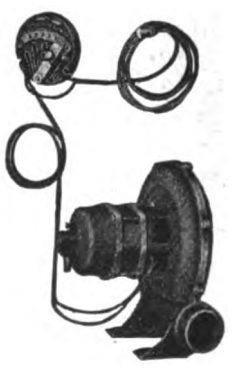
Blower, 12"
Wt., 135 lbs
Height, 47"

ROYAL BLOWER

(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.

Fire pot is 8x9 in. inside.



No. 8 ELECTRIC BLOWER

The best outfit money can buy.

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google



Digitized by Google

1848

Seventy Years' Experience in the execution of orders for export

1918

AUTOMOBILE JOHN A. GIFFORD & SON 25 PARK PLACE CARRIAGE MATERIALS 22 MURRAY ST. NEW YORK HARDWARE & TRIMMINGS

Carriage and Wagon Materials

AUTOMOBILE HARDWARE and TRIMMINGS

Send for a Copy of our Anniversary Catalogue

JOHN A. GIFFORD & SON

25 Park Place, 22 Murray Street, NEW YORK

Profitable Repair Work

Why not equip your shop to handle profitable repair work this season? Automobiles, tools, machinery, in fact practically all metal work can be quickly repaired by the Oxy-Acetylene process with

Imperial Welding and Cutting Equipment

Oxy-Acetylene Process

A relatively small investment in one of our outfits will give you exceedingly large returns and at the same time gives you an equipment that is unequalled in safety, economy and efficiency.

Practical mechanics grasp the operation of the process quickly and with a little practice soon become efficient welders. Do not permit the most profitable work to go elsewhere—equip now—you will never regret it—particularly if you select an Imperial Outfit.

FREE BOOK—Our new illustrated catalog shows work actually done, gives cost of operation and other valuable data.

Imperial Brass Mfg. Co.

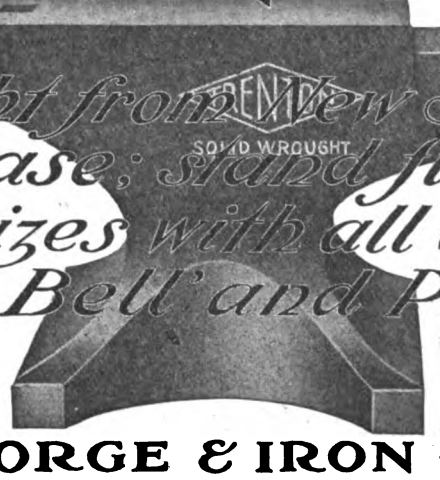
512 S. Racine Ave.,

CHICAGO.



Engine Bed welded with IMPERIAL OUTFIT

TRENTON ANVILS



Solid Wrought from New Steel; not cast.
Recessed Base; stand firmly on the block
Made in all sizes with all desirable Clips.
Ring like a Bell and Perfect in Shape.

BOKER CUTLERY & HARDWARE CO., Inc., Sole Sales Agents,
101-103 Duane Street, New York City

THE COLUMBUS FORGE & IRON CO. COLUMBUS, O.

JUST PUBLISHED



AUTOMOBILE WELDING

WITH THE OXY-ACETYLENE FLAME

By M. KEITH DUNHAM

167 Pages Price $1.00 Fully Illustrated

Sent Postpaid to Any Part of the World.

This is the only complete book on the "Why" and "How" of Welding.

EXPLAINS in a simple manner apparatus to be used, its care, and how to construct necessary shop equipment. Proceeds then to the actual welding of all automobile parts, in a manner understandable by everyone.

Gives principles never to be forgotten. Aluminum, cast iron, steel, copper, brass, bronze and malleable iron are fully treated, as well as a clear explanation of the proper manner to burn the carbon out of the combustion head.

AUTOMOBILE OWNERS, GARAGE AND SERVICE STATIONS, BLACKSMITHS AND MACHINE SHOPS, as wel as industries using the oxy-acetylene flame, will find this book of the utmost value, since the perplexing problems arising when metal is heated to a melting poin. are fully explained and the proper methods to overcome them shown.

CONTENTS

CHAPTER I.—APPARATUS KNOWLEDGE.

Oxygen Supply—Care of Oxygen Cylinder—Acetylene Generator—Care of Generator—Regulators—Care of Regulators—Creeping Regulators—Gauges—Care of Gauges—Welding Torch—Care of Welding Torch—Effects of Heat—Hose and Goggles.

CHAPTER II.—SHOP EQUIPMENT AND INITIAL PROCEDURE.

Preheating Agencies—Welding Table—Location of Welding Outfit—Starting the Welding Outfit—Adjustment of Flame—Principle of Welding—General Welding Knowledge—Welding Rods and Fluxes—Choice of Tip—Expansion and Contraction.

CHAPTER III.—CAST IRON.

Simple Welding—How to Hold the Flame—Hard Cast Iron—Pin Holes and Blow Holes—Lug on Cylinder—Water Outlet—Cylinder Welding—Compression Head—Finishing and Testing—Scored Cylinders—Cylinder Parts—Fly Wheels—Pistons—Crank Cases—Babbitted Bearings—Valve Guides—Preserving Threads—Conclusion of Cast Iron.

CHAPTER IV.—ALUMINUM.

Use of—Welding Knowledge—Puddle System—Flux System—Comparison of Systems—Welding Rod—Preparation of the Weld—Inlet Manifold—Arm of Crank Case—Welding the Arm Without Taking Out the Motor—Break in the Body of Case—Welding Cold—Wrong Method of Setting Up—Lug or Boss Welding—Preheating the Case—Gas Preheating Flame—One Side or Both—Collapse of Weld—Broken Bearings—Direction of Welding—Shrinkage Cracks—Missing Parts—Finishing—Die Mould Castings—Body—Other Parts.

CHAPTER V.—STEEL

Welding Knowledge—What the Flame Does to Steel—The Welding Rod—Simple Welding—Position of Flame—Reinforcing the Weld—Frame Welding—Lengthening the Chassis—Tube Housings—Worn Parts—Gear Welding—Case Hardening—Light Metal Welding—Gasoline Tank—Welding Adjacent to Rivets—Shaft Welding—Construction of Parts.

CHAPTER VI.—MALLEABLE IRON, COPPER, BRASS, BRONZE.

How to Detect Malleable Iron—Brazing Malleable Iron—Real Housing—Reinforcing the Braze—Brazing Tube to Housing—Building Up Worn Parts—Copper—Brass and Bronze—Silver Soldering.

CHAPTER VII.—CARBON BURNING AND OTHER USES OF OXYGEN AND ACETYLENE.

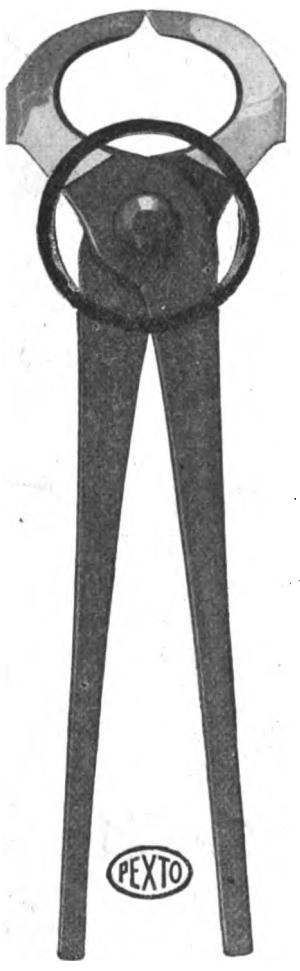
Principle of Carbon Burning—Method of Operation—Lead Burning—Soldering—Case Hardening—Heating Uses.

CHAPTER VIII.—HOW TO FIGURE COST OF WELDING.

Oxygen Consumption—Dissolved Acetylene Consumption—Torch Consumption Test—Acetylene Generator Consumption—Cost Card—Conclusion.

ADDRESS ALL ORDERS TO

M. T. RICHARDSON COMPANY, 71-73 Murray St., NEW YORK



The Secret's in the Circle

Put into a pair of Blacksmith's Shoeing Pincers the finest of steel, balance them with painstaking care, design the jaws with the utmost precision and you may still be a long way from making a thoroughly satisfactory tool.

How a pair of Shoeing Pincers performs depends largely upon how accurately the jaws are centered and fitted together.

Pexto Pincers not only meet all other requirements but also this exceedingly important one. That's why they always open easily and open wide. There's no binding or sticking with Pexto Pincers.

One hundred years of tool-making experience are back of every Pexto Blacksmith's Tool. Ask for them by name. If your dealer can't supply you, write us.

The Peck, Stow & Wilcox Co.

Manufacturers Mechanics' Hand Tools, Tinsmiths' and Sheet Metal Workers' Tools and Machines, Builders' and General Hardware.

Southington, Conn. Cleveland, O.

Address all correspondence to
209 W. Center Street, Southington, Conn.

PEXTO

BLACKSMITHS' TOOLS

Digitized by Google

ESTABLISHED 1880

The Pioneer Journal of its Class

THE BLACKSMITH & WHEELWRIGHT

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers. 71-73 Murray St., New York. Registered in U. S. Patent Office.

Vol. LXXVII. No. 2 NEW YORK, FEBRUARY, 1918 TERMS: One Dollar a Year, Foreign, $1.50, (6s. 3d.)

BUYERS' GUIDE AND INDEX TO ADVERTISEMENTS, PAGE 55

BEST HOOF PADS

Strong, tough canvasback, reinforced by new process ingredient—easily takes the place of a leatherback which is more expensive. High gravity stock in the heel too—new equipment in a big new factory enables us to turn out quantities to meet the demand—no waiting—Send for sample price list and learn something.

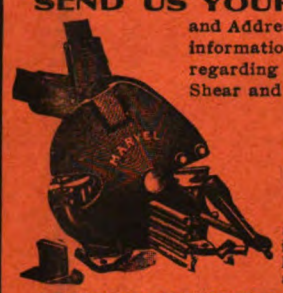
KAPLAN—Heavy Pads
PEARL—Light Pads
Furnished in 14 sizes—see list.



RADICAL RUBBER CO.
117 Gerry Street
BROOKLYN, NEW YORK

SEND US YOUR NAME

and Address and you'll get information worth while regarding this splendid Shear and Punch.



THE MARVEL
A Double Lever Machine.
One man does all the machine is capable of and he faces his work all the time.

ARMSTRONG-BLUM MFG. CO.
340 N. FRANCISCO AVE., CHICAGO, ILL.

STEEL STAMPS
BURNING BRANDS
RUBBER STAMPS
STENCILS
GEO. M. NESS, JR.
61 FULTON ST. NEW YORK
Send for price list.



SUREGRIP CALKS
American Calk Co.
DETROIT, - - MICH.

THE TEETH IN
BLACK DIAMOND RASPS
ARE MINGLED
So as to Cut Clean and Free and Leave no Furrows in the Work

Twelve Medals of Award by Jurors



At International Expositions

C. & H. BARNETT COMPANY
Black Diamond File Works, PHILADELPHIA, PA.
Owned and Operated by NICHOLSON FILE CO.
Copy of Catalog sent Free to any interested file users upon application.

To Drive "Capewell" Horse Nails

is to insure satisfaction for yourself and your customer.

Remember they are adapted to all kinds of shoeing—for heavy or light animals, for the road or the field.

The very best horse nail investment—economical, safe and reliable.

Substitutes will disappoint you. You really can't afford to accept a substitute.

Order The Capewell—the world's best nail at a fair price, not the cheapest regardless of quality.

Our 1918 CALENDAR Free

We have sent this calendar to all parts of the world. If yours has gone astray send us a postal request for one. *Free* to all horseshoers.

Printed (on a card 9 x 16 in.) from an oil painting. It is in six colors and has attracted much attention.

The Capewell Horse Nail Company
HARTFORD, CONN.
Largest Makers of Horse Nails in the World.



MUD CHAIN

Can be put on in a jiffy with one hand while standing on the run board. If you get in a mud hole, you will laugh out loud. Hook the ends together and pull the little lever and they are on tight. One or two will take you out of a hole, but it is better to use about 6 for continuous running. Good for blow-outs.

STEEL TIRE PROTECTORS



Tires can't wear out if covered with Steel. Try a few sections over any old blow-out. Tires are as flexible as ever. Can't Skid.

Special Inducements to Those in New Territory

KIMBALL TIRE CASE CO.
175 Broadway Council Bluffs, Iowa

Each Section 2 inches Wide, ⅛ inch Thick
Write for Prices and Full Particulars



Stokes Bros.' Improved Horse Rasps

Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A.

HORSESHOERS

It pays to pack the horse's hoofs with Lemoine's hoof packing. It has no equal for dry, hard, contracted hoofs, quarter cracks, corns and thrush. It never fails to do the work.

N. LEMOINE COMPANY
P. O. Box 88 FRAMINGHAM, MASS.

SUPERIOR Welding and Cutting Outfits, designed for the Blacksmith's use

Increase your profits by being able to take care of your repair work by the Oxy-Acetylene process. Saves time and money.

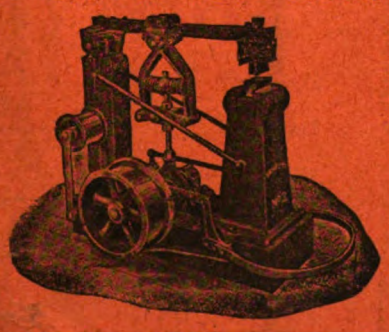
Write for complete catalog and monthly price sheet.
AGENTS WANTED
SUPERIOR OXY-ACETYLENE MACHINE CO.
HAMILTON, OHIO

The HAWKEYE HELVE HAMMER'S Built in Three Sizes.

12 years in successful operation. Fully guaranteed. Note the principle of stroke. Double the capacity of any upright hammer of the same weight and price.

For price and descriptive literature write,

The Hawkeye Mfg. Co.
CEDAR RAPIDS, IOWA, U. S. A.



The ROTO ELECTRIC BLOWER $27.50 COMPLETE

THE U. S. GOVERNMENT

Wants everybody to avoid waste. Why should the middleman come between you and the maker? Our direct plan of selling

ELIMINATES THE MIDDLEMAN.

The latest model AIR COOLED ROTO BLOWER is better than any $35 or $40 Blower on the market. It will weld the largest size axles or the lightest calks. No forge is too large for this Roto. It will make your work easier—Save 50% of your time—Let you do twice the work in less time—Costs only 2 cents per day to run and is fully guaranteed.



N. B.—The above price is subject to change without notice.

The Navy Department Uses The Roto

It surely ought to be good enough for you if it can pass government inspection. You can't go wrong by sending us the coupon for a free trial. If it doesn't satisfy you in every respect send it back at our expense. That's fair isn't it?

CUT OUT THE COUPON
SEND IT TODAY DO IT NOW!

THE ROSEWATER ELECTRIC CO.
5516 KINSMAN ROAD CLEVELAND, OHIO

Send me by..... An AIR COOLED ROTO BLOWER with one year's guarantee, complete with cord, plug and Speed Regulator. I will return it to you at the end of 30 days, if it does not give me entire satisfaction, and if I keep it, I will pay you $27.50 at the end of 30 days.

Name..... Address.....

Current..... Voltage..... Cycles.....

Your Electric Light or Power Company Will Give You This Information

WELDING PLANTS, $25.00 to $300.00

Designed for all purposes. Small cash payment; balance, three to six months. Every mechanic and shop should have one.

BERTSCHY-BERMO CO. OMAHA, U. S. A.

Digitized by Google

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge

Nothing to get out of order.



Will hold securely any size of shoe.

No. 8 16 Inches Long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

Weights, 1¾ to 3 lbs.

This Hammer is the most popular Sharpening Hammer on the market.

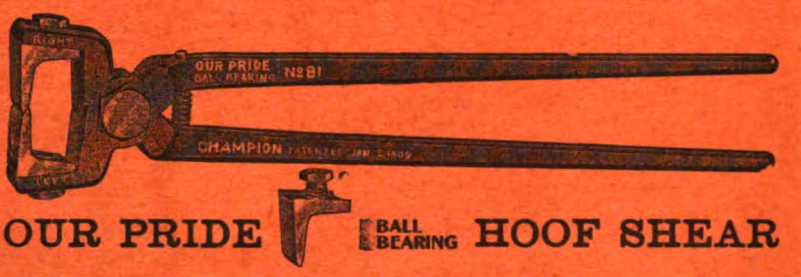


Corrugated Pein.

IT GIVES RESULTS.

No. 12 ELECTRIC SHARPENING HAMMER

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.



Blades easily replaced when worn out.

All parts interchangeable.

OUR PRIDE BALL BEARING HOOF SHEAR

Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY, - Meadville, Pa., U. S. A.

THE LIVINGSTON CO., 131 E. 23rd Street, NEW YORK, Eastern Representatives

STOP REAR AXLE TROUBLE

BY INSTALLING THE

BAILEY BALL THRUST



at left (gear) side of Ford and Chevrolet 490 differential, to replace flat thrust washers

Whenever a car owner comes to you because of rear axle trouble, as a rule you will find that the flat thrust washers at left (gear) side of differential have worn thin, causing drive and pinion gears to get out of mesh and break.

Because flat washers have but a sliding contact they are bound to wear thin and cause breaks, but the Bailey Ball Thrust bearing, an exact replacement for flat washers, will not wear thin and will positively keep gears in proper mesh, make them run smoothly and last indefinitely. Hence remedying axle trouble.

The Bailey bearing is made of the finest materials, carefully heat-treated and ground, has eighteen ¼ inch balls of the highest grade, and having a capacity for six times the maximum thrust, every bearing holds an unqualified guarantee that will "stand up" under all conditions and strains.

We absolutely stand in back of you on every bearing you install.

Here is a profitable replacement business for blacksmiths. More than usual profit and an opportunity to promote considerable business if you will carry one or two on hand at all times to be ready when occasion demands. Write your nearest jobber or to us.

Place an Order Now

List Price, $3.75

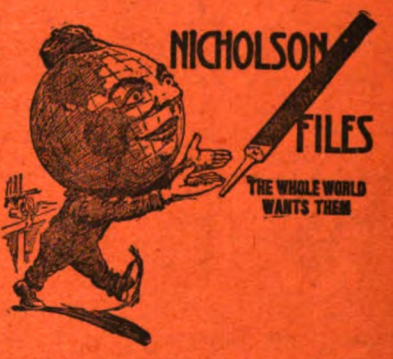
Regular Dealer Discount to Blacksmiths



Fits to a 1000th Part of an Inch

GEO. D. BAILEY CO.

1124 S. Michigan Ave. Chicago, Ill.



The files which do the best, "longest," are the ones for you to use on your work.

You will always find that

NICHOLSON FILES

Give Best Service

NICHOLSON U.S.A. (TRADE MARK)

BY INVITATION MEMBER OF

NEW YORK, U.S.A.

"NICHOLSON" stamped on a file, absolutely guarantees selected steel—forged, annealed, ground and cut by expert workmen who have made your needs a lifetime study.

SPECIFY "NICHOLSON"—AT ALL LEADING DEALERS

Nicholson File Co., Providence, R. I.

Digitized by Google

"F-S" PAINTS



A Good Reputation is an Asset. Everyone Speaks Well of "F-S" Products

"F-S" Carriage and Automobile Top Dressing makes old tops look new and turns water like "a duck's back." Easily applied—dries quickly—won't crack—can't injure leather. Try it on the next job.

FELTON, SIBLEY & CO., Inc.

Manufacturers of Colors, Paints, Varnishes since 1863

136-140 North Fourth Street, Philadelphia

(146)



Massive in Appearance Light in Weight



Cushion



Internal Wire



Side Wire

IT is the generous measure of rubber that gives Firestone Carriage Tires the width and thickness which add so much to the appearance of the "turnout."

It is the quality of the rubber that allows extra size and resiliency without extra weight.

Firestone Carriage Tires give thorough satisfaction in comfort, wear and appearance, so uniform that they wear evenly to the channels.

Firestone Dealers win new buyers who become regular customers. Write for attractive proposition to dealers.

FIRESTONE TIRE & RUBBER COMPANY, AKRON, OHIO

Branches and Dealers Everywhere

Firestone Carriage Tires

JOB WANTED



An able bodied workman seeks a position in some good blacksmith or machine shop.

He is an old acquaintance and friend of the Editor of the Blacksmith and Wheelwright, to whom he is permitted to refer.

He is not particular as to what locality he works in, provided he has plenty of good hard work to do, and his employer honest and careful.

With such a boss, he agrees to never touch intoxicants or indulge in other dissipation. He agrees to be on hand ready for work at seven o'clock in the morning, or any earlier hour the shop opens. He will work overtime without grumbling, even to twenty-four hours daily for as long a period as may be necessary.

He will agree never to strike, ask for higher wages, or even want to go fishing or take a holiday.

He will board himself and remain in perfect health indefinitely. He has no family cares to worry about. He and his brothers, older and younger, are of the well known L. G. P. HAMMER clan, world renowned for skill, integrity and ability.

He is willing to work for twenty cents a day and agrees to do more work than any six skilled men at $3.00 per day. After his wages have been paid for twenty months, he agrees to work for nothing during the remainder of his natural life, which he estimates at fifty years.

He agrees to come on trial, and after thirty days' work, if his boss is not satisfied he will return home without any charge for his services.

He guarantees that he will relieve his employer from all drudgery, so he can spend more time with his family, and not be so eternally tired that he can get no enjoyment out of life.

He will treat all customers so pleasantly and do their work so skillfully that they will always bring their work to his shop, and advise their friends to do likewise.

He is not subject to enlistment or draft, and is ready to leave at once and begin work immediately on arrival.

ADDRESS:

LITTLE GIANT

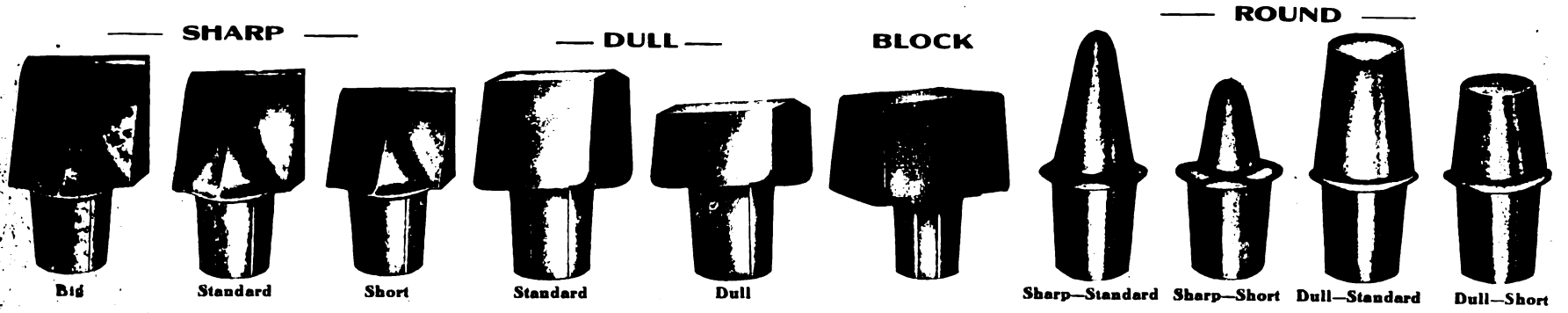
103 Rock Street

MANKATO, MINN., U. S. A.



Digitized by Google

A Diamond Calk For Every Purpose



DIAMOND CALKS are made for every possible need of the horse, and severe tests together with long continued use under every condition have absolutely proven that they **meet those needs** most effectively.

They not only fit the shoe perfectly, but they fit every purpose where calks are required.

DIAMOND SHOES are made of Driving, Draft Horse and Mules, and when used with Diamond Calks, afford the most efficient and economical horse footing that money can buy.



Made both Front and Hind

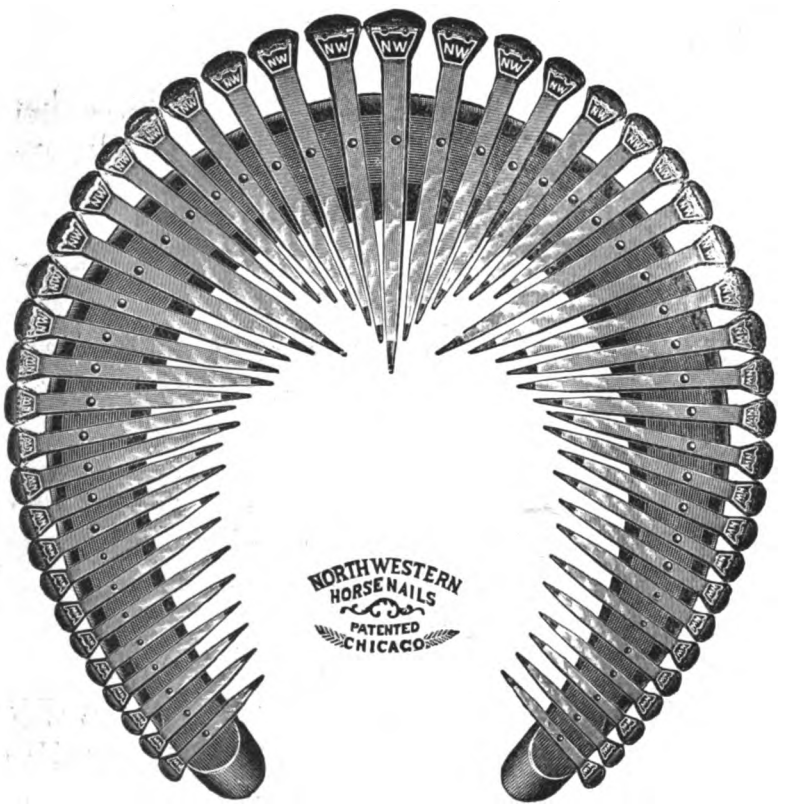
ASK FOR NEW CATALOGUE
Also large wall poster in colors

DIAMOND CALK HORSE SHOE COMPANY
DULUTH, MINNESOTA



Made both Front and Hind

NORTHWESTERN HORSE NAILS



MADE OF THE BEST QUALITY MATERIAL

The most perfect in form and finish and will hold a shoe longer than any other nail made.

THE RE-ENFORCED POINT makes it the easiest to drive and the safest to use.

UNION HORSE NAIL COMPANY
Manufacturers
CHICAGO ILLS.

INDIAN CHIEF
Black-smiths' **VISES** Horse-shoers'

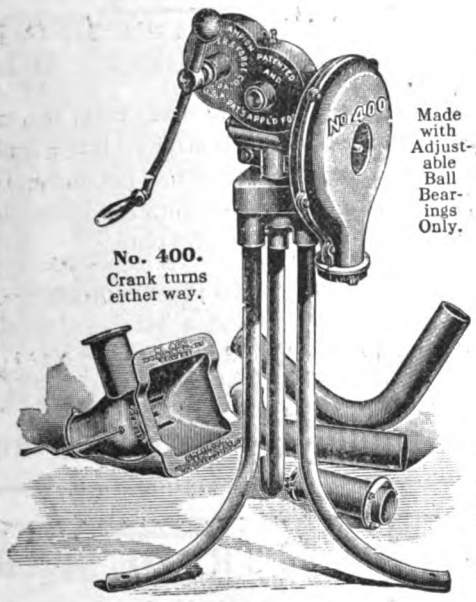


BOKER CUTLERY & HARDWARE CO., Inc.
Sole Sales Agents
101-103 Duane Street, New York City

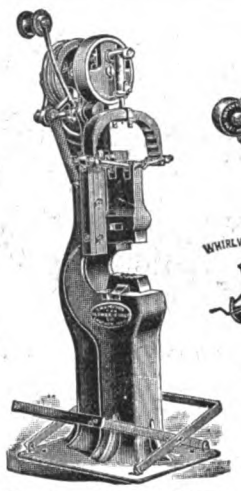
Solid Box — Solid steel drop forged jaws faced with crucible tool steel. Improved screw of one piece of forged steel. Built right throughout.
THE COLUMBUS FORGE & IRON CO., COLUMBUS, OHIO.

Digitized by Google

THE FAMOUS "CHAMPION" BLACKSMITH TOOLS



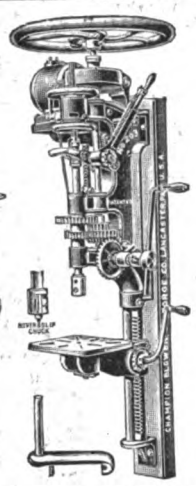
No. 400. Crank turns either way. Made with Adjustable Ball Bearings Only.



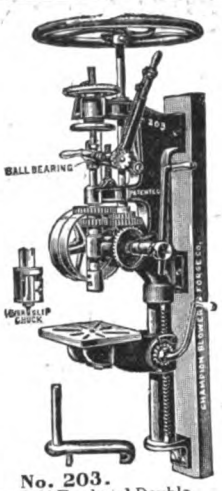
Hercules Patented Power Hammer. Weight of ram, 65 pounds. The power hammer with the flexibility in stroke of a hammer in a mechanic's hand.



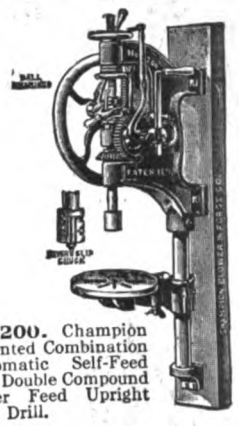
No. 408. Steel Blacksmith's Forge.



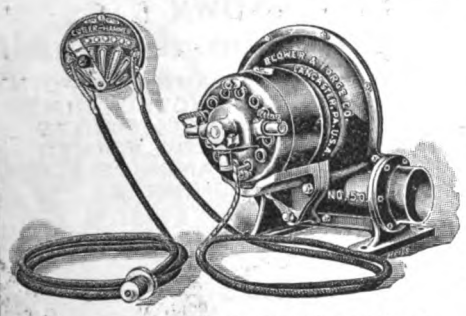
No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.



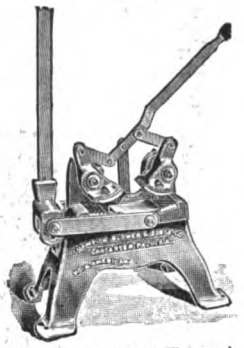
No. 203. Self-Feed and Double Compound Lever Feed Drill.



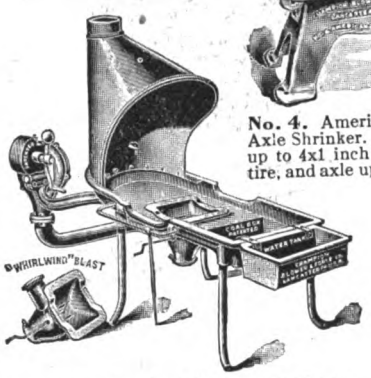
No. 200. Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



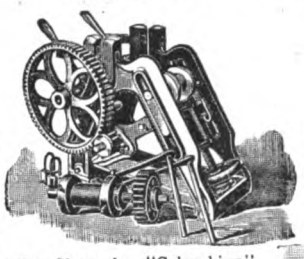
No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower with a Universal Motor for both direct and alternating current, either 110 or 220 volts, with Detached Rheostat for six speeds, and Steel Pressure Blower case, for all kinds of general Blacksmith work.



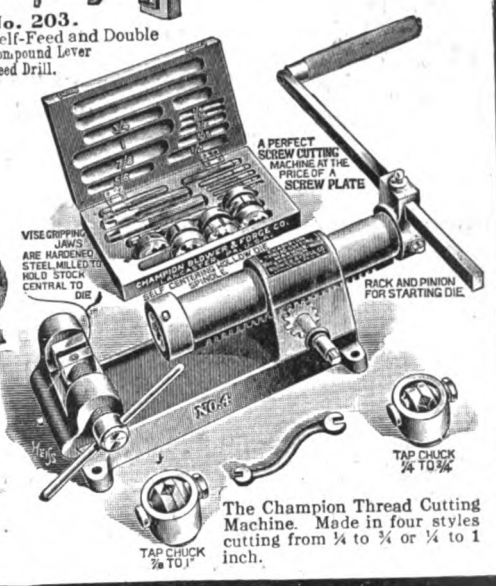
No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



No. 433. Cast Iron Blacksmith's Forge.



The Champion "Columbian" Tire Bender. Made in 3 sizes.



The Champion Thread Cutting Machine. Made in four styles cutting from ¼ to ¾ or ¼ to 1 inch.

Don't Fail to Get 1917 Catalog

Before purchasing a Hand Blower, Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

"IDEAL" LAWN MOWER GRINDER

A BIG MONEY-MAKER.

Many of our customers make $300 in one season. You can do as well.



"You Grind It as You Find It."

Grinds all makes of Mowers perfectly in 15 minutes without removing wheels, ratchets or reel-knife. Has perfect Skate Sharpener Attachment for sharpening skates. Operated either by hand or power. Ball-bearing; easy running. Will do the work so much BETTER, QUICKER and EASIER you cannot afford to be without it. Nearly 10,000 in use. Fully guaranteed. Sold on easy-payment terms.

WRITE TODAY for catalog and full information.

Also makers of the "PEERLESS" Horse Lawn Mower Grinder.

THE ROOT-HEATH MANUFACTURING CO.

PLYMOUTH, OHIO

Would You Sell Your Life For $65?

You wouldn't part with even an arm or a leg for that figure, would you?

Yet every vicious horse you shoe is likely to do more damage in the twinkling of an eye than can be repaired at several times the cost of **Barcus Stocks.**

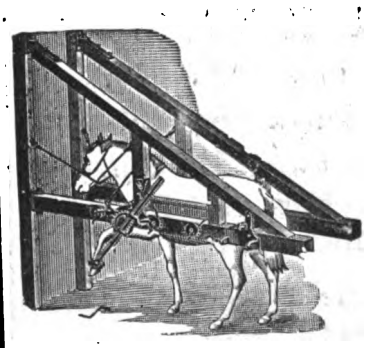
When you place a horse in a Barcus Stock, he is harmless—he cannot hurt either you or himself. Costing only $65 it is cheap insurance, indeed.

BARCUS STOCKS not only furnish the logical way to observe "Safety First," but they are also a positive aid to good shoeing. The BARCUS is a modern Stock—automatic working parts instead of the bothersome ropes, straps and blocks that made the old style stock almost more of a nuisance than a help.

If you don't know about **Barcus Stocks** you owe it to yourself and your family to write **at once** for the complete details.

The Barcus Mfg. Co.,

Wabash, Ind.

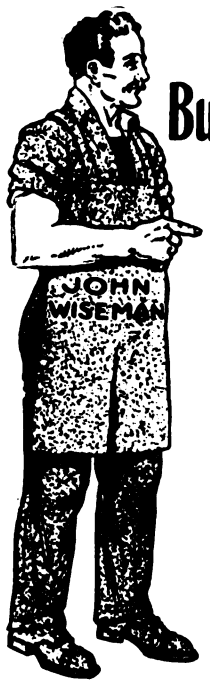


Please send me full particulars regarding your Horse Stocks without any obligation on my part.

Name.....

Town.....*State*.....

Digitized by Google



Higher Prices But Bigger Cash Saving



If you're John Wiseman, you used STANDARD Toe Calks last year and copped the saving.

If you're Bill from Missouri, now is the time to admit that you have been shown.

You make about *twice* the *cash saving* this year that John Wiseman made last year by using STANDARD Toe Calks.

Prices are up on steel products—hence the greater cash saving and the added necessity for saving every cent.

You don't buy the Calk Box. You buy the Calks in the box and there are more Standard Toe Calks in the box. And there's just one quality—THE BEST.



STANDARD TOE CALKS

Buy from your dealer. He can get STANDARD CALKS for you

No. 1

FRANKLIN STEEL WORKS

Joliet, Ill. Cambridge, Mass. Hamilton, Ont.

"GREYHOUND"

$27.50



Variable Speed only

These motors are made from the very best materials obtainable. Have a perfect lubricating system. Economical in the consumption of current. Complete with rheostat cord and plug.

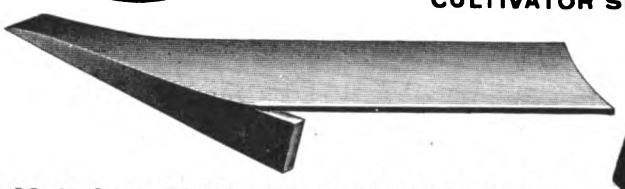
Shipped to you through Your Dealer on a 30 days' trial

R. GARDNER ELECTRIC & MFG. WORKS

1714 COLUMBUS ROAD CLEVELAND, OHIO

The STAR TRADE MARK IS KNOWN as a Guarantee of Quality

PLOWSHARES
LISTERSHARES
MOLDBOARDS
SUBSOILERS
SEEDER POINTS
LANDSIDE POINTS
SHOVEL POINTS
DRILL POINTS
PLOW POINTS
LANDSIDE PLATES
CULTIVATOR SHOVELS



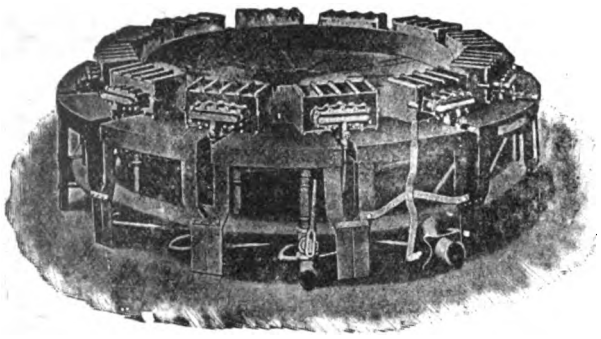
(2)



Made from SOFT CENTER, SOLID CAST, or CRUCIBLE STEEL.
Best Material and Workmanship.

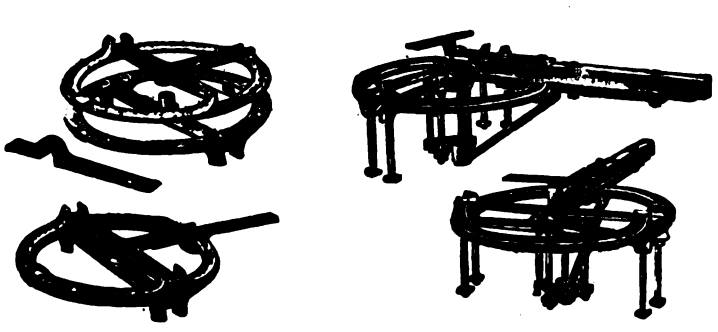
Star Manufacturing Co.

CARPENTERSVILLE, ILL.



TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.

OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.



Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE COCEL MFG. CO., TOLEDO, OHIO.

Edwards Shears

For twenty years the Two Leading Low Priced Shears in the U. S., representing the Greatest Value for the Least Money.

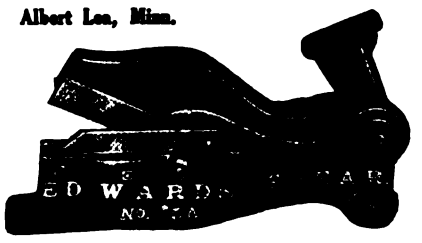
No. 5, weighs 200 lbs., cuts 4x½ inch soft steel.
No. 10, weighs 430 lbs., cuts 4x¾ inch soft steel.

At their price you should have had one long ago. Order one from the first iron man that calls on you. They All Sell Them.

Write for descriptive circular and prices.

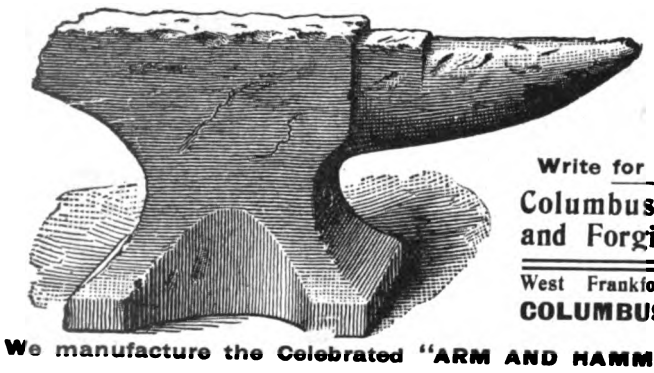
C. D. EDWARDS

Albert Lea, Minn.

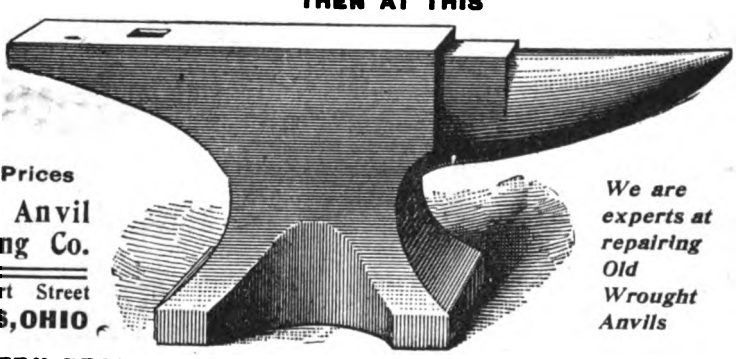


No matter how badly they are broken we can repair them in good shape

LOOK AT THIS



THEN AT THIS



Write for Prices

Columbus Anvil and Forging Co.

West Frankfort Street

COLUMBUS, OHIO

We are experts at repairing Old Wrought Anvils

We manufacture the Celebrated "ARM AND HAMMER" BRAND ANVILS

Ask Your Dealer for Them

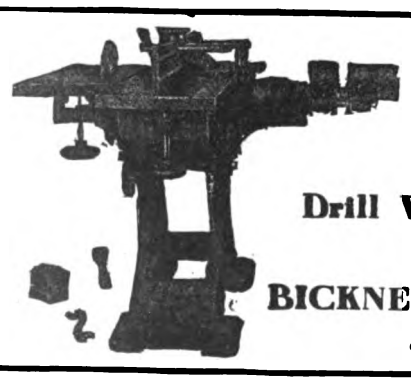


ABSORBINE STOPS LAMENESS

from a Bone Spavin, Ring Bone, Splint, Curb, Side Bone, or similar trouble and gets horse going sound. It acts mildly but quickly and good results are lasting. **Does not blister or remove the hair** and horse can be worked. Page 17 in pamphlet with each bottle tells how. $2.00 a bottle delivered. **Horse Book 9 M free.**

ABSORBINE, JR., the antiseptic liniment for mankind, reduces Painful Swellings, Enlarged Glands, Wens, Bruises, Varicose Veins; heals Sores. Allays Pain. Will tell you more if you write. $1 and $2 a bottle at dealers or delivered. Liberal trial bottle for 10c stamps.

W. F. YOUNG, P.D.F., 55 Temple St., Springfield, Mass.



BICKNELL'S

Jointer, Saw and Rounding Machine,

Drill Vises, Farriers' Knives, and Other Tools.

BICKNELL MFG. & SUPPLY CO.

JANESVILLE, WIS.

THE ARMSTRONG MFG. COMPANY

BRIDGEPORT CONN., U.S.A.

NEW YORK OFFICE 248 CANAL STREET

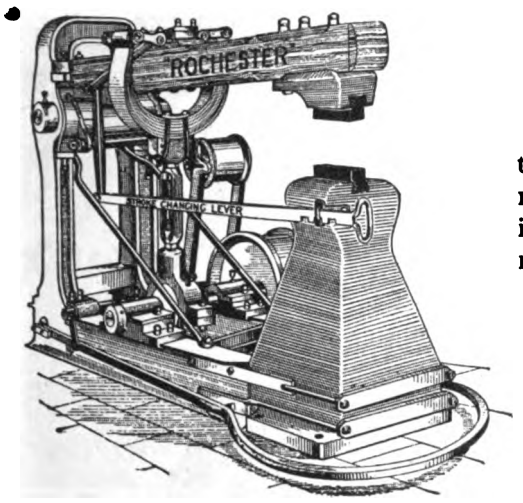
like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



"Makers of the Genuine ARMSTRONG Stocks and Dies."

Digitized by Google

ROCHESTER HELVE HAMMER



Made in six sizes, one of which is just adapted to your needs.

The sooner you put one of these to work for you, just that much earlier will it begin paying dividends on your investment.

Write us your requirements to-day. Our catalogue is free.

THE WEST TIRE SETTER COMPANY
Rochester, N. Y.



Free 512 PAGES OF BARGAINS

POST PAID

WE WANT TO SEND YOU THIS 512 PAGE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

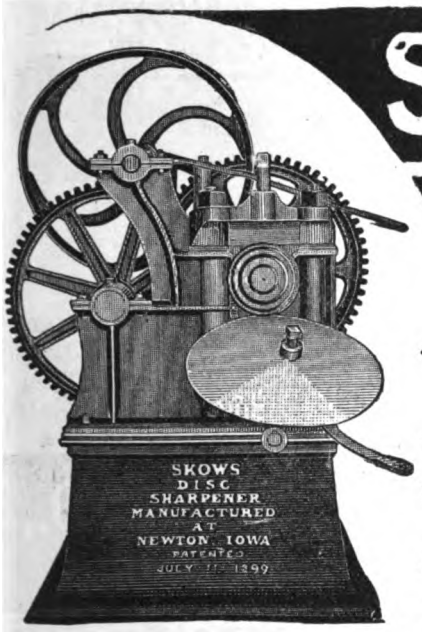
Tells how you can work up a profitable auto supply and repair business.

Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories
1117 W. 11th Street, Cleveland, Ohio, U. S. A.



SKOW'S ROTARY DISC SHARPENER

is a big Money Maker in any Shop.

MADE $229.50 IN A LITTLE OVER 2 MONTHS
We shipped this machine from factory on January 10th, 1914

SKOW MFG. CO., Newton, Iowa. Nora Springs, Iowa, March 18, 1914.
Dear Sirs:—We have sharpened 78 discs on our "Skow Roller" to date, which brings us $229.50 and the end is not yet. Now can you make us a casting like No. 15 with the shank straight up for rolling coulters. We have tried them on the roller and it is O. K., but should have the casting No. 15 as above mentioned. Let us hear from you if you can make us one. Send us your bill and we will remit for same. VOLKMAN & SEAMAN.

700 of these machines in use. Sharpens cultivator and plow discs of all sizes by cold rolling. Gives a better and more permanent sharp edge than is possiblle by any other method.

Ask Your Jobber For Skow's Disc Sharpener. *Write Us For Descriptive Circulars.*

SKOW MANUFACTURING CO., - Newton, Iowa, U. S. A.

UNITED STATES HORSE AND MULE SHOES ARE REAL TRADE WINNERS


Front Lt. Long Heel

PERFECT ALL THROUGH AND EASY TO FIT


Hind Lt. Long Heel

Prove It Out On Your Next Order

Carried in Stock by All Jobbers

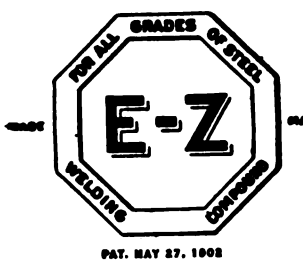
A Handsome Souvenir Watch Fob Given Away Free To All Blacksmiths and Horsemen Upon Request.

WRITE FOR OUR LATEST CATALOG No. 16 ILLUSTRATING OUR COMPLETE LINE

Manufactured By
United States Horse Shoe Co.
ERIE, PA.

"E-Z" WELDING COMPOUN

is the best **BECAUSE**



It works Equally good on all Kinc of steel.

It welds at **lower heat** than an other.

It **sticks** to metal at a **very lo** heat.

It leaves **no scale.**

USE IT ONCE AND YOU WILL ALWAYS WANT I

Crescent Welding Compoun

MAKES SMOOTHER WELDS THAN ANY OTHER

It is fine for plow work or where parts are fastened together before welding, or for making split welds, finishing heats, or for welding under dies, etc., etc.

CRESCENT WELDING COMPOUND TRADE MARK

It insures smooth finish and perfect welds on Toe Calk

"Money back" from any jobber if "E-Z" or Cresce does not give perfect results.

We will send samples free of charge.

MADE ONLY BY
Anti-Borax Compound Co
FT. WAYNE, IND.

Digitized by Google

WAGON BUILDING

"Build me a wagon that will last forever."

"Sorry, Sir, but 'axle troubles' (due to wear—wear on the spindle, or on the box, or both) make it impossible."

You've often received a specification like that and been obliged to give that answer—haven't you?

The Sheldon "TON-DON"—an axle that will not wear, run hot or break—allows your meeting the requirements of the man who wants a wagon to last forever, **and we have told him so.**

The Sheldon "TON-DON" was originally made for buggies and carriages. Its success was so instantaneous and pronounced that we were deluged with requests for an axle embodying the same principle for use on Delivery, on Business and on Express Wagons.

Hence, the "TON-DON" CONCORD EXPRESS.
In EFFICIENCY—The HIGHEST.
In CONSTRUCTION—The SIMPLEST.
In SERVICE—The MOST SATISFACTORY.

The Spindle of the Sheldon Ton-Don Axle

Ordinary axles wear flat on the bottom of the spindle because the bottom side is the point of contact and where the wear of the spindle is concentrated. It takes a spindle of unusual hardness to resist this wear—greater hardness than any ordinary axle affords. The spindle of the "TON-DON" is hardened by a special process, producing a wearing surface of such hardness that a fine file makes no impression on it—yet the center remains soft or "natural."

The Phosphor-Bronze Lined Box

The peculiarity of this box lining is that while somewhat softer than the spindle, there is no perceptible wear after thousands of miles of running, but becomes harder and more wear-resisting with use.

Phosphor-Bronze (of a mixture which increases its toughness, smoothness under friction, and wear-resisting qualities) is a metal used for making the propellers of ocean steamships, bearings for locomotives, crank-shaft bearings for automobiles and other fine machinery. Imagine what a metal must be to meet such conditions, and you will grasp the advantages of applying such metal to axle purposes.

THESE AXLES CARRIED IN STOCK BY THE FOLLOWING JOBBERS AND CAN BE OBTAINED AT MANUFACTURERS' PRICES.

Baltimore, Md. ..... E. Scott Payne Co.	Providence, R. I. .. Congdon & Carpenter Co.
Boston, Mass. ..... E. P. Sanderson Co.	Rochester, N. Y. ..... Burke Iron & Steel Co.
Buffalo, N. Y. ..... H. D. Taylor Co.	San Francisco, Cal. ... Waterhouse & Lester Co.
Chicago, Ill. ..... E. D. Kimball Co.	Scranton, Pa. ..... Bittenbender & Co.
Cincinnati, O. ..... G. B. Schulte Sons Co.	Seattle, Wash. ..... Gray Bros. Co.
Indianapolis, Ind. ..... W. J. Holliday & Co.	Springfield, Mass. ..... Chas. C. Lewis & Co.
Los Angeles, Cal. ..... Percival Iron Co.	St. Louis, Mo. ..... Sligo Iron Store Co.
Milwaukee, Wis. .. Shadbolt & Boyd Iron Co.	Washington, D. C. ..... Louis Hartig
Pittsburgh, Pa. ..... McLean & McGinness	Wilmington, Del. .... Delaware Hardware Co.
Portland, Oregon ..... J. E. Haseltine & Co.	Bridgeport, Conn. ..... Chapman & Bangs Co.
Ft. Wayne, Ind. ..... Mossman, Yarnelle & Co.	San Antonio, Texas Heusinger Hardware Co.
New Orleans, La. ..... Jos. Schwartz & Co.	

SHELDON

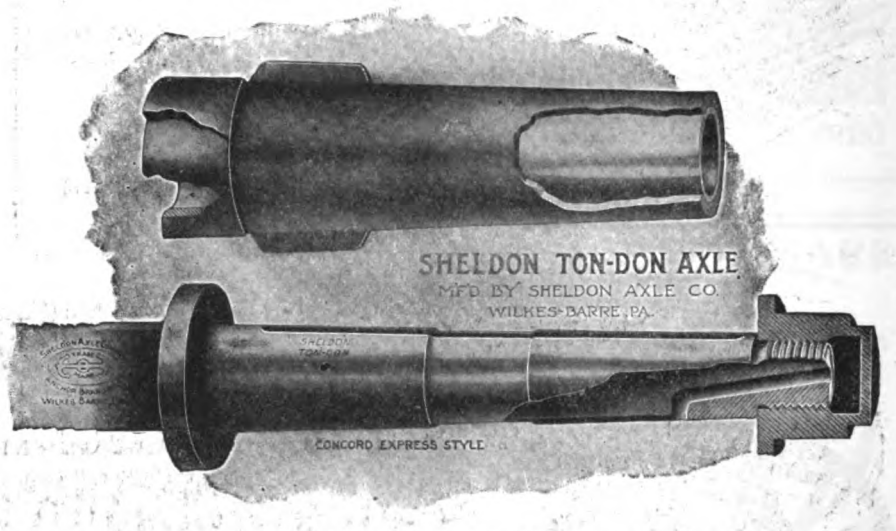
"TON-DON"

CONCORD EXPRESS STYLE

NOT A BALL OR ROLLER BEARING—BUT

ANTI-FRICTION—EVERLASTING—INTERCHANGEABLE

IT WILL NOT CUT, HEAT OR STICK



NOTICE THE PATENTED OILING DEVICE
HAS ALL THE ADVANTAGES OF FRICTION AND ANTI-FRICTION AXLES WITHOUT THEIR DISADVANTAGES
"TON-DON" MEANS KNOWN QUALITY WITHOUT FANCY PRICE
MADE ALSO FOR BUGGIES AND SURRIES

SHELDON AXLE & SPRING CO.,
WILKES-BARRE, PA.

LARGEST AXLE FACTORY IN THE WORLD.

Drowning the Magazines

OF INTEREST TO EVERY SUBSCRIBER

By a Reader

I live in a tiny town in the mountains of Vermont. The nearest railroad station is twelve miles away. The population of my town is about four hundred, scattered over a number of square miles, and there is not one of that four hundred who could be referred to as well-to-do. My husband is not well-to-do. He is a rural mail carrier with a route which gives him time to work a little farm.

We have no public library. We are too small and poor a community to afford that. Few books are owned in our homes, and those not offering a variety of reading. But one thing we do have which gives us something fresh to read and which enables us, even in that remote village, to keep some account of the world, and to satisfy that hunger for knowledge which seems to increase as the opportunities for it diminish. We have our reading club, of which I am secretary.

With the sum of our dues we subscribe for all the magazines the money will buy. These magazines are our theaters, our concerts, our lecture courses; they enable us to travel in foreign countries and to know and to understand distant parts of our own countries. They are our art museums. They make it possible for us to talk intelligently to strangers about places we can never hope to see, about the finer privileges of life in which we can never hope to share.

Ourselves and our whole village are the better for articles we read. We have learned the meaning of sanitation; we know why the fly is dangerous; we have compelled the Selectmen to enforce sanitation that we would never have heard of but for our magazines.

Our kitchens are not the same. Our food is better prepared and more tasty. Instead of being backwoods housewives, we try to be as up-to-date as our city neighbors. Perhaps we try harder than they—and we know how, because our magazines tell us.

Twenty years ago the infant mortality among us was an agony. A baby born was received with both love and terror, for we saw how few were his chances for surviving his first three years. Today the love is there, but the terror is gone. We have been taught how to guard our babies, not only to guard them after they are in our arms but before. For this one thing the magazines are precious to us.

Our education is not altogether on the practical side, either, but in those things which make life more beautiful and livable. We cannot know the music of the world, for we have not yet been able to afford a phonograph. But we are saving for one. At least we have learned that if we have not heard it we must hear it. But we do know about pictures and about statues and about architecture. The magazines have shown us those things and explained them to us—and have developed in us an appreciation for beauty.

I could write to you for hours about what changes the magazines have brought about in the lives of myself and my family, in my neighbors, in our whole village. We are not the same. And because the magazines were almost our sole source of information and of encouragement and of inspiration, I place the credit for these changes where it belongs. I do not overstate the fact.

Now I am writing because I am afraid. We have heard that Congress does not understand the place the magazine has in the lives of such as myself, and has passed a law which threatens to interfere with our receiving them as we have. Father and I have studied that law and it doesn't seem just to us. It seems as if Congress, unwittingly, had set out to punish us and to deprive us of the thing that has made us what we are. We are afraid that some of the magazines which are so necessary to us will not keep on in business because they cannot afford to pay the increase in postage that Congress has enacted.

We are afraid that those who do keep on will be obliged to raise their rates of subscription. Do you know what that will mean? Eighteen of us contribute twenty-seven dollars a year. That twenty-seven dollars buys us all I have told you about above. We cannot afford more than twenty-seven dollars, and increased subscription means we must take fewer magazines. We cannot get along without them.

I believe if Congress understood that; if Congress knew about us and how we need the magazines, they would repeal that law. Father has written to our Congressman and our Senator. Once he would not have dared to do that. He asked their help for us. Every family of our eighteen has written. Don't you believe that when Congress understands; when Congress knows about us back here in the mountains, and about our like on distant prairies, it will look at this thing from another direction, and work to give us more of what is so necessary to us, instead of depriving us of it? There must be some way to make them understand.

Will you not write your Congressman urging a repeal of this measure which will deprive many homes of a source of enjoyment and inspiration? If you do not know his name, ask your Postmaster and then write him and address your letter House of Representatives, Washington, D. C. Also write the two Senators from your State, addressing them Senate Chamber, Washington, D. C.

Digitized by Google

"Buffalo"

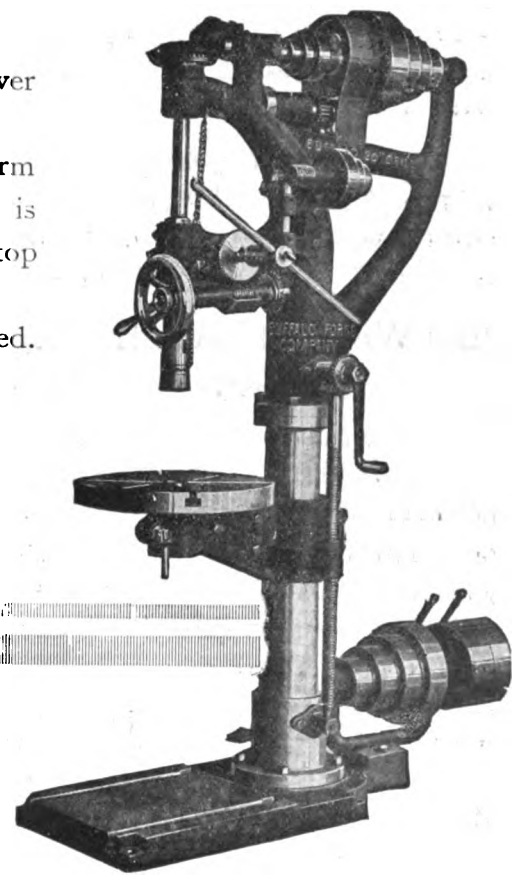
For the Auto Repair Shop

The repairing of automobiles calls for accurate workmanship and this means good tools

The Buffalo No. 5, 20-inch Back-Geared Drill is a machine tool designed for the very highest class of work that may be demanded in the repairing of automobiles. It can be changed instantly from plain to back-geared drive. Has eight speeds, three power feeds, together with hand and lever feed.

All gears are machine-cut; worm feed wheel runs in oil; crown gear is bronze brushed. Automatic feed stop insures accuracy.

All parts carefully made and fitted.



May we send you detailed information and prices?

Buffalo Forge Company, Buffalo, N. Y.

CLIMAX WELDING COMPOUND
TRADE MARK
REGISTERED AUG. 22, 1905.

Especially adapted for welding tires, axles, springs and all lap welding.

WANT A FREE SAMPLE ?



WHICH ONE ?

A flux which causes the steel to weld like iron. Not necessary to apply between the lap, but may be applied to the outer surface of the work, the same as borax. Has no equal for plow work. Just the thing for welding toe-calks so they can't knock off.

Large Free Sample Sent on Request

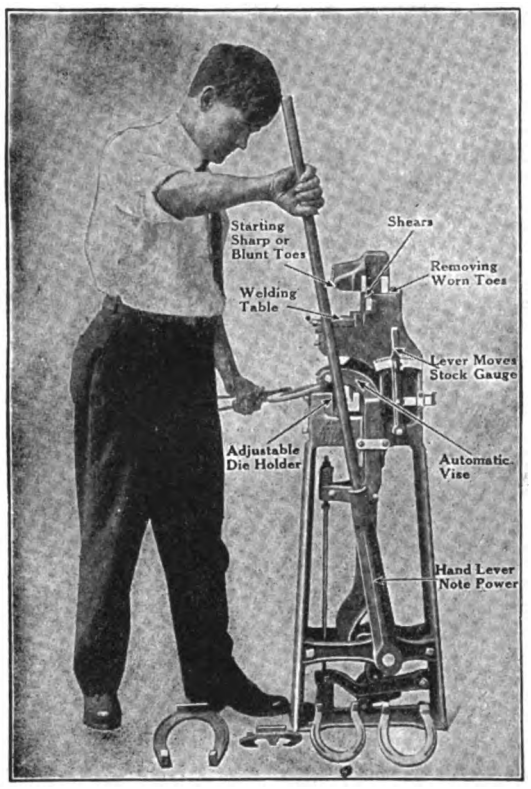
Cortland Welding Compound Co.
CORTLAND, N. Y.

BORAX-ETTE FOR STEEL
TRADE MARK
REGISTERED AUG. 22 1905
A PERFECT WELDING FLUX
PREPARED ESPECIALLY FOR WELDING
FAR SUPERIOR TO COMMON BORAX

1918 MODEL

THE L. S. P. CALKING MACHINE

The Greatest Time and Labor Saving Machine On Earth



1918 MODEL—Fully covered with Patents

OUR 1918 Model is the same as our 1917 Model with the exception that we have eliminated the steel plugger attachment and strengthened some of the parts.

Do not mistake this for a machine which makes toe calks or a foot vise. This machine is for turning heel calks, both Blunt and Sharp, sticking and welding toe calks, clipping and trimming ends of shoes. IT CALKS SHOES, doing the work just the same as you do by hand with the hammer, only it is done much better and easier, and in a fraction of the time.

In turning heels, you can turn up just as much stock as you wish, upset or stoveup to make as heavy as you like and square up the calks without use of hammer. There is no losing of toes when you weld on the L. S. P.

It is a strong, handsome, well made machine and will last, as you might say, a life time, fully warranted for one year. It is in use in the best shops in the United States, users claiming more for it than we do.

Write at once for full information and prices.

L. S. P. CALKING MACHINE CO.
P. O. Box 225 WYALUSING, PA., U. S. A.
NATIONAL MACHINE CO., Brighton, Ontario, Canada

Digitized by Google

LINDE OXYGEN SERVICE

Asks Fifty-Fifty Cooperation from Its Thousands of Patrons

WE believe we have the service capacity to supply the requirements of every user of Oxygen. We have sixty-four big factories and distributing stations, located in the heart of Oxygen consuming districts—each of these factories and stations are backed by huge stocks maintained at our other stations located on Continental Trunk Lines.

And we are adding thousands of new cylinders monthly to the hundreds of thousands we have in commission—a grand total more than sufficient to meet even war-time requirements.

But We Must Have the Cooperation of Patrons to Keep the Cylinders Rolling

Empties must be returned to us promptly.

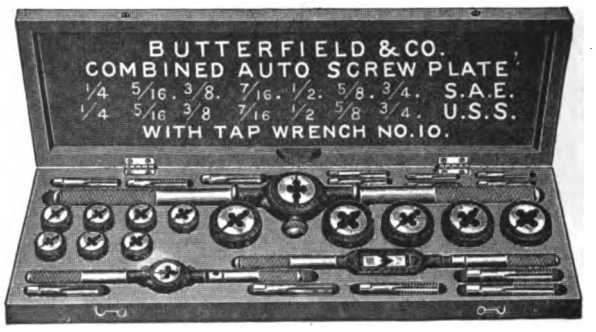
This vital factor in the maintenance of the standard of service in which all our interests are mutual must be apparent to every Oxygen user. To this end we ask you to do your bit—**see that the empties are gathered promptly and shipped with equal promptness to us via the quickest route.**

THE LINDE AIR PRODUCTS CO.

"Largest Producers of Oxygen in the World"

42nd Street Building **New York City, N. Y.**

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.

New York Store: 126 Chambers Street

The Horse Rasp of Quality



Ask your Dealer for the

IMPROVED HELLER RASP

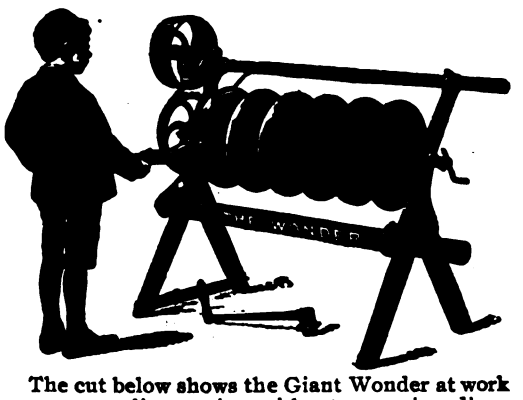
with keen cutting hard teeth. Made in all patterns and cuts, **"Slim," "Light," "Slim Light"** and **"Fine Cut."** Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial. New catalogue mailed free on application.

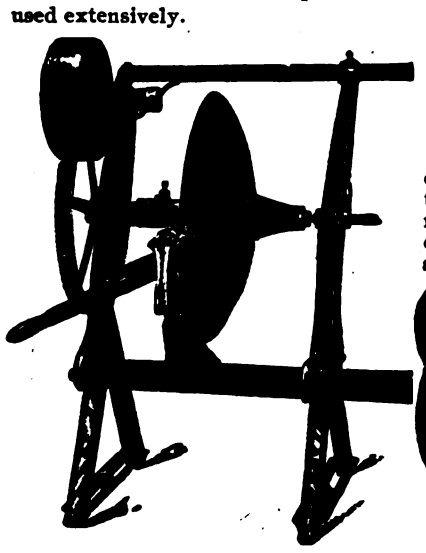
HELLER BROTHERS CO. *Established in 1836* **Newark, N. J.**

THE WONDER DISC SHARPENERS

BUILT LIKE A LATHE

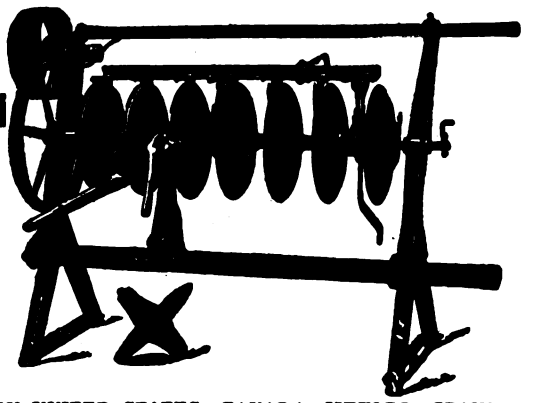
This cut shows the Little Wonder at work on a whole section of discs. This machine is especially adapted for sharpening disc harrows. While the Little Wonder is being successfully used to sharpen plow discs of 22 inches or less, we would recommend the Giant Wonder where disc plows are used extensively.





The above cut shows the Giant Wonder at work on disc plows. Will sharpen any size from 12 to 32 inches in diameter.

The cut below shows the Giant Wonder at work on a seven-disc section without removing discs, thereby saving one-half the time and labor, as in many cases you can sharpen a whole section of discs while your competitor is taking his off the shaft the old fashioned way.



FOR SALE BY LEADING JOBBERS IN UNITED STATES, CANADA, MEXICO, SPAIN, AUSTRALIA, ARGENTINE REPUBLIC, SOUTH AFRICA AND FIJI ISLANDS.

A. E. DURNER, Manufacturer EVANSVILLE, WIS., and BRANDON, MAN., CAN.

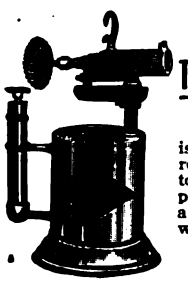
ADDRESS ALL INQUIRIES TO

A. E. DURNER; Head Office, Evansville, Wis.

Both size machines are equipped regular, long enough to take in 8 disc section. Special length furnished for 10 and 12 disc section at small cost.

I hold the original patent on this style sharpener. I could build them cheaper, but I won't. I would build them better, but I can't. Write for testimonials from your neighbor. Did you ever buy a cheap machine that gave satisfaction?

THINK ABOUT IT, THEN BUY A WONDER.



JOBBERS!

Turner Kerosene Torch

(No. 426)

is a rapid seller. Meets all requirements of a good blow torch. Produces a steady, powerful blue flame. Not affected by wind or bad weather.

Catalog or our complete line for the asking.

THE TURNER BRASS WORKS, Sycamore, Ill., U. S. A.

B. S. Alder, 30 Warren St., New York, N. Y., Eastern Representatives.

EMPIRE STEEL WHEELS



Plain or Grooved Tire To Fit Any Wagon.

FARM TRUCKS

All Standard Types

Write today for Proposition to Blacksmiths

EMPIRE MFG. CO.

P. O. B. 208

QUINCY, ILL.

1843 EAGLE ANVILS 1918

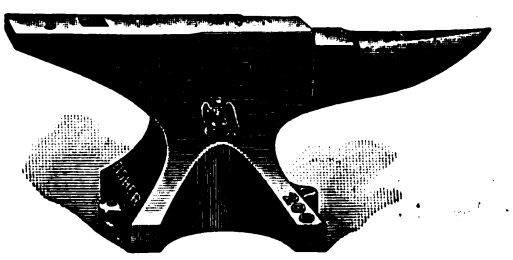
AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works

TRENTON, N. J.





Digitized by Google

THE

BLACKSMITH AND WHEELWRIGHT

Vol. LXXVII. No 2. NEW YORK, FEBRUARY, 1918. TERMS ONE DOLLAR A YEAR

Design, Construction, Operation and Repair of Motor Vehicles

Part 1—Explaining in Non-Technical Language the Various Groups of the Chassis and Their Relation to One Another

BY CLIFTON EGERT, M. E.

There are two well-defined methods of learning how to make adjustments and how to complete repairs on motor vehicles. One is by practical experience, a satisfactory method, but it has its disadvantages because it is slow and a workman is frequently handicapped by not knowing why a part fails to work, although capable of repairing it. The best results are obtained when experience is combined with a knowledge of the

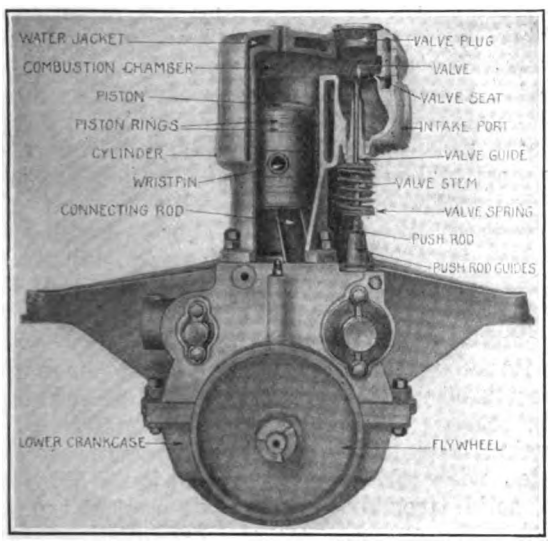


Fig. 1—Showing a Four-Cycle Engine With Part of Cylinder Walls Cut Away to Reveal the Combustion Chamber, Water Jacket, Piston, Rings, Connecting Rod, Etc.

basic principles, for it enables the workman to quickly locate and correct the fault.

Many repairmen can remedy troubles, make a part work when out of order, but cannot explain the whys and wherefores. To illustrate the point, ask the average repairman or mechanic in a garage why a differential is used with an automobile, and invariably his answer will be, "So that the car can turn a corner." But ask him how the differential works, why it is that when the rear wheels are jacked clear of the ground one wheel can be turned forward and the other in an opposite direction, and you will have him stuck as to a practical explanation. He will be bothered to explain why one wheel of a car will spin when it is on a slippery road and why the other wheel won't turn if on a good road; that is, to explain the mechanical reasons.

It certainly is an advantage in automobile repair work to know why a part does a certain thing and its relation to another part. A knowledge of the principles of a part will greatly help solving troubles of another part.

Knowledge and Experience.

The writer has noted the results of the two methods and believes that the best results are obtained by combining study with experience. One is not practical without the other. The writer knows of persons who know the name of every part in a motor car and what it does, but not all of them can entirely disassemble and reassemble the parts and have the car run as it should after the job is completed. This class has theoretical knowledge. When this knowledge is combined with the practical experience, an ideal workman is obtained. In other words, if one wants to be successful in repairing he must put on the overalls and the jumpers and be not afraid to get his hands dirty. The repairing of motor vehicles is no job for those afraid of work and dirt.

Before beginning this series of lectures or articles on automobile repairing the writer wishes to warn his readers that while the motor car is not so complicated as it is made out to be, one must expect to pay for his experience. You cannot learn to become an expert workman in a few weeks or months. It takes time. But there is no reason why you cannot, within a reasonable length of time, obtain your share of the business in your neighborhood. The making of even minor repairs and simple adjustments has its advantages, for it means that the owner comes to you and affords you an opportunity to sell him supplies, accessories, etc., and there is good profit to be made handling these goods.

Principles Are Similar.

In describing the motor vehicle, whether it be a passenger car, a motor truck, motorcycle or a tractor, it should be borne in mind that the basic principles are the same. For example: The engine propelling the passenger car, truck or tractor obtains its energy or power from the explosion of a combustible mixture. The size of the engine, number of cylinders, bore and stroke, speed and horsepower may vary, but the principles are the same. In other words, each engine has a combustion chamber, piston, connecting rods, crankshaft, etc. By mastering the principles of one you become familiar with all internal combustion engines.

Parts of the Chassis.

Inasmuch as nothing will be gained by describing the parts of a motor vehicle in a haphazard fashion, it will be divided into a number of groups, and these in turn subdivided. Beginning with the car itself, it consists of a running gear and a body, as does the horse-drawn vehicle or wagon. The running gear of the automobile is termed the chassis, a word borrowed from the French, who took up the motor car before we did. The chassis, or running gear, consists of the mechanism employed for propelling or moving the car, and the chassis can be run without the body, as invariably the supply of fuel or gasoline tank is a part of the chassis.

Grouping the Parts.

To simplify matters the various groups of the chassis will be divided as follows: Power plant, clutches, gear sets or transmissions, power transmission or drive, rear axles, springs, front axles, frames, steering gears, wheels, brakes and tires. In subdividing or treating the various members of a group they will be divided as follows for example:

Power Plant.

1. Engines.
2. Carburetors.
3. Ignition systems.

In presenting the first article of the serial dealing with the design, construction, operation, maintenance and repair of all types of motor vehicles, The Blacksmith and Wheelwright is not introducing an innovation but is continuing its policy of keeping its readers abreast of the times, and the blacksmith who does not seriously consider the motor vehicle is, in our opinion, making a mistake. By motor vehicle we mean the passenger car, the motor truck and the tractor, particularly the last named, for the tractor will eventually be handled by the smith.

This serial will be one of the features of The Blacksmith and Wheelwright for several months to come. The expert, Mr. Clifton Egert, will answer any and all questions dealing with motor vehicles, and any subscriber is welcome to ask as many as he desires. Readers desiring a reply by mail should so state in their letters.

4. Cooling methods.
5. Lubrication systems.
6. Starting and lighting.

Similarly the different types of clutches will be described and illustrated, these including the cone, wet and dry disc and that employed with the old type of planetary form of gearset. The gearsets will include the progressive and sliding types, constant mesh, planetary and variations of these. Axles

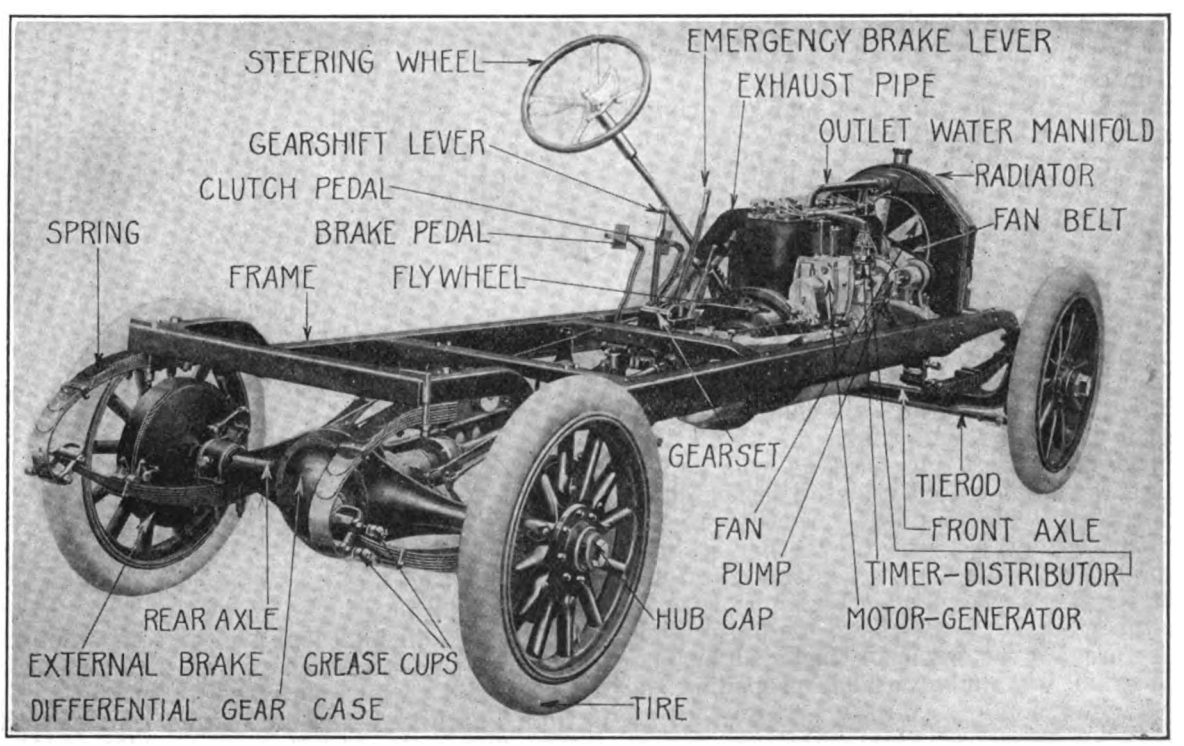


Fig. 2—A Conventional Type of Passenger Car Chassis With the Majority of Parts Lettered to Indicate Location and to Enable Reader to Become Familiar With Names of Components.

Digitized by Google

will include the solid, semi-floating, three-quarter floating and full floating types. The various types of drive, the bevel, chain, worm and internal gear and those employed with the tractor as well will be discussed.

Referring once more to the chassis, it is explained that it includes the power plant or engine which develops energy or means

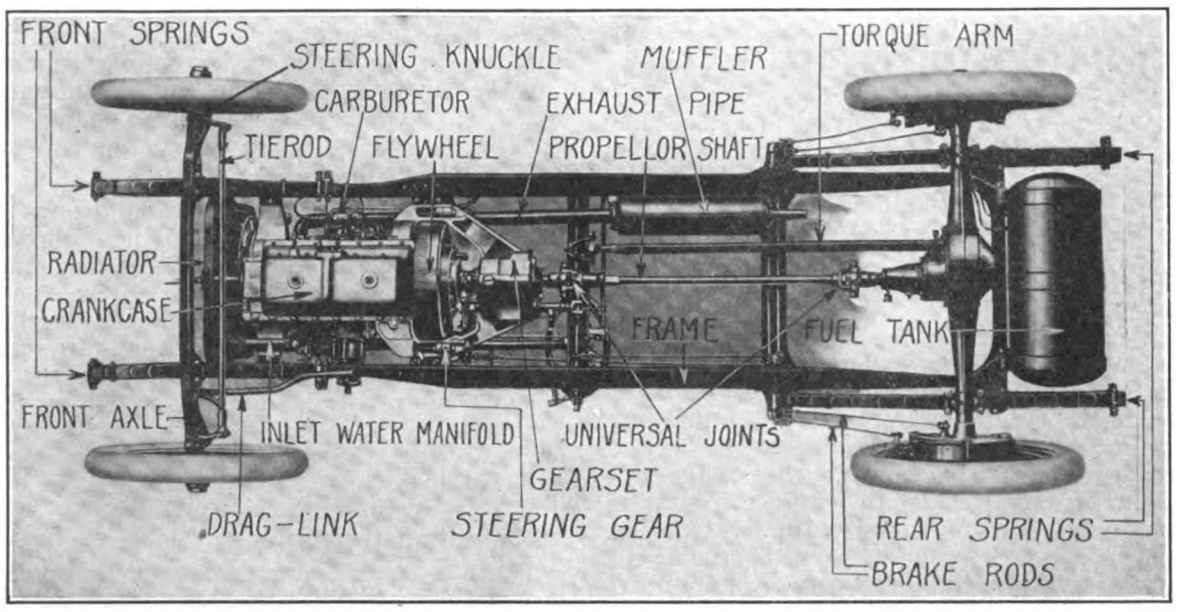


Fig. 3—Bottom View of Passenger Car Chassis Showing the Arrangement of the Various Parts and Illustrating How Drive Is Imparted to Rear Wheels Through Gearset, Universal Joints, Propeller Shaft, Etc.

for propelling the chassis. The engine may consist of any reasonable number of cylinders and is securely mounted or attached to the forward part of the frame. The power of the engine is derived from the explosion or burning of a combustible mixture in the cylinder or cylinders, and this power is utilized to turn a crankshaft which is a part of the engine.

Attached to the crankshaft is a flywheel and directly in back of the flywheel is a mechanism termed the clutch. A clutch is necessary with a vehicle propelled by an internal combustion engine to interrupt the power, to prevent it from turning the rear or driving wheels of the car when one desires to stop the machine or to start it. It would not be practical to connect the engine directly with the rear or driving wheels because upon starting the engine the vehicle would move and the operator would find it difficult to mount the seat and control the movement of the car at the same time. The clutch, therefore, serves to disconnect the engine from the gearset or transmission and affords the driver control. It also permits operation of the engine without imparting energy to the rear road wheels.

Why the Gearset.

The gearset or transmission may be located amidship or back of the flywheel and clutch or just forward of the rear axle. The function of the gearset is to enable the driver to change and engage gears of different ratios so that the power of the engine can be made to do work that it would not do if it were directly applied. For example: If the engine were directly connected or so arranged it would turn the rear or driving road wheels a complete revolution every time the crankshaft of the engine made a complete revolution, the engine would have to be run quite fast in order for it to develop sufficient power to propel the car.

This would result in the car traveling at too fast a speed, and when it came to a steep hill the car would not climb it unless the engine was unusually large and powerful. And it should be borne in mind that the output or power of the internal combustion engine increases as the number of revolutions of the crankshaft increase, as will be explained and illustrated in detail in the chapter dealing with engines. Another reason for the use of a gearset, whether it be a planetary or a sliding type, is that the four-cycle engine runs in one direction; that is, the crankshaft revolves in one direction, therefore a gear must be included or provided that will make possible propelling the car backward.

Forms of Final Drive.

Thus far we have brought the power to the gearset or transmission. From the gearset the energy of the engine is transmitted by one of two forms, by a shaft or by chain. The shaft drive predominates, as the use of the chain is now being confined to commercial cars and motorcycles. With the shaft drive the shaft or propeller carries a pinion or gear which meshes with a large gear in the differential housing. Connected with this gear and through a train of gears (differential gears) are the driving axles, to which is rigidly secured the rear driving or road wheels. The pinion or gear on the driving or propeller shaft generally has about one-third the number of teeth as does the large gear. For example: The pinion of the Ford car has 11 teeth and the big gear has 40 teeth. This obtained a gear ratio of 3 7/11 to 1, meaning that the engine makes and turns the driving shaft 3 7/11 times while the big gear turns once. Similarly, the road wheels make one revolution.

Why a Differential.

The rear axle includes the differential, driving axles, axle housing, brakes, etc. Sometimes the gearset is mounted on the rear axle, as previously explained. The differential or equalizing gear is incorporated in a motor vehicle for several reasons, one of which is that the automobile is propelled, not pulled, as is the case with the horse-drawn vehicle, and the automobile is steered or its movements directed by the front wheels.

The motor car also differs from the horse-drawn wagon in that with the latter the rear wheels can revolve in either direction; that is, one wheel can turn faster than another, as when making a turn or a corner, and without injury. With the automobile the wheels are not loosely mounted, but are secured to axles, which in turn are driven. Consequently some mechanism must be utilized which will permit one wheel to rotate faster than another, yet at the same time permit both to be driven by the power of the engine.

While the engine, clutch and gearset are firmly anchored to the frame or its cross members, the rear axle is not. This part is secured to the frame of the car by means of springs and the rear construction is free to move up and down as the vehicle passes over rough places in the road. Universal joints are incorporated in the drive or shaft and these permit the rear axle to move as described. The joints also take care of any misalignment in the driving mechanism, as well as compensate for angularities.

The chassis also includes the frame, and attached to this are the springs, front and rear. The springs are employed to absorb shocks, to prevent transmission of shocks to the mechanism of the chassis. Attached to the springs are the front and rear axles and to these are attached the wheels.

Steering of the motor vehicle is by a mechanism that permits of turning the front wheels to the right or left, and the steering gear proper is so constructed that the road shocks are not transmitted to the hands of the driver. The mechanism is so arranged as to be what is termed irreversible, a method that will be explained in logical sequence.

How Car Is Controlled.

Control of the motor vehicle is divided into groups. The power of the engine is increased and decreased, as may be required, by the use of a throttle which regulates the supply of fuel to the cylinders, and the advance or retard of the spark also plays an important role. Control of the clutch is by a clutch pedal, which when pushed forward or down disengages the driving and driven part of the clutch mechanism. A similar pedal operates one set of brakes, two sets of which are provided. The brakes generally act on the drums of the rear wheels and enable the driver to bring the car to a stop when desired. The other brakes are termed the emergency and are generally operated by means of a hand lever.

Pneumatic tires are employed on passenger cars, motorcycles and some types of commercial cars. A pneumatic tire consists of a casing having a tube which when inflated or filled with air provides a cushion. The use of solid tires are confined to motor trucks, although some commercial cars utilize pneumatics. Both the single and dual form of pneumatics are employed on the rear wheels of some trucks.

The Gasoline Engine.

The most important, and possibly the least understood, group of the chassis is the power plant. While one may master its troubles by experience, it is a long road to travel. The better way is, as previously stated, to learn the basic principles, the whys and the wherefores of each part and the relation of that part to another part. It is not uncommon that faulty action of a part is caused by trouble with another part. Then again the symptoms of two different parts are similar, making it difficult to locate to determine which part is at fault. For example: Carburetor and ignition troubles are closely allied.

There are two general types or forms of gasoline engines, the four-cycle and the two-

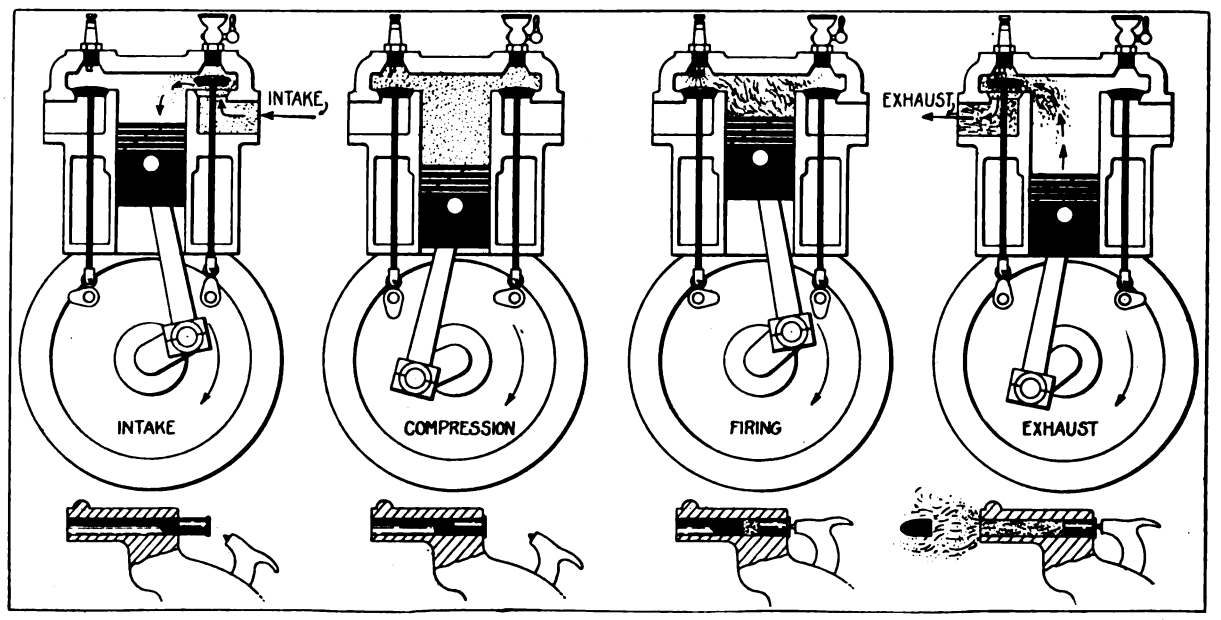


Fig. 4—Illustrating the Four Strokes of the Four-Cycle Engine, the Position of the Piston, Valves, Etc., During Each Stroke and Showing How the Strokes May Be Compared to the Loading, Firing, Etc., of a Pistol.

Digitized by Google

cycle. The last named is not favored by motor vehicle engineers because of its several disadvantages, which will be explained later. The four-cycle engine, so named because of its strokes, etc., is in universal use insofar as motor vehicles are concerned.

The four-cycle engine is constructed in single, two, four, six, eight and 12-cylinder form, and while the arrangement of the cylinders vary the principle of operation is similar. The early form of gasoline engines was a single-cylinder construction and the engine was vertical or up and down. This was followed by the two-cylinder engine, generally two cylinders horizontally opposed. This type of engine is a very satisfactory one, but because of its extreme width and bulk it gave way to the four-cylinder engine, which practically consists of four single engines in a row. Closely following the development of the four-cylinder engine came the six-cylinder, and then came the eight and the 12. All of these types will be described and illustrated, but, as previously explained, the principle insofar as operation is concerned is similar.

Parts of Four-cycle Engine.

A description of the four-cycle engine will be of extreme value to those not familiar with it, and as the accompanying illustrations show the majority of the parts and these are lettered, the writer suggests that the reader study the location of the parts and memorize the names, as they will be rereferred to a great many times in this serial.

The gasoline engine consists of a cylinder the upper part of which is so cast that two separate walls are provided. One of these, the inside, forms the combustion chamber and cylinder proper in which piston operates. The space between the inner and outer wall is the water jacket, in which water circulates, and the fluid is employed to keep the cylinder from becoming too hot. The burning of the gases in the combustion chamber or the explosion of the mixture gives off a tremendous heat, and were not some means of cooling employed the cylinder, piston, etc., would be injured by the expansion of the metal.

Function of Piston.

A piston moves up and down in the cylinder and the former is a very close fit; or, in other words, is nearly of the same diameter as the bore of the cylinder. To seal any openings that would otherwise exist between the piston and the walls of the cylinder piston rings are used. These rings are flexible and have a tendency to expand outward like a spring ring, which they really are.

The cylinder is mounted on the crankcase, which is a barrel-like or cylindrical construction, and the cylinder is bolted to the upper part of the crankcase, which is generally divided in two sections. With some types of engines the cylinders are cast with the upper half of the crankcase, and others have the crankcase made in a single casting. Cylinders are not always cast single, in pairs or in triplets, as the tendency now is towards using a single casting which is termed a bloc casting. These will be described and illustrated in logical sequence.

Connecting Rod.

The crankshaft of the engine is mounted at a line dividing the crankcase and the crankshaft rotates in the same manner as does any crank having arms or crankthrows. The crankshaft is secured in bearings and the connecting link between it and the piston is termed a connecting rod. This rod is pivotally mounted at both ends. One end is secured to a rod-like device extending through the piston and termed the wristpin. The other end of the connecting rod is secured to the crankshaft, or rather to a crankpin. Rotating the crankshaft caused the rod and the piston to move up and down. If one compares the movement of these parts to the action of a treadle of a grindstone the principle will be easily grasped.

Why the Valves.

The four-cycle engine is provided with two valves to each cylinder, although there are types of engines using four to a cylinder. The engine we have in mind uses one intake and one exhaust valve to each cylinder. These valves may be compared to doors in a room, the intake valve opening to allow the mixture to enter and the exhaust allowing the burnt gases to depart. The action of these valves is controlled or regulated by a cam. This cam is on a shaft and the shaft is connected by a gear to a gear on the crankshaft. By using gears with varying number of teeth the action of the valves is easily controlled.

Igniting the Mixture.

The energy of an engine is derived from the expansion or burning of explosive gases in the combustion chamber, said gases forcing the piston down. The device supplying the combustible mixture is called a carburetor. Its function is to take the gasoline, vaporize it and mix the vapor with the right amount of air to obtain an easily ignited mixture. The mixture is ignited by an electric spark, and the apparatus creating or supplying the spark is termed the ignition system. The spark is timed by a device called a timer or commutator with one type of ignition and a circuit breaker or interrupter with the others.

Inasmuch as the working parts of a gasoline engine operate at a high rate of speed considerable friction is set up. To reduce this friction to the minimum and to prevent wear as much as possible, the working parts are oiled or lubricated. Lubrication systems are divided into a number of different types and lubrication of the engine should not be confounded with that of the other parts of the chassis.

Strokes of Four-Cycle Engine.

The strokes of an engine are four in number and it is most important that one masters these, for they have an important bearing on valve and ignition timing, and unless one be familiar with the strokes much of the work of repairing cannot be accomplished. The diagram at Fig. 4 shows the different strokes of the four-cycle engine, and the principle of these is similar to the loading, firing, etc., of a pistol.

The strokes are intake, compression, firing or power and exhaust, and the diagrams show the position of the piston, valves, etc., during the strokes, which will be fully described in the next installment.

(To Be Continued.)

FAVORS WOOD WHEELS.

Says Steel and Other Metal Wheels Are Detrimental to Rubber Tires.

Motor transport has produced many problems for designers and engineers, among them those pertaining to wheels.

Whatever the relative merits of all metal or artillery type wheels may be, the latter are more popular with manufacturers of cars and light commercial cars of today, says The Coach and Motor Builder.

The heavy vehicles are more frequently fitted with all metal wheels, due probably to faulty design of wood wheels adopted until recently, and the use of unsuitable timber in the construction of them.

The heavy metal wheel now in general use is of cast steel. The disc or plate iron wheels having proved a failure. All metal wheels, light and heavy, of the cast or pressed metal types, prove severe on tires owing to the lack of resilience.

This feature alone gives to the wood wheel a special value and should make it again the popular wheel for heavy motors.

The heavy wood wheel has fallen into disrepute from two causes mainly. Firstly, being designed on wrong lines. The vertical line did not pass midway between the bearings to the tread of the wheel in the profile elevation, therefore the weight is distributed unevenly, and secondly the timber used and the methods of construction not being up to standard required. The timber in many cases being faulty and insufficiently seasoned or too soft. Also the lack of equipment in the factory where built.

Use Special Hardwood.

We have in Australia a hardwood eminently suitable for heavy wheels, and we should be in a position to solve the last problem of good wheels. It is all a question of tire mileage. Rubber or iron makes no difference, the principal involved is the same. It is universally accepted that wood wheels return a better tire mileage than iron wheels, and in money terms good wheels will save their cost probably in two fittings of tires and still be in first-class order. Another advantage is in alterations to fit standard size tires or a change of diameter or section. Steel wheels are difficult to alter. Wood wheels may be reduced or enlarged in diameter and section, or rebuilt at small expense compared with all-metal wheels.

The processes of building wood automobile wheels in Australia may be of interest.

Timber Carefully Selected.

The careful selection of timber is the first process and of the greatest importance. Many things are to be considered. The species. The state of maturity when felled. The breaking down of the log. Method of seasoning. The cutting and machining. The lay of the grain of the finished piece, and the moisture contents at time of assembling. Having suitable timber at hand the next process is the accurate machining of the parts. A prelude to this is accurate templates. These are developed from a drawing whereby a section of a wheel is set out showing two spokes and a felloe in the front and profile elevations.

Allowance Is Made.

The machinist shapes the spoke feet true to template, which, by the way, has had allowance made in definite proportion to its width to provide for the compression of the fiber of the timber under the pressure employed in assembling the wheel. The wheelmaker then marks the extreme length, the shoulder and position of the tang, when the spokes pass over other machines and are prepared for assembling. The felloes are shaped accurately on the inner surface and are cut off to the correct length, bored to receive the spokes and dowels, and cut something large on the outer surface, also to greater than the finished width of tread.

Assembled Under Pressure.

When all is ready the spokes are driven into the felloes, the dowels inserted, and the whole assembled under pressure until the feet of the spokes form a solid mass in the center of the wheel and will stand a heavy blow, also indicating by the sound that the center of the wheel is solid. Strong ribbled washer plates are applied on each side and secured by a large bolt passing through the center and screwed very tight.

Turned on Lathe.

The wheel is then mounted on a lathe and the outer circumference of the wheel turned to the desired measurements. A steel band, usually three-eighths of an inch in thickness, is then shrunk on the wheel. This involves a modern feature of engineering. The band is made about an inch and a half larger in circumference than the desired finished size and is easily placed on the wheel. The whole is then placed in a hydraulic tire-setting machine and the band reduced until it becomes within two millimetres of the internal diameter of the rubber tire proposed to be fitted. The process of shrinking the band has the effect of closing all joints of the felloes and applying still greater pressure to the spoke feet.

The wheel returns to the lathe, where it is bored to take the wheel center, faced true and passed on to the press, where the wheel center is pressed home.

The wheelmaker inserts the bolts and finishes off the wood work ready for paint. All parts where iron bears on the wood are well primed with paint previous to placing in position. The tire is then pressed on the wheel and all is ready for service.

When a man has lost self-respect he has no care for that of others—he is simply a dead mule waiting for the buzzards.

An ounce of scandal can make a ton of trouble—a single hog can scatter a crowd, and one match can set fire to a barn.

Digitized by Google

How a Missouri Blacksmith Saves Time and Labor

Fred N. Roehlk Operates Three Shops Equipped With Modern Apparatus Including Many Home Made Devices and Tools

BY JAMES F. HOBART

The writer spent a very pleasant hour recently in one of the shops of Fred N. Roehlk, whose card reads: "Carriage, Wagon and Auto Builder." Mr. Roehlk at present operates three shops in St. Louis, Mo. The one visited by the writer at 1617 Clark avenue stands with the back door adjacent to another of his shops just around the corner on 17th street, where a woodworking and trimming shop is located above the smithy, which has two fires. The rear of each building being adjacent, the workmen pass freely into the Clark avenue shop to use the power machines, band saw, buzz-planer, etc., each electrically driven by its own motor. The third shop is a block or so distant on 15th street.

I found Mr. Roehlk in overalls and a work jacket in a chat with the president of the largest steel store in St. Louis, and should judge from the remarks that the chat was between two pretty good friends as well as business men. Although he does not work with his hands any more, Mr. Roehlk always puts on the overalls as soon as he gets to the shop which is usually before many of his men, and he is always the last to leave at night as he keeps his own books, etc.

Twenty-six men are employed in the shops which do general smithing and wheelwright work. Several automobiles were in the Clark avenue shop having various repairs made and a couple of motor trucks were having new bodies fitted.

The writer was told that there was no shortage at all of mechanics for the very good reason that good wages were paid. Only good men are used and they are left to retain their own individuality and personality as much as possible with the result that it was almost impossible to hire a man out of any of the three shops.

"I never allow a man to call me Mister," said Mr. Roehlk. "If he is anywhere my own age it will be Fred for him every time he wishes to speak with me. In that way and by being among them all the time in overalls myself, and by letting good men do what I want done in their own way I keep my men with me. I would like to see any other shop hire one of them away from me. I like America because there is so much equality here. I never had any love for titles. Yes, I was a German soldier in my youth and I left there just because I did not feel that any high official had any right to order me to lose my health, limbs or life at their will, for things

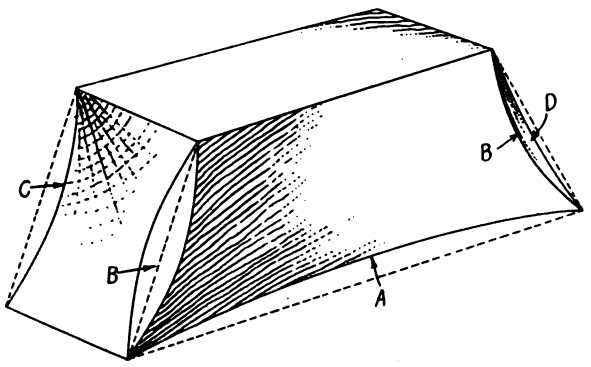


Fig. 1—Illustrating Points in Making Bolsters as Suggested by Mr. Hobart.

in which I had no interest whatever. Therefore I told my father that I was done and came to America. I am an American citizen, am proud of it and always will be."

I noted a large number of express wagons being repaired in the 17th street shop. A tailgate was being renewed, the old woodwork having been split and cracked in several places. There were three heavy strap hinges riveted on, one on either end and one in the middle, and ⅜ inch rivets were being used. In removing these hinges no time was lost in chopping off the heads of the rivets. Two men were working on the gate, a smith and his helper. And there was no waiting by the smith for the helper to do all the work. They laid that gate on a pair of heavy trestles or horses, each man seized a hammer with flat face and good square corners and went at those rivet heads.

Two blows, sometimes one, and occasionally three delivered upon the side of a rivet head caused the hinge to shear off the rivet as cleanly as though it had been done with a chisel. In less than three minutes those nine rivets were out, the hinges knocked off and the two men were taking off the strip of steel along the upper edge and ends of the gate. No lost time there; no waiting of one man for the other to stir. It was team work. They got something done, did it right and quickly.

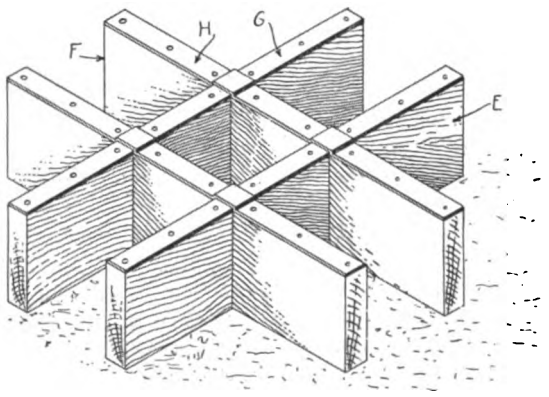


Fig. 2—The Wooden Wheel Block and Showing Method Utilized in Fastening the Strap Irons.

In the wood shop I saw a man finishing up some bolsters which were to be placed against the heavy elliptical springs used under express wagons. One of these wooden shapes is shown at Fig. 1. It was made of oak, 2¾ inches thick and had been sawn very smoothly by the band saw. Instead of smoothing up the ends C and D with a plane the workman used a draw-knife and he only made four or five cuts on each end before the job was done. A few rubs with sandpaper completed the work.

Despite the expertness displayed by the workman the writer could not but think how much quicker and better the wood could have been finished if it had been pushed against a sandpaper disc. In less time than would be required to put the work in the vise and remove it the sand disc would have done the business and much better.

A combination sanding machine, a sand roll with a disc at one end, should be found in each and every smith shop, no matter whether they use power or not. Even a foot operated sand roll and disc is by no means to be despised and every smith can rig up one of these useful machines at very little expense.

With a sand drum not only could have the ends C and D been quickly and accurately finished but the chamfers B, B, would have needed no tool save the sand roll. The sweep A, where the wood fitted the spring, was laboriously fitted with the draw-knife, the spring being repeatedly rubbed against the wood and the marks as carefully removed with the shave. Do this work on a sand drum and it is only necessary to give the wood a few rubs against the spring, then against the sand roll, and the job is finished in short order.

Gas Tire Setting.

The writer was greatly interested in the speedy manner in which tires were set at this shop by means of the apparatus shown at Figs. 2, 3 and 4. Home made apparatus, every bit of it. The "wheel block" shown at Fig. 2 needs little description save to state that the 3x12 inch planks were carefully halved together as shown at E and F, then the four ⅝x3½-inch tire iron straps G and H were fastened on by spikes, home made, with round flat heads which were countersunk into the iron straps. These straps, by the way, were not fitted flat on top of the frame E F. Instead the straps G were fastened, then the other pair of straps H were forged to fit right over the first pair as shown. This left four high places but it did no harm.

The Slack Trough.

The home made slack trough was about 20 inches square and nearly six feet long as shown at Fig. 3. This trough was no different from any other, save for the two standards, J, J, which were bolted to the sides of the trough at the middle thereof. Each standard carried several three-quarter inch steel pins, bore-driven tightly into the wood, and each pin on either standard was placed level with the corresponding pin on the other standard.

The apparatus shown at Figs. 2 and 3 was located just outside of the smithy door. Just inside was the gas heater, a machine which, the writer was informed, had been furnished by the gas company. The machine consisted of a metal table upon which several tires could be piled horizontally and against the piled tires was made to play gas flames from nine segments, each segment full of small holes from which issued the blue-burning mixture of gas and air, the latter being supplied by an electrically driven fan.

The segments, to each of which a gas hose was attached, were adjustable and the segments were moved in or out according to the diameter of the tires to be heated. Some inquiries made as to the cost of thus gas-heating tires for setting brought forth the information that a record kept of setting 285 tires showed that the cost of gas averaged eight cents per tire. "And the tires were nearly all heavy ones, too," remarked Mr. Roehlk, as he handed out the desired data. "Besides," he continued, "I never have to pay out anything for bringing in wood, piling it on the tires, carrying away ashes, or cleaning up in any way. There is the machine. It is ready for instant use at any time and my smith and two helpers can heat a tire and set it inside of six minutes, easy. And when there are several tires to be set at the same time, as is usually the case in this shop, the time of heating and setting will not average much more than four minutes for 3x⅝-inch tires, which we set a whole lot of."

Method of Setting Tires.

The gas machine is provided with a weighted or counterbalanced sheet iron cover which may be pulled down over the batch of tires which may be in heating, thus protecting them from drafts of air. But the cover device is seldom if ever used, only in case of a large number of very heavy tires. For ordinary work the smiths find that it does not pay to spend the necessary time for pulling down and raising the weighted cover.

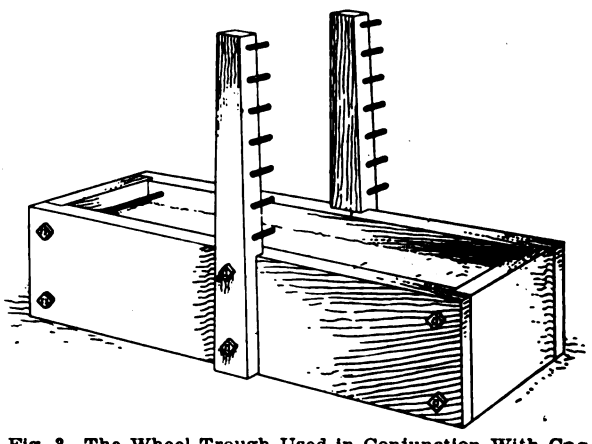


Fig. 3—The Wheel Trough Used in Conjunction With Gas Heater for Heating Tires.

While the tire is heating, the helpers place the wheel, shown at Fig. 4, dished side down, upon the wooden wheel block. Two sledges are provided and placed near by. When the smith comes, he brings his forging hammer with him.

When the smith regards the tire as being hot enough, a nod from him starts things a-moving. The two helpers grasp the tire with tongs and carry it to the wheel block just outside of the shop. If it should be the last tire of a bunch on the heater, the smith shuts off the gas and air before he follows his helpers. Should there be other tires heating, the smith sees that the segments

Digitized by Google

have not been disarranged in removing the tire from the heater, then he follows his helpers with the tire and gets there by the time they have laid the tire upon the wheel as shown at Fig. 4, at M, and have placed the several appliances in position.

A wooden pole N is at once thrust over the rim L and tire M, which, at the point where lever N is placed, is flush with the top of the wheel rim. The inner end of pole N is caught under the hub of the wheel or under the wheel block and one helper promptly straddles the pole N so as to prevent the tire from working upward at point L.

While all this is going on, and it is done in a very few seconds, the other helper has placed in position the piece of steam pipe (about 2-inch pipe) shown at P, also the grab link O, several of which, of various lengths, are scattered around and near at hand.

By the time the second helper is ready to give a pry on pipe lever P, the smith is on the

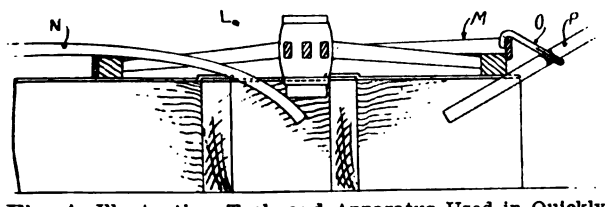


Fig. 4—Illustrating Tools and Apparatus Used in Quickly and Easily Setting the Tires.

job and is banging away with his hand hammer at any spots inside of tire M which may fail to slip readily over the rim of the wheel. Inside of a very few seconds the tire is forced into place. The second helper thrusts his pipe lever through the hub of the wheel, gives a heave, the first helper raises his side of the wheel after dropping his wooden lever and the wheel is quickly placed upright upon the wheel block.

The smith runs his eyes over the tire and rim, strikes any places in the rim which have not been centered, then the two helpers, one at either end of the pipe through the hub, place the wheel upright in the slack trough with the piece of pipe resting upon two of the pins in the standards. The pins used are those which will permit the wheel to hang with its lower edge in the water and without touching the bottom of the trough.

Both helpers then stand by with the sledges. One strikes smart blows on the face of the tire as the smith revolves the wheel in the water, driving back any bit of felloe which may not be properly centered, and directs the other helper where to strike sledge blows in case any may be required to properly center the rim in the overhanging tire.

The above bit of work was about as pretty a sample of team work as the writer has ever seen in a smith shop or out of it for that matter. The writer timed the setting of one two-inch tire. The entry in my notebook reads:

Lighted gas, 4.25.
Started air, 4.26.
Tire hot, 4.27.
Tire set, 4.30.

Five minutes to a single tire is surely not so bad. Wonder how long it would have taken in a fire in the yard or in the best tire-heating furnace one can build?

A Shop Trapeze.

Up in a quiet corner of the wood shop above the smithy and adjacent to Mr. Roehlk's office, the writer saw a contraption, which he studied for several minutes before inquiring as to its use. The apparatus in question consisted of a piece of one-inch steam pipe about three feet long and well polished. Each end had been fitted into whippletree irons, to each of which was attached a nicely spliced piece of 3/8-inch galvanized wire cable, the upper end of each piece being made fast to the ceiling.

The pipe hung about seven feet from the floor and the writer at once suspicioned its use, but made inquiry if they had a college student in the shop who hadn't got through with athletics yet?

"No!" said Mr. Roehlk, "that trapeze is mine. I get tired walking around sometimes. I don't get a chance at the forge any more, you see, so I just sneak up here once in a while when I am tired, and I tell you it does rest a man a whole lot to take a few turns on the bar. Brings another set of muscles into use, you see, the tired ones forget to be tired and it freshens me up again. I tell you, sir, there is nothing like fooling tired muscles into making them think that they are all fresh. Five minutes on the bar will make any tired man fresher than two hours' lazy loafing. I know that, too, for I've been trying it for 20 years and it hasn't failed me yet!"

Evening Industrial Schools.

Mr. Roehlk is very much interested in the City Evening Industrial Schools and he took the writer there of an evening while the classes were at work. We went through the smith shop and saw young men awkwardly hammering steel into funny shapes, and evidently attempting work far beyond their experience.

"Why," said the writer to an instructor, "do you not keep the young men at simple hammer work and teach them how to use that tool with confidence and ease before they branch out, trying to 'make something' which would tax the skill of an experienced smith?"

"We would like to do that," said the instructor, "and we do work in that direction as far as possible. But the young men come here because they are interested, not because they have to come, same as to the day schools. Therefore, if we put them at work at the rudimentary things which they should master first and before they attempt advanced work they won't come. So we have to do the best we can, teaching them all we can while they are making something.

"Why, we had one young man here who wouldn't practice the simple things at all. He came here, we are advised, simply because he had got some invention in his head which needed smith work to perfect. So he came here expecting to pick up in a few weeks 'know-how' enough to enable him to go into a regular smith shop and make up his invention."

Department of Body Designing.

About the only real work which the writer saw being accomplished was in the class devoted to body designing. Here the young men were actually learning something which they would not have to "unlearn" when they entered carriage or automobile shops.

Mr. Roehlk, who had served as instructor for several years in this school, until, in fact, too many other cares forced him out, told the writer that he had tried to have the school authorities start a regular school of body designing and actual manufacture, to put some of his body makers into that class as actual instructors and to have the pupils make up some bodies under actual shop conditions.

"But it wouldn't go through," regretfully continued Mr. Roehlk. "It is very hard to make school officials appreciate the matter of working under actual shop conditions instead of learning something to "unlearn" soon as one gets to the shop.

To Breed Army Horse.

A movement to centralize the efforts of horse breeders in producing animals likely to be of service in the war was started by the Arabian Horse Club of America at a meeting held recently at New York.

A resolution adopted was as follows:

Whereas, The present position of the United States Government in the world war requires that the best horses for all utilitarian purposes shall be placed at its disposal;

Resolved, That we the breeders of all horses of recognized dominant strains, laying aside all personal consideration, pledge our earnest efforts of co-operation to breed horses that shall give the maximum efficiency as required, and, if possible, produce horses that shall have no superior in the world.

Suggests Shell Track.

George E. Perrin, who broke the noted trotting sire Moko, thinks that something new is needed to increase public interest in harness racing. He says: "Horses can be made equal by weight to pull. Tracks of oyster shells act like a springboard, cause no soreness and enable horses to start, rain or shine. They should race at all distances, in harness, under saddle and in double harness, with mutuel betting. It would give the public something to think about and talk about."

Utica Smiths Raise Prices.

The prices for work have been raised around the city of Utica, N. Y., by the Master Horseshoers' Associations. The price for drive calk shoes of all sizes is now $6.00 the set of four. Resetting shoes is 40 cents the shoe, while calks are six cents each.

Home-Made Bevel Gauge.

A gauge that will be found very useful in filing bevels, nuts, etc., is shown in an accompanying illustration, and can be made from pieces of sheet steel.

The sides are made from sheet steel 3¾ inches by ½ inch by ⅛ inch thick. Two pieces are required, and they should both be drilled and filed up together. A ⅛-inch hole is drilled at one end of each piece, and the end rounded off with a file as shown. At the other end three 3/32-inch holes are drilled, and a hollow filed to facilitate the lifting up of the blade when the tool is folded.

Making the Blade.

The blade is made from 1/16-inch thick material, 3⅜ inches long and ½ inch wide. At one end a 3/16-inch hole is drilled and the end rounded off; the opposite end is bevelled off as shown, so as to prevent the blade pushing right through when in position between the side pieces.

After the side pieces have been carefully scraped up and the blade made level, the packing piece should be made from 1/16-inch material and marked off for drilling through the holes that have already been made in the side pieces. The joint should be turned from hard material, with the collar the same thickness as the packing piece. The length of the ends of the joint, each side of the collar, should be about 1/16-inch longer than the thickness of the sides. The outside edges of all the holes in the side pieces are slightly countersunk, and the rivets gently knocked over with a small round-ended hammer.

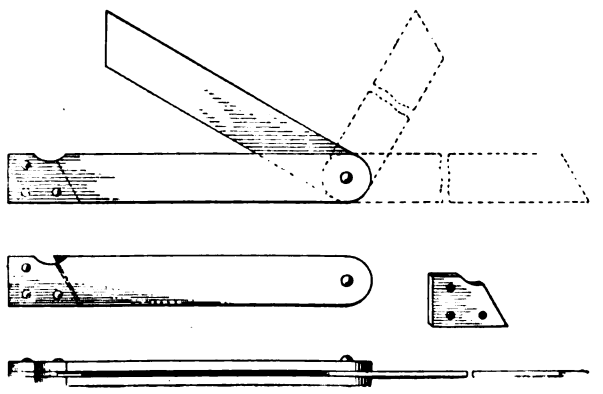
Finishing the Work.

After riveting up, the outside faces should be filed with a smooth file, and polished with worn-out emery cloth and oil. If the riveting has been carefully done and the sides draw-filed, the position of the rivets should not be seen after the tool has been polished.

This bevel gauge is easily made, and can be put to many uses, including the testing of the angle of nut faces, testing screw-cutting tools, bevel-gear angles, lathe-bed angles, the cutting edges of twist drills, the cutting edges of flat drills, the angle of lathe centers, etc.

As a Fixed Square.

If desired, the bevel gauge can be made so that it can be used as a fixed square. One



Illustrating Parts and Construction of Home-Made Bevel Gauge.

method of accomplishing this is to place the blade exactly at 90° with the shank, and carefully to drill a small hole through the portion of the tool near the joint. A small steel pin could then be placed through the hole, in order to keep the blade in the correct position. A better way is to allow some material on the edges of the blade, place it in an approximately correct position, and then drill through the side pieces and the blade. The pin can then be put through the hole and the blade scraped or filed up square.—Work.

Digitized by Google

Why You Should Take Part in the Prize Photo Contest

Since the prize photo contest was inaugurated we have received pictures of shops from a number of different States and we hope that by the time the contest ends that every State will be represented. For the benefit of new subscribers we would state that the contest is open to every reader of The Blacksmith and Wheelwright and that three prizes of $15.00, $10.00 and $5.00 will be awarded.

The conditions are extremely simple. Send us a photo of your shop, an interior or exterior view, and just a few words about your place and yourself if possible. This is not essential for the prizes will be awarded according to the photos; that is, what the pictures show. Of course we are glad to have you tell us about your work and to make suggestions for improving business conditions. We also welcome the discussion of any subject of interest to the blacksmith, wheelwright and wagon maker. You don't have to be a writer to tell us about your shop and yourself. Just jot the facts down and we will attend to the writing part. If you haven't sent us your photo do so at once.

Prize Photo No. 10.

From Peter Van Dyken, Michigan.—"I am sending you a photograph of my shop for entry in the prize photo contest and hope to see it reproduced in your paper, which I have read ever since I took up blacksmithing in this country, which was five years ago. I came here just five years ago. The shop is one we built about three years ago.



The Modern Blacksmith Shop Occupied by Peter Van Dyken.—It Is Well Lighted and Equipped.

It is 60 feet long, 24 feet wide, and is constructed of cement blocks. Two sliding doors, one front and back, affords easy entrance and exits. The building is well lighted, as there are 12 windows, six on either end. We have electric lights, two electric blowers, etc. The floor is half wood and half cement, cement being used at the fireplaces. I like your paper so well that I am hoping that you will continue to publish it."

Prize Photo No. 11.

From W. J. Ott, California.—Please permit me to enter the prize photo contest by submitting illustrations of my shop and sketches of my business. I have been a blacksmith for 34 years and have always dealt more or less in implements for the simple reason there is more and easier money to be made in selling implements and wagons than there is in blacksmithing.

It is the duty of every blacksmith to keep posted on all things assisting the farmer; in fact, I consider the farmer's interest is really paramount with that of the smith or the grocer. It is our duty to be better posted than the farmer, so we can direct as well as assist him in the choice of good implements and all labor-saving tools.

I tell the farmer to grease his harness before winter, paint his wagon and oil his shoes, because if you use grease or oil (Neatsfoot pure) it keeps all else out. Paint keeps water out, for two things cannot occupy the same space at the same time.

I can see, and you can see, that the automobile and tractor are displacing the horse. We smiths are gradually losing the shoeing as well as the setting of tires and at the same time the replacing of the wear and the tear of the wagon and the buggy. Let me say



Showing W. J. Ott and Wife in Front of Shop With His Son Making Use of Free Air Pump. Note the Large Sign Calling Attention to Blacksmithing.

here that we are not the only ones losing out, for there are the nail shoe companies, harness-makers and those making harness buckles and other accessories. All these must give way to the tractor.

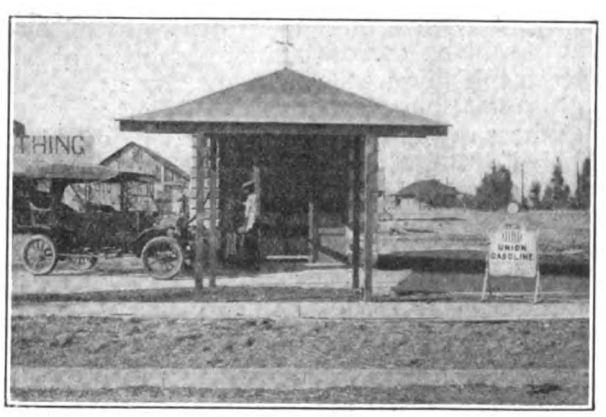
In 1914 New York had 200,000 automobiles and now seven States claim a similar number. Now that is why I entered the automobile repair, rubber casing (tires), gasoline and oil business. The oil station shown in the picture cost us (my wife and I) $2,000. We carry 18 barrels of good paraffin base oil, five grades and four different makes. We used to sell the farmer one-half a gallon of Neatsfoot oil a year. Now we sell the automobilist five gallons of gasoline for $1.00 and one quart of lubricating oil for 25 cents every five days.

Sundays a Busy Day.

There is one thing I do not like about the business, but it is a thing you all must make up your mind to do, and that is to give up your Sundays. That is when the owner of an automobile gets his lay-off from business, and don't you doubt it, he is the one that foots the bills. Many Sundays we do $50.00 worth of business in gasoline, oil, tires and inner tubes.

You will note the FREE AIR pump in the picture. It costs $150.00 to give away free air. And let me say right here I never give any "hot air." My motto is "Honesty is the Best Policy," and it is stamped on every deal made with us. More than once I have had my checks go through four different parties and come back to me for indorsement as I forgot to sign them.

Brother blacksmiths, let me say that they will "get your goat" if you do not get into



W. J. Ott's Gasoline and Oil Station Representing an Investment of $2,000 and Showing Conclusively the Possibilities in Catering to Automobile Trade.

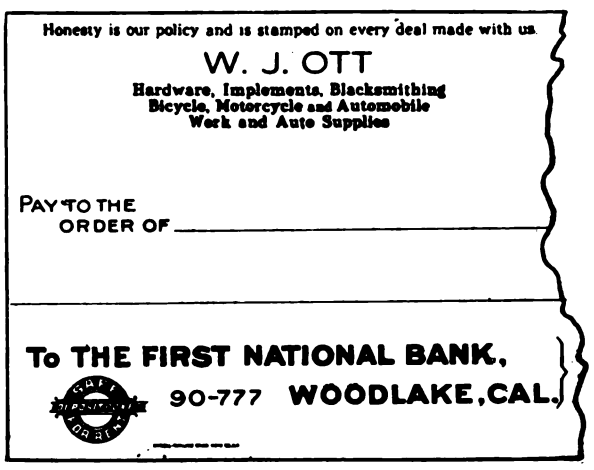
this great commercial business. It is a garage, gasoline, oil and tires you want. Don't handle any seconds, nothing but A-No. 1 goods, and stand in back of them. We handle bicycle tires and we sell lots of them.

For the interest of any new beginner I would say that we handle the —— goods (a well-known maker of tires, etc.). They are first-class and the company allows the agent to make his own adjustments on bicycle tires, and that means a good deal to a man. It means that it doesn't stop you from selling satisfaction and then the goods. This is a hobby of mine, selling satisfaction, because a good, satisfied customer is your best advertiser. And it doesn't cost you anything. That's what keeps you busy and keeps everyone satisfied. I will admit it is common to growl when you part with your money. A well-satisfied customer is pleased when he pays you for a satisfactory piece of work or goods. Only the other day a customer of mine wore a casing (tire) until you could see the inner tube through the worn place, and he came back for another one.

Some Tire Hints.

For the benefit of the beginner I would say that when a casing wears the tread off on one side and not the whole tread, that the wheel is out of true and should be trued up by loosening the tire and knocking it until the tire runs true, whether the wheel does or not. The smith knows what I mean. If a wagon wheel does not run true we change the box at the back or point as needed. So with the tire on the auto wheel. Move the tire a little and bolt it fast to the felloe.

Always keep your casing properly filled with air. Do not rely upon too old a tube. Better buy a new one, as they cost but about one-sixth of the casing. There are as many casings spoiled with old tubes as by any other way. There is a difference in inner tubes. The red tubes have more antimony in the rubber to stand more heat than the gray tubes. A heavy tube has rubber compound in it. To tell the difference, put the tube in



Illustrating How W. J. Ott Believes in Advertising, Even to the Extent of Using Publicity on His Check.

water. The more compound the quicker it will sink. Pure rubber will not sink in water.

Last year I sold over $700.00 worth of —— casings and had trouble with but one, and that was caused by running over a sharp rock. Keep all the Ford extras you can, for that is the workingman's car. We are careful out here where it is warm to always keep plenty of soapstone in the casing to prevent the tube from vulcanizing to the casing. Don't put too much soapstone in your casings, as it will damage the tubes. Just sprinkle a little in the casing and run it around until the inside of the shoe is covered.

We are going to install an electric vulcanizer, for it is automatic in its action and gives the same heat during vulcanizing. Our gasoline pump cost $262.25 and can pump five gallons at a stroke. With the one gallon at a stroke you may forget and only give a customer four gallons instead of the five.

In conclusion I will state that there are three great men in this country. They are Thomas Edison, the electrical wizard, who has given the world more great inventions than anyone else; Luther Burbank, the vegetable and florist wizard, and Henry Ford, the wizard of modern commerce. Just think of the gigantic manufacturing plant he has established and which earned $54,000,000 last year. The idea of one man producing more automobiles than the rest of the manufacturers put together. He can't make them fast enough yet.

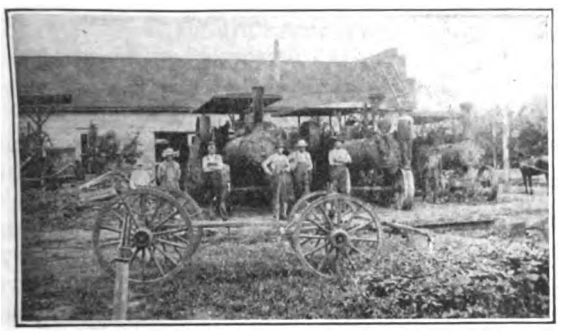
Think of the usefulness and benefit to mankind, the enjoyment of pure air and sunshine, all made possible by the automobile.

Digitized by Google

Just to think, you can buy the insides of Ford's car for $150.00. But Ford works from a commercial standpoint and has demonstrated that a well-paid man and just profit on his material is the road to greatness. Truly, no man liveth to himself. They couldn't live without us. You see, it takes us all to make the general whole. So get busy, Mr. Smith, and get into the auto business as soon as you can. Sell for cash and blacksmith on time. You can go broke selling on time faster than a high-speed engine. Why, bless you, you never saw a wealthy blacksmith in your life. The reason is plain. Because they never get their money and work for about one-half what they ought to work for and stand the losses they have to.

Prize Photo No. 12.

From W. T. McBride, Kansas.—I am sending you a photo of my shop and of my helpers. It is a side view and was taken last spring. There were other machines that I did not get in this picture, as they were scattered too much in the process of repairing for threshing work that was to come.



Showing the Shop of W. T. McBride of Kansas.—That He Handles Work Other Than Blacksmithing Is Indicated by the Threshing Machines.

I do all kinds of repairing, including general blacksmithing and woodworking. There is considerable work that comes quite a distance to me, as I am fixed to do it. I also do a great deal of work for the local garage, such as forging, lathe work, boring cylinders, making pistons and rings, etc.

I am not included in the photo, as I took it myself. My shop is constructed of cement blocks and has a high roof, as you will note. I use the upper story for storing material, etc. The floor is of brick and cement. The building was constructed eight years ago. I have been located in this town 14 years. Sometime I will send you a photo of the interior of my shop.

Prize Photo No. 13.

From Holden E. Schwalm, Pennsylvania.—I have been a reader of The Blacksmith and Wheelwright off and on for about 13 years. I first began reading it while an apprentice, as my boss was a regular subscriber. I have read the book with a great deal of profit, because of the many helpful articles contained therein. One copy has meant more to me than the price of the paper for the year. So much for the paper, and I am sure that every intelligent subscriber will bear testimony to its value.

Now with your permission I would like to touch on the different phases of the trade itself. As intimated above, I have read articles of different men on various phases with a great deal of interest. I am practically a beginner, just engaged in the business for the short period of six years, but I have tried to apply myself intelligently and to observe very closely. May I say right in the beginning that I have learned to know that the average blacksmith is an easy going sort of a fellow, letting someone else run his business, fix prices, closing hours, collection of bills, etc.

Now I want to state as briefly as possible my way of conducting my business, and if I can help any of my brothers in the business I shall feel amply repaid for my humble efforts. I do all of the work myself, with the exception of now and then a day. This is largely due to the fact that labor is scarce and expensive and in many instances unprofitable. I have no set time to begin or quit work. This may sound ridiculous to some of my friends that may belong to a horseshoer's or blacksmith's union, but remember I am doing this for myself with a firm purpose to succeed.

In the summer (all depending on the work, however) you may find me at work at four o'clock in the morning and maybe up to eight in the evening. I run from $2,000 to $2,500 a year. My running expenses at the highest are and have been not more than $400.

I do not belong to any organization of horseshoers, etc., believing that I ought to fix my own prices, take care of the so-called beats who like the poor, we have always with us, due very largely to the laxity of the average business man in collecting his bills. I want to say right here that the matter of collections I make a part of my business, and in little over six years I have not lost all told $25 and have it so arranged that today I have not much more than $100 on my books.

Furthermore, I am a great believer in preparedness (prepared to do things, of course). I make it a rule to utilize every spare moment in getting ready, to always have a large assortment of shoes toed and calked, for, in spite of the auto, I still have about 200 head of horses that I have to shoe, mostly farm horses.

Now I have had the experience over and over again that five, six or even seven head come to the shop at one time. Now suppose I did not have a single shoe ready. That would mean from four to five solid hours' work, but having them ready, or pretty near at least, I can dispose of those horses in from two to three hours' time, which is and does mean a great deal to a customer and myself as well. The same holds true of a great variety of smith-made articles such as open rings, links, all kinds of hooks, etc.

Before I close this rambling talk I want to say a few words as to the habits of blacksmiths. Now this may not seem important to some, but it is all important to me. No man should or can expect to succeed who passes his evenings, finds it necessary to loaf in a saloon, allows his hard earned money to flow into the till of the proprietor (who is, as a rule, a large consumer and no producer) instead of providing for himself and his own, as he should. I am a total abstainer when it comes to intoxicating drinks. I am not writing this boastfully, only to help someone else if I can. The same is true of the poolroom, and I may just add that all such spare times, evenings, holidays and Sundays, ought to be used profitably for the development of the moral and spiritual nature of ourselves.

Now, Mr. Editor, if you consider this contribution worth while, you may print same



Shop Conducted by Holden E. Schwalm, Who Is Shown Standing in the Doorway.

in The Blacksmith and Wheelwright. This is my first attempt to write anything for a paper. There are a few things that I would like to write about, but I am afraid I have been too prolonged already. Will do so sometime in the future, with your permission. Am enclosing a postcard photo of my shop.

Ed. Note:—We are sure that Mr. Schwalm's letter will prove of great interest to our readers, and we will appreciate receiving those further communications hinted at in his letter.

Sleigh Shoes.

From Old Subscriber, New York.—During the winter months over an extensive territory the sleighs, in one form or another, are a most useful and necessary conveyance. The large bearing surfaces of the runners enable them to carry loads where wheeled vehicles would sink in and get stalled. On smooth ice or packed snow almost any kind of runners will answer, but when there are spots of bare ground, railroad tracks, etc., to cross, the quality of the shoes becomes important. Strange as the statement may seem to some, the best material for sleigh shoes is unknown in many sections of the country.

The shoes most commonly used are mild steel for light cutters and bobs, and cast iron for heavy sleighs. Wrough iron or the mild steel commonly used, draws hard on bare ground, because the stones and grit cut into it, and the tough metal does not readily let go. This, as all drivers know, is very hard on horses and harness, and also on light sleighs. It causes the shoes to wear out quickly and bends and racks the braces and knees more or less.

Spring steel is better than the foregoing for light work, but it is harder to drill. The writer has heard of welding tool steel to iron and then hardening it, but this is a difficult and expensive job and is seldom resorted to. The cast iron shoes generally used are of that grade known as gray iron. They wear very smooth on snow and ice, but cut away very fast on bare ground and are easily broken. On account of the weakness and friability of the metal they do not "hang" like steel or wrought iron, consequently they draw easier on bare places. But in very cold weather they will freeze down tight when a loaded sleigh stops for a few minutes, owing to their becoming slightly heated by the friction when running.

No Corn for Western Horses.

Very little corn will be fed western horses this year, as it is selling at $1.20 the bushel, while oats are worth only about 60 cents. The custom of feeding corn instead of oats has been very general among farmers of the corn belt, and it is estimated that in normal times horses consume more than twenty-five per cent. of the 3,000,000,000 bushels raised each year in the United States.

The practice began when western farmers were hauling their corn from 5 to 25 miles to market and then selling it for 15 or 20 cents a bushel. It was of so little value in those days that many prairie corn growers used it for fuel in place of coal or wood.

The universal feeding of oats to horses would, it is believed, liberate something like 750,000,000 bushels of corn for human food, and by making full use of the bumper crop of oats in feeding other live stock, this addition to America's store of human food might, the experts estimate, be increased to something like 1,000,000,000 bushels of corn.

Making a Pry Bar.

There is always a demand around any railway station for pry bars for moving empty or loaded cars, says the Canadian Blacksmith and Woodworker. The following method of making these bars is of interest:

Make the bar 1⅝ inches square at the large end and tapered round to the other end like an ordinary crowbar. Let the bar be 6 feet 6 inches long. Upset the end and weld a piece of steel crossways for the fulcrum. Toe calk steel will answer the purpose. Cut it to an edge with a short chisel and smooth to a proper shape with fuller. A smaller riveting hammer is most convenient for working up the heel edge. Finish by hot filing. This is most expeditious and slightly rounds the heel from side to side, thus giving the smallest point of contact on the rail. Temper the heel to a blue color or, in other words, to a cold chisel temper. This temper is the toughest for the purpose. A bar made as described is very handy about roundhouses and locomotive sheds.

Digitized by Google

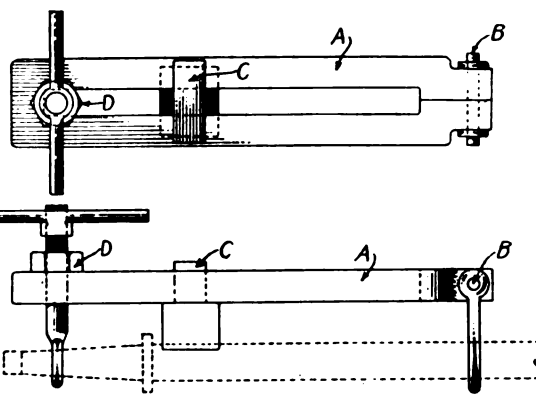


In this department our readers are invited to contribute articles explaining how they solve the various problems arising from day to day in the shop. You may have developed a method whereby a piece of work is finished quicker, easier and better than formerly, but when you have done so why not give your fellow-craftsman the benefit of your experience? No matter how simple the job may appear to you it may be one that is bothering the other fellow, so make a rough sketch of it, write a few words of explanation and send it to the editor of this department. He will have the sketch remade by an artist and fix up the article. We want every reader to join in making this department one of the features of our publication. Any suggestion for lightening one's labors in the shop will be welcomed and appreciated by your fellow-craftsman.

Straightening Axles.

From George W. Hardy, Idaho.—It is some time since I have sent you anything for The Blacksmith and Wheelwright, so I feel that I ought at least say that I appreciate what others have done to give me so many valuable ideas. I noticed one, however, in the December issue from Charles W. Kohler of New Jersey. He says he can shoe vicious horses that others have given up, and that without trouble, but he does not explain how he does it, except by hypnotism or mesmerism. It would be interesting to me and perhaps to others if Brother Kohler would explain the power or principle he works on. It may help others.

I am enclosing a drawing of a jack that I made about two years ago for straightening buggy axles when they are sprung on the end. No doubt there are some that are using straighteners similar to mine, but perhaps



Showing Construction of Axle Straightener Made from Buggy Axle by George W. Hardy.

there are a good many who have never seen one used and are using the old method, that of taking the axle out and straightening it on the anvil.

This jack is a great time-saver and I can do the work in about 15 minutes that ordinarily takes from 1½ to two hours. I took an old buggy axle and cut off the ends and bent it in the middle, forming the body about 18 inches long with slot about one inch. The ends are welded together and a hole made to receive clevis pin B. The loop that fits on the clevis pin goes around the axle. The rest C slides in the slot A and is adjustable on the shoulder of the axle as shown in the drawing. I welded a heavy block nut on the end of the body A at D. The eyebolt or hoop is threaded and loops over the end of the axle as shown. With my hands I can turn the handle so as to draw most any size axle either way and as needed.

To Resharpen Old Files.

In response to the request of George Stiefvater we give herewith a recipe for recutting old and greasy files.

Wash the files in warm water to remove the grease and dirt. Then wash in warm water and dry by heat. Put 1½ pints of warm water in a wooden vessel, put in the files and add 3 ounces of blue vitriol, finely powdered, and 3 ounces of borax. Mix well, and turn the files so that every one may come in contact with the mixture. Add 10½ ounces of sulphuric acid and ½ ounce of cider vinegar. Remove the files after a short time, dry, rub well with olive oil and wrap in a porous paper. Coarse files should be kept in the mixture for a longer time than fine ones.

Another Suggestion for Mr. Meyers.

From W. E. B., Massachusetts.—I read with considerable interest the replies to the auto questions asked by Brother Meyers of Little Rhody. I note that Brother Ott of California makes some good suggestions, but I feel that I must disagree with him as to one statement he makes. He says, "Get an old car and tear it down, watching every movement in so doing." Now I am assuming he means that this will enable a greenhorn to learn the parts, etc., and the way they go together. It all depends on the man.

I don't believe tearing down a car will do other than help a little. It is a simple matter to tear it down, as Brother Ott says, but it will be a different matter when you come to try and put it together, yes, even a small section of it. I well recall the first attempt I made to put together a part of a car. I had a mess of nuts, bolts, washers and other thingumbobs, and after using all I could found I had a few left over when the job was done.

Master One Part First.

I would suggest that Brother Meyers, or anyone else for that matter, learn the name of each part, how it works, where it goes, and how it goes, just as was suggested in your valuable paper. After getting an idea of the parts the tearing down will be all right, but I think Brother Meyers will do better if he sticks to one part of the car and masters it before trying a general tearing down. I trust Brother Ott will not take offense at my suggestions, for I really believe he meant that it would be best to learn something about the parts before tearing them down.

As to auto repairing, I have been at it for three years now, and what I have lost in regular smith work I have gained in auto repairing. I studied books teaching the parts of a car, talked with chauffeurs and owners who came to my shop for ordinary work, and kept storing this knowledge away.

Goes After Business.

When I thought I was ready to take up the practical end I bought me a second-hand car. I did not buy a "flivver," but a machine having a sliding gear set and cone clutch, as I wanted to learn about the big cars. My experiences would fill a book, so I won't take up any more of your valuable space, but I want to remark right here that I learned with that car and at the present time am considered a pretty fair auto repairman. It is seldom I get stuck and all repairmen get a poser now and then. I am a great believer in going after business rather than having it come to you. Those smiths who are prejudiced against the auto and wait for the business to come to them may wait too long. We are growing older every day.

Concerning Interfering.

From Charles W. Kohler, New Jersey.—When a horse that interferes comes to my shop the first thing I do is to take him on the level floor and see how he stands on his legs. Take a horse that toes out. He always interferes one or two inches from the toe. To stop this I dress the foot with the heels an even height then lower the inside from near the heel to the toe about one-quarter inch, the lowest part being at the inside toe. I make the inside heel of the shoe one inch longer than the outside and don't mule the heel straight back.

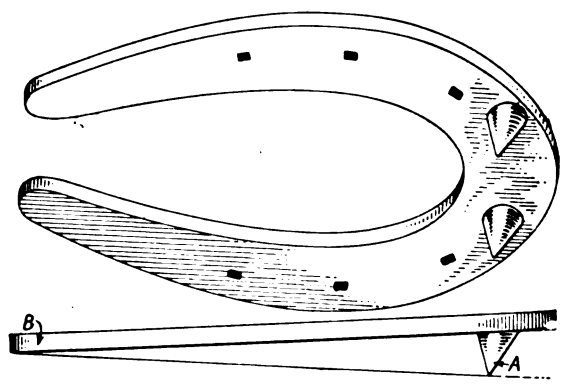
When a horse toes in I do nearly the opposite. I make the heels even height, lower the outside of the foot from one-quarter to 5/16 inch, make the outside heel one inch longer than the inside and mule it very little.

Now comes the horse that shaves the hair and skin of the coronet till it bleeds when he walks. When the horse trots he knocks the ankle. I make the heels even height, foot level, swell the heel on the inside, calk on outside with a side weight shoe.

Then there is the knocker, who knocks his ankle with the inside of the hoof (not the shoe), just bruising the ankle until it swells three to four times its natural size. The first thing I do is to reduce the swelling, then shoe him as the one before. This is for horse interfering with the hind legs.

Shoeing a Foundered Horse.

From R. T. M., Pennsylvania.—I am enclosing a rough sketch of a shoe that I have used with success in shoeing a foundered horse. Make a wide shoe, set the nails as close to center as you dare and cut off all the toe you can. Concave shoe so as not to allow any sole pressure. The toe calks, A, should



How Pennsylvania Smith Shoes Horse That Has Been Foundered.

slant toward the heel, B, so as to give as much of a rolling motion as possible. The plate is better with a small heel, so don't calk unless it is necessary. I believe this with the sketch makes the matter clear. Perhaps some of my brother smiths will give me their views on how to shoe a horse that has been foundered.

Hints on Soldering.

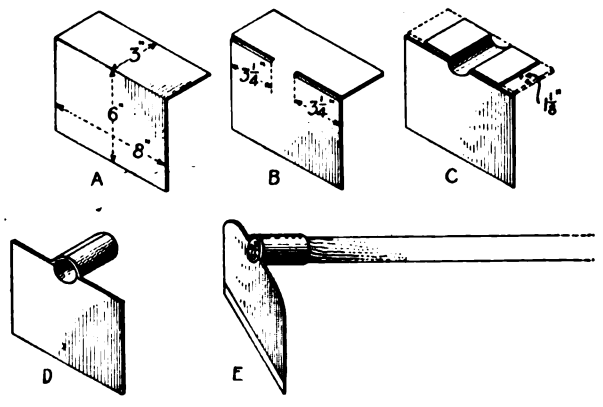
From Perry Robinson, Nebraska.—Those who do repairing to automobile radiators should get some Solderall and a small Presto torch. These do not cost much and they will solder the tubes of radiators. If it doesn't work, I hope anyone having trouble will write me.

I take a small round file and pound the handle end flat, also curve it a little so as to provide a scraper to work in crevices and around the tubes of the radiator to remove the dirt, etc., and to tin the surfaces. I take the torch and warm the tubes and the file a little at first. Next I take a little of the Solderall and put it on the place to be soldered and apply the heat.

Turning Eye in Hoe.

From Carl H. M. Zoellner, U. S. Navy.—In reading my January number of The Blacksmith and Wheelwright I came across the question of H. R. L. of Kentucky, asking how to turn an eye in a hoe like our grandfathers used to do.

I am a young smith and marine blacksmithing is my line. Now I have never made any hoes of this kind, but if I did this is one of the ways I would make it. For example: In making a hoe six by eight inches, with a



Suggestion for Turning Hoe Made by Carl H. M. Zoellner, a Marine Blacksmith Serving With Uncle Sam.

half-inch eye three inches long, I would take a piece of nine by eight 10-pound plate, or quarter-inch, which is the same, and turn it to an angle six by three, as shown at A in the drawing.

Next I would cut in both sides at the bend 3¼ inches as shown at B, then cut off 1⅛

Digitized by Google

inches of each end of piece three inches wide as shown at C. Next take a fuller and fuller down the center to a ¾-inch radius, turn the two ends toward the center as at D and weld. Next I would weld a thin piece of tool steel to cutting edge of hoe, then shape the corners as at E.

There are two ways of making these hoes, but I think this way is easy without working a helper to death.

Making a Band Saw.

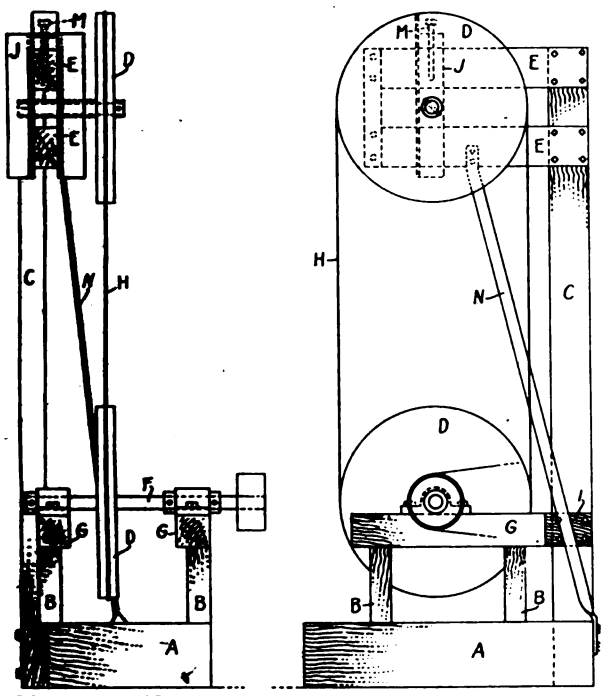
From T. R. Owens, Missouri.—I have been reading your paper for six years and have obtained much valuable information from it. So I am sending you a drawing of a band saw I made myself out of material I had laying around my shop. All I had to buy was the saw. I saw all the wagon timber to size and shape I use on the saw and have sawed lumber six inches thick with it.

The accompanying drawing shows the construction. A is a block of wood eight by 20 inches by three feet. This can be made of six by six or smaller timber bolted together so as to make a solid bar if desired. B is four old wagon thimbles, all of the same length and set on the base block. G is four by four inches and two feet long laid on top of them and bolts go through them and through the thimbles, then through the base block. These bolts are screwed down tight.

Making the Boxes.

The boxes for the shaft of the bottom wheel are bolted to these four by fours. One of the four by fours extends out as shown at I, and is bolted to an upright post C, which is three by five and about six feet long, with two pieces of three by five mortised on to the top like a letter E. Bolts run lengthwise and through the upright C.

The wheels D are 24 inches in diameter, but smaller wheels can be used. If smaller wheels are used the upright C must be made shorter to suit the space between the table and upper wheel. F is the shaft with pulleys on the other end from the band wheel. H is the saw, J is a two-inch angle steel with one angle sawed into twice and wide enough to



Illustrating How T. R. Owens Constructed a Practical Band Saw from Material Lying Around the Shop.

fit over frame at E when bent in the shape of a letter U as shown. The U piece goes over frame E E, open end down, and shaft goes between pieces E E with screw M in top to tighten saw.

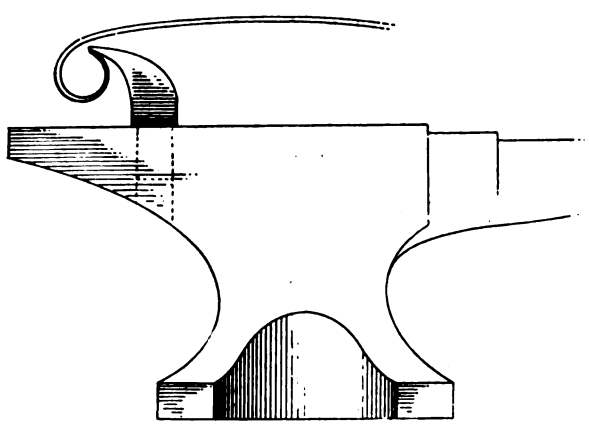
A piece of square pipe as long as the U piece is wide, with babbitt run around the shaft, makes a good boxing for the shaft of the top wheel and it can be clamped on to the angle steel so it can be adjusted to line the wheels. The angle steel U slips up and down in guides on pieces E E with a bolt through it to tighten it upon frame when saw is drawn tight. The wheels are covered with rubber belting fastened with glue and copper rivets.

How Table Is Made.

The table can be made as large as desired and fastened to the frame with iron legs. The upright and top frame should be braced with angle steel or heavy bar iron, as shown at N, on each side. Guides are put just under the table and over the lumber that is to be sawed, as shown at O. They are made by sawing a slot in a hard piece of wood for the back of the saw to run in. This saw of mine does such good work that I thought someone else would like to make and use one.

A Spring End Roll Tool.

From Charles Smith, Pennsylvania.—As neatness and a true roll is required in so much automobile spring work, the proper tool is a factor of importance to blacksmiths doing spring work. The accompanying sketch shows a very serviceable tool for the work, and, as you may notice, the thin end of the tool reaches into the thin end of the spring



Spring End Roll Tool Invented and Used by Charles Smith.

and allows a smooth job to be done where a hammer could not reach. And as brass bearings are often inserted in the spring rolls this tool reaches into all parts required to make a good, smooth job. Once this tool is made it lasts a lifetime and pays for the making. This tool fits the hot steel to the drift pin neatly for the brass bearing. The tang should be made to fit the square hole in the anvil and snugly.

Fereno, 2:05½, Is Dead.

Fereno, 2:05½, a famous trotting mare, broke her leg while running in pasture at the Walnut Hill farm, Kentucky, and had to be killed. She was 20 years old and had not been bred for several years, but was kept as an honored pensioner because of her famous record as a racer in her younger days.

Fereno was the first trotter to win the two-year-old and the three-year-old Kentucky futurities in successive years. She raced six seasons, and in 26 races was first 11 times, second 8, third in 3 and fourth in 3. She was never unplaced at the top of her form. There were only three horses who beat her —Lou Dillon, Cresceus and Major Delmar. Fereno was by Moko out of Hettie Case, a descendant of George Wilkes.

Blacksmiths Wanted.

Seven thousand men are needed by the Aviation Corps for immediate service behind the firing lines in France. Only men over and under the draft age are acceptable under this call, which is sent out by the United States Service Reserve. It is proposed to form a motor mechanics regiment, the first of its kind.

Skilled mechanics are desired most, but chauffeurs, blacksmith forgers, wheelwrights, cabinetmakers, sheet metal workers, cooks, canvas workers, house and sign painters, harnessmakers and acetylene welders will be accepted. The Public Service Reserve of the Department of Labor, which has undertaken to get these men for the Aviation Corps, says the men specified are urged to enlist at any recruiting station, but they should not give up positions in shipyards or war industry plants.

Owner of Tom Hal Is Dead.

There died at Nashville a fortnight ago the man who once owned the pacing gaited saddle stallion Tom Hal, founder of a tribe of fast pacers which made Tennessee famous as a nursery of light harness horses. The man was Thomas Gibson and he was 82 years old. It was soon after the civil war that he purchased Tom Hal and began breeding saddle horses near Spring Hill, a few miles south of Nashville. One of his neighbors, R. H. Moore, bred a pacing mare called Lizzie to his saddle stallion in 1874 and she produced the next spring, Little Brown Jug, 2:11¼, the fastest pacer in the world in his day. From the same sire and dam came Brown Hal, 2:12½. He proved to be the fastest pacing stallion of his time and the sire of Star Pointer, 1:59¼, the first harness horse to gain a record of 2:00 or better. Brown Hal is the sire of 15 pacers in the 2:10 list, and his sons and daughters are the sires and dams of many more.

Horses Have "Shipping Fever."

"Shipping fever" and its complications, for which no satisfactory preventive has been found, has caused the loss of 4,777 horses and mules in the army remount service. The loss is said to amount to $835,975. Steps have been taken to reduce as far as possible loss from the disease, a form of influenza. Since the United States entered the war army horses and mules have increased from 66,145 to 344,000.

Pan Zareta Dead.

Pan Zareta, the eight-year-old racing mare, holder of several track records and winner of more than eighty races, died recently of pneumonia. She was known to race followers as "Queen of the Turf." Pan Zareta was purchased a year ago by Joseph Maronne, of New York, from H. S. Newman, of Texas.

A Chance for Inventors.

When attending a meeting of the Board of Review recently, W. H. Gocher, secretary of the National Trotting Association, said that accidents caused by one horse in a race stepping into the sulky wheel of a competitor were becoming so common as to demand an improvement in the modern pneumatic sulky which would prevent such mishaps. It is not generally known that sulky builders have been trying for years to solve this problem, but as yet without success. A guard for the wheel is among the contrivances tested.

Is 43 Years Old and Working.

Rev. U. Myers, of Catawissa, Pennsylvania, attended the Bloomsburg Fair last week for the thirtieth consecutive time. That in itself is not of particular interest, but when we add that he has driven the same horse to the fair each year during that period it is a record of which few, if any, can boast. His steed, said to have been a fast trotter in his day, is now forty-three years old.—Our Dumb Animals.

Many Fast Horses Died in 1917.

Eleven trotters and 17 pacers having records of 2:10 or better died last year, according to the American Sportsman. The fastest of the trotters was Mary Putney, 2:04¾, regarded by many horsemen as a prospective two-minute performer. Others were Fereno, 2:05½; Charley Herr, 2:07; Fair Maiden, 2:07; Ruth McGregor, 2:07½; Arion, 2:07½; The Lark, 2:08¼; Adbell M., 2:08¾; Codero, 2:09¾; Jim Thorpe, 2:09¾, and The Wolverine, 2:09¾. Among the noted sires that passed away were Axworthy, 2:15½, and McKinney, 2:11¼.

Most Successful Colt Trainers.

Thomas W. Murphy, Alonzo McDonald, W. J. Andrews, J. L. Serrill and Ed Geers are the most successful trainers of colt trotters, judged by the number of three-year-olds they have driven to records of 2:10 or better. According to the American Sportsman Murphy leads with 12, including The Real Lady, 2:03; Peter Volo, 2:03½, and Native Belle, 2:06½, all of which held the world's record in their respective years. Andrews is credited with nine; McDonald with eight, Serrill with six and Geers with five.

Digitized by Google

THE MACHINE SHOP

Readers are requested to supply information and to ask questions in relation to matter for this department. The range of subjects must necessarily be broad, and it is hoped that it will improve and simplify small machine shop practice as well as make it more profitable. Its value will largely depend upon the co-operation extended by our readers.

LATHE WORK.

Describing and Illustrating Methods of Turning and Fitting Bushings.

BY TOM SCOTT.

Part XI

Probably one of the first jobs of importance which will come to the smith-machinist will be the making and fitting of a bushing for the hub of some pulley, or perhaps for a gear which has worked loose. Fig. 2 illustrates the



Fig. 1—A Solid Bank for Bushing.—These Can Be Secured at Any Foundry, Also Cored.

usual situation, the metal of the hub A having worn away as shown at B and C.

Sometimes attempts are made to repair such worn hubs by pouring in hot babbitt metal around a shaft of the proper diameter which has been centered more or less accurately—usually less—before the babbitt was poured.

Bushing Hubs.

But this method hardly ever proves satisfactory. It really is a makeshaft, one that lasts only a very short time. The proper method of treating a hub such as is shown at Fig. 2 is to bore it out, say, to the line D, or until the inside of the hub becomes a true cylinder again. Two methods are available. Either fit in a larger shaft, or, as usually is done, make a bushing which will fit the old shaft which has been dressed true in the lathe if necessary. Next drive the bushing into the hub, fit it to the newly dressed shaft, and the mechanism is as good as when new. This makes a permanent repair, one which will NOT go bad in a short time or as soon as a little babbitt wears out or becomes loose.

The first step is to chuck the pulley or gear in the lathe, using either of the methods described, and bore away the metal to the line D. This may be done by means of a long-necked internal turning tool as described in Chapter IX, but better work can be done by means of one of the boring bars described in the same article.

When it is desired to do the best work, to make lathe work interchangeable so it will fit without trying in and fitting, procure some fluted reamers of various diameters as required by the line of work you are to do. When a hole is to be finished after the boring or internal turning has been done, run one of these fluted reamers through the hole and it will be about as true to size and as perfect as can be made without grinding the inside by special apparatus.

Reamers are mighty good things to have. They are expensive, and many of them are needed in order to make it worth while. But

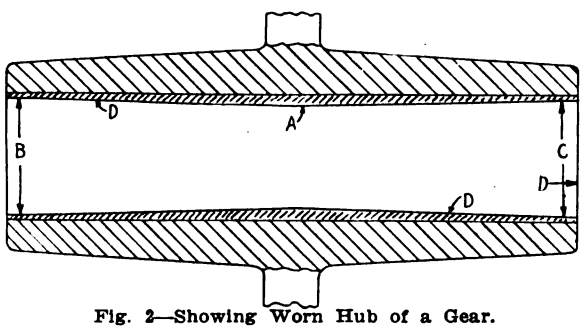


Fig. 2—Showing Worn Hub of a Gear.

once procured and well taken care of, and used merely for brushing out to exact size the inside of a hole, a fluted reamer will last a very long time without becoming appreciably smaller. But do a lot of work with a reamer, such as taking out a lot of metal instead of boring it out with a cutting tool, and the reamer will soon become worn, require sharpening, and is soon undersize and will make the holes too small.

But sometimes it is mighty convenient to thus ream out a hole instead of boring away the metal. When a practice is made of this method procure two reamers of the same size. Use one for the rough work but keep the other reamer separate and use it only for a single finishing cut in each piece of work. In this manner the reamers and consequently the holes made therewith will be kept up to standard size. And the use of reamers is about the only profitable way in which the smith-machinist may make standard holes and keep them always up to size.

Reaming and Grinding.

Having bored and perhaps reamed the hub hole to size, and if necessary turned the shaft, proceed to make up the bushing. When the shaft must be turned, make it fit a hole of the proper size which has been reamed in some waste bit of metal with another reamer, a hole smaller than that of the finished hub hole. If you do not care to go to the extra work of making such a test hole, then leave the shaft until the bushing has been made and fit the shaft directly to the reamed hole in the new bushing. This is the usual method where plug and ring gauges are not in use in the shop.

Plug gauges are pieces of hardened steel ground to fit holes made by the reamers in the shop. Ring gauges are pieces of hardened steel with a hole which is exactly fitted by the reamer of that size, also by the plug gauge of same size. Thus when a plug and

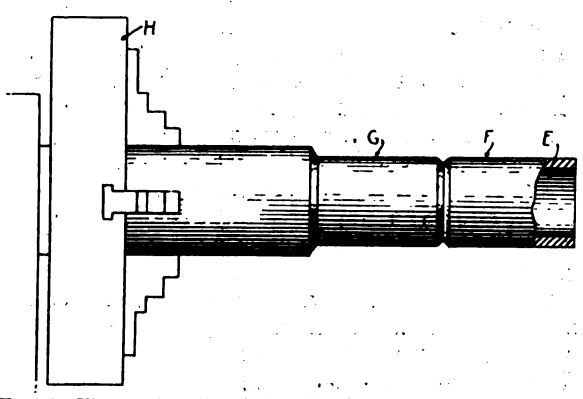


Fig. 3—Illustrating Blank in Chuck and Method of Preparing to Obtain a Snug or Drive Fit for Bushing.

ring gauge are at hand, for any size of reamer, pieces fitted to the plug and to the ring must fit each other without any trying or fitting together.

Look into this reamer and grinding business, also the plug and ring gauge if you intend to do very much accurate lathe work and to do it quickly and profitably. It should be stated that in making plug, ring and other gauges it will not answer to turn and to ream them to size and then harden. The rings must be turned a trifle small, the plugs a little large and both ground after hardening to a fit in a costly machine devoted entirely to that work. Only by means of such a machine can the smith-machinist or any other man ever expect to turn out accurate lathe work.

A good deal of grinding may be done in the lathe by means of a little rigging up, but it is mighty hard on the lathe, which will not last long when used continually for grinding. Occasional jobs may well be done in the lathe and a future article will tell how to arrange for and do the work.

Making a Bushing.

Having reamed the interior of the hub to the required size, procure a piece of cast iron which is large enough to make the bushing. There are two methods which may be followed from this point. If you have a drill large enough to make the hole and still leave enough metal for the reamer to clean up, then the drill may be sent right through the soft cast iron shape. Use the reamer and the inside of the bushing will be thus finished in short order.

But if you have only the lathe and the boring tool, then fasten the bushing blank shown at Fig. 1 to the face-plate of the lathe, either by chucking or by simply catching the blank in the jaws of an independent or universal chuck, if you have either.

In the universal chuck all the jaws are geared together and moving one moves them all. The independent chuck is one in which each jaw is set forward separately. Most good chucks can be used in either manner by making a slight adjustment which separates or connects the several jaws.

Bushing Blank.

Two patterns of bushing blanks are shown by Figs. 1 and 3. The former is cast from a simple round pattern. That shown in the jaws of the chuck was made long enough to make two bushings. It may be procured either solid or with a hole through the blank lengthwise.

Almost any iron foundry can supply ordinary sizes of bushing blanks of either type. Foundries also carry patterns for standard sizes of bushing blanks, for there is a steady demand for this kind of castings.

Bushing Blank in Chuck.

When a bushing is to be made from the blank shown at Fig. 1 it will be necessary to chuck and bore the blank or to drill and ream it to the required size. Next a mandrel must be found or made which can be placed between the lathe centers. The bushing is removed from the face-plate and driven upon the mandrel hard enough so that it will not turn around while the outside of the bushing is turned and finished to size which must be exact enough so that the bushing may be driven snugly into the hub which has been already bored and reamed.

In making bushings always fit the hole first. Make that to standard size by reamer or otherwise, then fit the bushing to the hole. Don't try to fit the hole to the bushing. At Fig. 3 the hole E is shown already reamed to fit the hole in pulley hub. The two bushings have been turned a bit oversize and partly cut off as shown at F and G. All this is done while the blank is caught in the jaws of the chuck H.

The bushing F may now be fitted by light filing to the exact size necessary to drive snugly into the hub shown at Fig. 2. If the bushing be made a very little too large it will drive too hard and may crack the hub. If too small it will be loose and will not stay without putting paper around it. This is bad practice so don't do it. Work carefully and get the bushing just right, so it will drive in snugly and stay in place without further trouble.

Horse and Mule Export Figures.

That the horse and mule are playing important roles in the war is indicated by the export figures during the past three years ending in August, and those dealing with September and October of the present year. A total of 1,490,000 horses and mules have been exported during this period. During the first year and ending in August, 375,000 horses and mules were sent abroad. In 1916 470,000 were exported. The third year and ending in August 1917 saw 450,000 shipped. During September and October of the present year, 195,000 were exported. Of the total amount of 1,490,000 75 per cent. represents horses.

The value of horses sent to Europe during the first seven months of the present year is approximately $25,500,000. Since August 1914, and up to the end of July 1917, the value of horses exported was $215,000,000 and that of the mules shipped was $66,000,000. The average value of the horses exported during the first year was $221 a head; in the second year $205, and in the third year of the war $214 per head. Mules averaged $193, $205 and $206 per head respectively during these years.

Digitized by Google

USEFUL DELIVERY BODIES.

Designs for Popular Type Including the Convertible Vehicle.

During the past few years that popular and well-known type of automobile is being more and more utilized for commercial work. There are many owners of these machines who employ their cars during the week in their business and on Sunday use the vehicles to give their families a chance to breathe some fresh air or to make calls on their neighbors. As a result of making the horseless wagon earn its upkeep six days of the week, the owners frequently display considerable ingenuity in constructing bodies, etc., for transporting the merchandise or other material.

A Thief-Proof Design.

Among the interesting designs shown herewith is one that is adaptable to the runabout type of car and can be used by the grocer, druggist, butcher, baker, etc., and those concerns dealing in light and compact goods.

The construction of the rack is shown at B, and it is made of one-inch angle iron and the shelves are of ¾-inch wood. These can be made removable so as to increase the space when large packages are to be carried. The top is constructed of wood and when the job is completed it is given a neat coat of paint. The door is made of sheet metal and the three sides are covered with a heavy wire screen. A suitable lock completes the rack, which is secured to the deck of the car by four bolts. The deck or door of the runabout body is removed while the rack is in service. As the rack can be removed or installed in a few minutes, and the car made ready for other service, the arrangement is a most practical one. The material is not expensive and there is a good profit for the smith or wagon builder.

Novel Tire Carrier.

The construction shown at C is a job easily completed by the smith and is one adapted to supply houses, etc., dealing in automobile tires. The door of the runabout deck is displaced and the tire carrier secured to the floor of the machine. The carrier consists of three 50-inch lengths of ordinary one-inch pipe with one end threaded. These ends are screwed into flanges, which, in turn, are attached to the floor of the car. The method of assembly and attachment is plainly indicated at D and a top view is shown at E. The pipe holders are spaced equidistant. In arranging the carrier its diameter should not be greater than the inside diameter of the Ford type of shoe. As the pipes are screwed into the flanges it is a simple matter to displace them when use of the car for Sunday is desired.

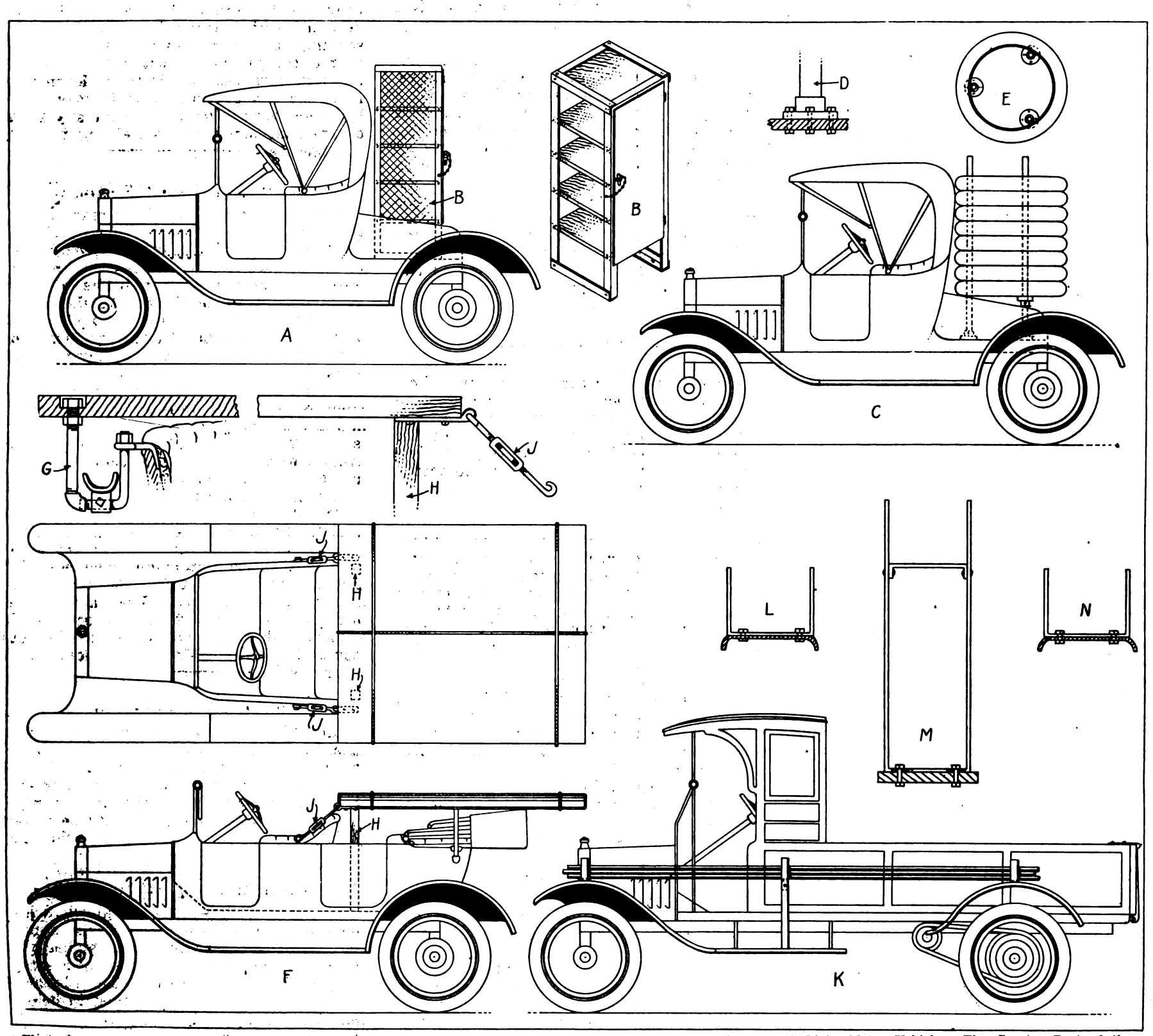
A Pipe Carrier.

The carrying of piping, long strips of iron or other metal is not an easy matter, as there is considerable movement to the pieces and the length makes it awkward to secure. The sketch at K shows how an electrical contractor utilizing a ton capacity truck solved the problem. The fact that the fenders of this machine were rugged and securely mounted, enabled the smith doing the work to use the fenders for supporting the racks shown at L and N. These were made U-shaped and bolted to the fenders with a strip of painted canvas between the irons and fenders to prevent rust and to reduce the effects of vibration. The center support M was bolted to the running board, the construction of the former being illustrated at M. As the carrier has three supports, the piping is kept level and the possibility of bending is avoided. To prevent movement of the pipes when traversing rough roads, they are tied to the uprights.

A Plate Glass Carrier.

A clever adaption of a touring car by a concern dealing in plate glass is shown at F. The details of the construction are also shown. This job was figured out by a blacksmith in response to the demand of the owner for a plate glass carrier which could be removed to permit of use of the machine on Sunday.

The smith solved the problem by threading the rear top bow support and adding thereto a 15-inch section of pipe with an elbow as shown at G. The upper end of the pipe passes through a broad platform and is secured in place by two nuts. The platform employed is 60x64 inches and has at its forward end two legs, H. These rest on the floor of the car, forming a support. The front end of the platform is prevented from moving or rising by the use of two turnbuckles, J, which are attached to the forward top iron by means of the hook-like end.



Illustrating and Showing in Detail Several Practical and Easily Constructed Carriers Adaptable to Runabouts and Light Motor Vehicles.—The Greater Part of the Work Involved Requires the Services of the Blacksmith.

Digitized by Google

The Pioneer Journal of Its Class in the World.
Member of the Audit Bureau of Circulations.
PUBLISHED MONTHLY BY
M. T. RICHARDSON COMPANY,
71-73 MURRAY STREET, NEW YORK.
POST OFFICE BOX, 654. TELEPHONE—7377-7378 BARCLAY
CHICAGO OFFICE, 608 SOUTH DEARBORN STREET.

M. T. RICHARDSON, President and Treasurer
F. R. WHITTEN, Secretary
C. P. SHATTUCK, Managing Editor

F. R. WHITTEN, Advertising Manager.
F. M. DAMPMAN, Eastern Representative
H. F. LUDINGTON, Western Representative

AGENT FOR GREAT BRITAIN:
ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance..$1.00
One Copy, six months, in advance.....60 cents
Single Number .....10 cents
Canadian subscriptions .....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English money.
Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

COMMUNICATIONS.

Communications on subjects appropriate for our columns solicited from all quarters. We want practical information. If you KNOW something that will benefit our readers, we shall be glad to have you write it out and send it to us for publication. All communications of this nature should be addressed to the Editor of THE BLACKSMITH AND WHEELWRIGHT, P. O. BOX 654, New York.

CHANGE OF ADDRESS.

Subscribers who desire the address of their paper changed will please send the old as well as the new address.
Newsdealers can obtain THE BLACKSMITH AND WHEELWRIGHT from the news companies with whom they deal regularly.

ADVERTISING RATES SUPPLIED ON APPLICATION.

Entered as second-class mail matter at the Post Office in New York City.

SPECIAL NOTICE.—When subscribers fail to receive THE BLACKSMITH AND WHEELWRIGHT regularly, we shall take it as a favor if they will notify us to that effect.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

The Blacksmith and Wheelwright in New Zealand.

Mr. R. Hill, Matlock House, Devonport, Auckland, New Zealand, is our accredited representative in New Zealand for obtaining new subscriptions.

☞ **When you change your place of residence always write to us and give your new address.**

FEBRUARY, 1918.

TABLE OF CONTENTS.

	PAGE.
Classified Buyers' Guide	55
Index to Advertisers	55
Want Advertisements	56
Design, Construction, Operation and Repair of Motor Vehicles	41
Favors Wood Wheels	43
The Horse Is the Brake	43
How a Missouri Blacksmith Saves Time and Labor	44
To Breed Army Horse	45
Suggests Shell Track	45
Utica Smiths Raise Prices	45
Home-Made Bevel Gauge	45
Why You Should Take Part in the Photo Contest.	46
Sleigh Shoes	47
No Corn for Western Horses	47
Making a Pry Bar	47
Workshop Experience	48
Blacksmiths Wanted	49
Is 43 Years Old and Working	49
Horses Have "Shipping Fever"	49
Most Successful Colt Trainers	49
The Machine Shop	50
Horse and Mule Export Figures	50
Useful Delivery Bodies	50
Editorials	51
Kansas B. H. & W. Association Holds Annual Convention	53
Montana Gets Good Prices	53
South Dakota Smiths Organize	53
North Dakota Convention	53
Questions for Our Readers	54
Painting Hints	54

ACT QUICKLY.

In our last issue we called the attention of our readers to the iniquitous second-class postage law, passed at the last session of Congress, which will result, when enforced next July, in increasing the postage on all periodicals from 300 to 900 per cent., and will make it necessary for most publications to raise their subscription rates from 50 to 100 per cent.

Every reader of The Blacksmith and Wheelwright is interested in having this measure repealed, and a concerted effort on the part of periodical readers all over the country will assist very materially in bringing this repeal about. It has never been proven yet, conclusively, that the Government is losing any money whatever on second-class postage at a cent a pound. The Post Office Department had a surplus, according to the report of the Postmaster General last year, of over $9,000,000.

The Post Office, however, was never intended to be self-sustaining, any more than the agricultural or some of the other departments. The argricultural department prints millions of copies of bulletins every year, which are sent out free of charge to the farmers. It also sends thousands of tons of farm and garden seeds to the farmers, free of charge. Why, therefore, should the general public be forced to pay a largely increased rate for its reading matter because it is thought that the Post Office Department loses money on second-class mail, which consists, of course, of all the monthlies and weeklies relating to all sorts of subjects?

The Canadian Government charges only a quarter of a cent a pound on second-class matter.

Once more we urge every reader who has not already done so to write to his Representative in Congress and insist upon a repeal of this new postage law. If you don't know the name of your Representative, ask your postmaster; he will be almost sure to know. When writing a letter to your Representative, address him at the House of Representatives, Washington, D. C. Also don't fail to write to the two Senators from your State, addressing your letter to the Senate Chamber, Washington, D. C.

We trust that every reader of The Blacksmith and Wheelwright will attend to this matter as soon as possible.

OUR PHOTO CONTEST.

We received a letter from an old subscriber who states he is pleased to see his fellow craftsmen on paper even if he cannot have the pleasure of meeting them personally. He commends our efforts in conducting the photo contest and hopes that each issue of The Blacksmith and Wheelwright will contain a greater number of pictures than the preceding number.

We are always pleased to receive expressions from our readers even if they contain criticism, for criticisms serve a most useful purpose when honestly made. As we have so often stated, the photo contest was started with the idea of getting our big family of readers acquainted with one another, to show the smith in Maine how a shop in California looks.

Not only has the contest been a success, but it has been the means of obtaining a number of excellent, practical ideas. Contestants have discussed a number of interesting subjects and a number of smiths have given some excellent advice to the young man embarking in the business. If we do not achieve any other success than that of introducing our readers to one another we shall feel well repaid for our efforts.

A NEW DEPARTMENT.

Beginning with this number we introduce a new department in The Blacksmith and Wheelwright, a serial dealing with the construction, operation, maintenance and repair of vehicles propelled by the internal combustion engine. It will take up and discuss in logical sequence the various parts of the passenger car, motor truck and tractor. Each article will be well illustrated and drawings showing the principles involved will be included. The serial is being prepared particularly for the person not familiar with the mechanically propelled vehicle, which is not so complicated as it is thought.

One of the features of the department will be the question and answer privilege extended to all subscribers of The Blacksmith and Wheelwright. We have made arrangements with the expert conducting the serial to answer all questions relating to each installment. So if there is any question you wish to ask about any part or if any explanation made in the article is not exactly clear to you, do not hesitate to ask the expert to be a little more explicit. While we prefer that questions be confined to the subjects in hand, replies will be made to all questions relating to motor vehicles.

When information is desired address the automobile editor of The Blacksmith and Wheelwright. A prompt reply will be made by mail and generally on the same day the question is received. In asking for specific information, such as how to time a Hudson car, for example, give the year and model of the car.

DELAY IN THE MAILS.

We must ask our readers not to become impatient if their copies of The Blacksmith and Wheelwright fail to be received on time. Everybody, of course, is aware of the congestion of freight on the railroads all over the country, and this congestion has resulted in a slowing up of the mails to such an extent that in many cases they are a week behind, or more.

We want to say to each reader that if his copy does not arrive when expected, we wish he would wait patiently for a few days before sending in his complaint. Sometimes, of course, the papers are lost in the mails, and in every such case we desire to learn about it as soon as possible so as to make every lost copy good. We don't want any reader of The Blacksmith and Wheelwright to miss a single issue during the year.

IS AUTO WORK PROFITABLE?

A short time ago one of our readers wrote to us that the only criticism he could make of The Blacksmith and Wheelwright was that it contained too much about automobiles. He further stated that the motor car had no place in the blacksmith shop. This blacksmith really paid us a compliment, at least we think he did, if he really meant that our only fault was that we endorsed auto work.

In decided contrast is the letter received from W. J. Ott of California, whose article appears in the prize photo contest in this issue. Mr. Ott's story should be read by every smith who does not believe in automobile work as well as by those who do or contemplate taking it up.

Mr. Ott has been in the blacksmith business for 34 years. He is still a blacksmith and proposes to continue at his trade, but he also is in the automobile business. The fact that he has invested $2,000 in a gasoline and oil station and over $150 in a free air pump would indicate that it is possible for a blacksmith to achieve success in the automobile field. What Mr. Ott has done can be accomplished by others.

WORKSHOP EXPERIENCE.

The editor takes this opportunity to thank those subscribers who have contributed to the department entitled Workshop Experience. While the response to our suggestion that readers help one another by contributing short cuts on work, etc., has been very gratifying, we trust that those who have not will do so.

ENDORSES THE MOTOR CAR.

That the arrangement made by The Blacksmith and Wheelwright to publish a serial on the automobile meets with the approval of our readers is proven by a number of letters received, the following being a sample:

"I am pleased to see that The Blacksmith and Wheelwright has arranged to help the smith in his efforts to learn auto repair work. I believe the blacksmith will make the best automobile mechanicians."

Digitized by Google

Kansas B. H. & W. Association Holds Annual Convention

Delegates Adopt Patriotic Resolution Pledging Support to the Government.—Hutchinson Selected for 1918 Convention

Although the attendance was not so large as in former years, the eleventh annual convention of the Blacksmiths', Horseshoers' and Wagonmakers' Association, held at Wichita, Kan., November 14 and 15, made up in enthusiasm what it lacked in numbers. Delegates were present from all sections of the State and letters and telegrams from members unable to be present were numerous. Considerable business was transacted in addition to the election of officers, committees, etc., and a patriotic resolution was adopted. Hutchinson was selected as the meeting place of the 1918 convention and the dates are November 13 and 14.

RESOLUTION ADOPTED.

The following resolution was adopted by the Kansas B., H. & W. A.:

BE IT RESOLVED, That, whereas our beloved country is now engaged in the great world war, and whereas our President of these United States of America has sounded the tocsin that the world must be made safe for Democracy,

BE IT RESOLVED by the Blacksmiths', Horseshoers' and Wagonmakers' Association of Kansas in convention assembled that we pledge to our Chief Executive in this crucial hour of our beloved America for the cause of humanity that all mankind may be made free, and the world shall know no more of war, our wealth, profession and lives if need be to the cause of freedom. And may our forge fires and work shops be the place where spears shall be beaten into pruning forks and swords into plowshares. We pledge our all upon the altar of our country, and God being our strength we can offer no more.

Visitors Welcomed.

The visiting delegates were given a royal welcome by the Wichita members, and during the convention were conducted over the city in automobiles. On the second day of the meeting the visitors inspected the different Wichita smiths, etc., and the tour of inspection included the wholesale districts. The entire morning was spent on these trips, which proved highly enjoyable.

President Irvin Presides.

The meeting, which was held in the A. O. U. W. Hall, was called to order on the opening day, November 14, by President Tracy Irvin. Invocation was by the Rev. A. M. Brodie, D. D. Mayor L. W. Clapp welcomed the delegates in a fitting manner and response was made by Roy Reeves. Following the president's address was the transaction of routine business, it including the minutes of the former meeting. A committee was appointed to draft a patriotic resolution, after which the convention adjourned until afternoon.

Afternoon Session.

The afternoon session, which began at 1:30 o'clock, included a number of addresses. "How I Manage My Business," by A. J. McCullen; "The Whys and Wherefores of the Blacksmith," by George Howard; "The Village Blacksmith 12 Years Ago and Now," by Wm. Ochel, and "How About the Automobile in the Shop," by A. Jolly, teemed with interesting and instructive points. The balance of the afternoon was given over to a discussion of the points brought out in the addresses and much valuable information was derived from the remarks.

Evening Session.

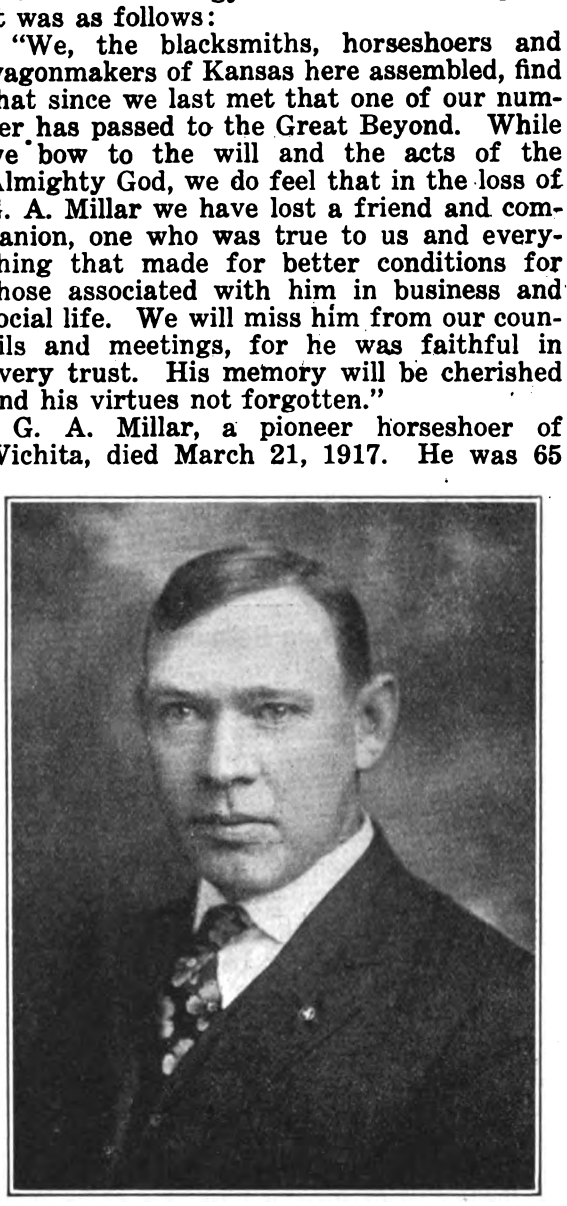
The evening session proved as thoroughly enjoyable and instructive as did the afternoon meeting. The meeting opened at 7:30 o'clock and the first speaker was Paul Brown, a well known attorney, whose subject, "The Lien Law of Kansas and How to Make It Better," proved highly instructive to the delegates, as it is a subject of vital interest. Another address of unusual interest was that on salesmanship by W. M. G. House. W. H. Sasher spoke on "The Costs and Profits in the Blacksmith Shop," and blackboard examples were given by John Massey. Papers were prepared by Carl Irvin and A. McNeil. "The Opening of the Question Box," a new stunt, proved very interesting to the members. The meeting came to an end with a smoker, which was enjoyed by all.

Second Day.

The morning of the second day was utilized in sightseeing. The afternoon session opened at one o'clock and the report of the secretary read and accepted. The report of the committee on necrology was read and accepted. It was as follows:

"We, the blacksmiths, horseshoers and wagonmakers of Kansas here assembled, find that since we last met that one of our number has passed to the Great Beyond. While we bow to the will and the acts of the Almighty God, we do feel that in the loss of G. A. Millar we have lost a friend and companion, one who was true to us and everything that made for better conditions for those associated with him in business and social life. We will miss him from our councils and meetings, for he was faithful in every trust. His memory will be cherished and his virtues not forgotten."

G. A. Millar, a pioneer horseshoer of Wichita, died March 21, 1917. He was 65



G. E. Johnson, Secretary-Treasurer of Blacksmiths', Horseshoers' and Wagonmakers' Association of Kansas.

years old and had conducted a shop in Wichita for 30 years. Although he acquired considerable property, which increased in value as Wichita expanded, he stuck to his trade and could be seen daily working at the anvil. He was always active in the interests of his fellow craftsmen and was prominent in the state association. He was a member of the executive board from the time the association was organized. Mr. Millar endeared himself to all who knew him. Of a genial and generous disposition, always ready to aid those in need and to assist one of the craft, he was greatly missed at the convention and will be at all its councils.

Pres. Irvin Re-elected.

The election of officers resulted in the re-election of President Tracy Irvin. Harry S. Overfield, Independence, was re-elected vice-president and G. E. Johnson, Lindsborg, was elected secretary-treasurer. The selection of the executive and membership committees resulted as follows: Executive, Theo. Olsen, Lindsborg; Perry Buckley, Lyons, and A. McNeil, Arkansas City. Membership, William Nelson, Olatha; A. Auget, Eureka, and A. P. Maltby, Hutchinson. These members will serve during 1918. All are live wires in every sense of the word and there is every indication to believe that their efforts will result in the 1918 convention being the best in the history of the association.

The price list problem was left unsolved. A committee was appointed to investigate the matter of prices, but nothing definite was arrived at, which was largely due to the fact that so many different prices prevail throughout the state. It appears that the rapid fluctuation in prices was a factor, so it was decided to leave the matter of prices with the individual for the present. There are several strong county organizations which are proving a great help to the state association. At Wichita the members meet monthly and discuss the question of prices as well as other subjects of interest. This method obtains in other sections of Kansas.

Montana Gets Good Prices.

The smiths in and around Missoula, Mont., are obtaining good prices, judging from a list recently compiled and published by one of the organizations. Some of the prices in effect are as follows:

New shoes, 0 to 3, per set	$2.50
New shoes, 4 to 5, per set	3.00
New shoes, 6 to 7, per set	3.50
New shoes, 8, per set	4.00
Extra calks, each	.10
Bar shoes, 1 to 3, each	1.00
Bar shoes, with calks, each	1.25
Bar shoes, 4 to 6, each	1.25
Bar shoes, with calks, each	1.50
Bar shoes, 7 to 8, each	2.00
Fitting shoes, 1 to 4, per set	2.00
Fitting shoes, 5 to 6, per set	1.25
Fitting shoes, 7 to 8, per set	2.50
Rubber pads, per pair	2.50
Leather pads, per pair	1.00
Adjustable calk shoes, 1 to 3, per set	3.50
Adjustable calk shoes, 4 to 5, per set	4.00
Adjustable calk shoes, 6, per set	4.50
Adjustable calk shoes, 7 to 8, per set	5.50
Adjustable calks, 3/8, 7/16, 1/2-inch, per set	1.50
Adjustable calks, 9/16, 5/8-inch, per set	2.00
Resetting keg shoes, Nos. 1, 2, 3, 4, per set	2.00
Resetting keg shoes, Nos. 5, 6, per set	2.25
Resetting keg shoes, Nos. 7, 8, per set	2.50
Shoeing stallions, extra	2.50

South Dakota Smiths Organize.

The blacksmiths, horseshoers and wagonmakers of South Dakota have effected an organization, and at the initial meeting held at Sioux Falls about 42 joined the temporary organization. The object of the association is to obtain better prices, improve collections and general conditions. The members propose to add to the membership by interesting fellow craftsmen in their neighborhood. J. L. Cooper of Sioux Falls was elected president and W. H. Baddeley, Madison, was chosen as secretary. The following prices were agreed upon for horseshoeing:

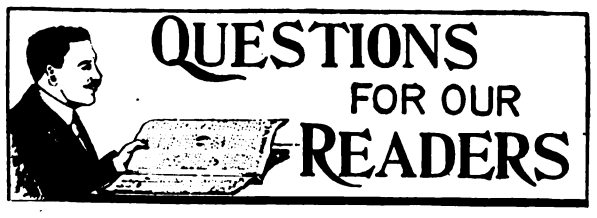
New shoes, common, each	$ .75
Resetting shoes, common, each	.40
Stallion, each	1.25
Resetting stallion, each	1.25
Bar shoes, common, each	1.25
Neverslips, new, each	1.00
Neverslips, calk, each	.08
Neverslips, reset, each	.40
Leather pad and packing, each	.50
Paring feet, each	.40
Bronchos, fractious horses, extra	1.50

The prices for general work, wagon, plows, etc., were left to a committee consisting of E. H. Olstad, M. Hermanson and H. Halverson.

North Dakota Convention.

The annual convention of the Mechanics' Mutual Benefit Association of North Dakota will be held at Valley City, February 6 and 7, according to the announcement made by E. W. Ryall, secretary of the association. This organization is 12 years old, and the coming convention promises to be one of the most successful and best attended in the history of the association. Not only will the question of prices be discussed, but other equally pertinent matters will be thrashed out on the convention floor. Secretary Ryall makes a very striking plea to all members to be present and outlines some of the matters to be discussed, particularly the need of revising the prices drawn up at the last meeting.

Digitized by Google



In this department our readers are invited to ask questions about anything concerning which they need information. There is no charge connected with it. It is as free as air. Questions require answers, and these often are as valuable to other readers as to the ones asking the questions. We urge all to make free use of this privilege. Fire all the questions at us you please. The more the better.

How to Use Department.

For the benefit of our new subscribers, it is explained that this department is to give all of our readers the benefit of the knowledge and experience of both the editorial staff and subscribers. The method in vogue is to publish the questions received under the above heading. Answer is made in the department entitled Workshop Experience. It may be that a reader will want an immediate answer, a reply by mail. If so, he should so state in his letter. The reason why we prefer to publish the question and have our readers answer it is because a number of different replies are invariably made and the person asking the question obtains the benefit of the experience and knowledge of a number of persons instead of one. Not only is the seeker of information benefited, but other readers are afforded an opportunity to obtain practical information. Any reader is welcome to ask as many questions as he desires.

A Few Automobile Questions.

From Charles H. Cragin, New Hampshire.—I will appreciate some information as to a Ford car I have been overhauling. I put in new transmission drums complete, reverse, low and brake, and there seems to be a grinding noise somewhere when in the high speed. I took the parts down, but could not see anything but what was perfect in every way.

I took down the rear end, and drive shaft rear axle is somewhat worn. I also put the triple gears in mesh with every nine teeth of the driven gear with prick punch marks. I looked for corresponding marks on the other gears, but could not find any. Is this right or not? The car has a light regulator on it and is so wired that if one light burns out you are supposed to have one burning. I took the car out to try it out and out went both bulbs. I got two more and put them in, after which the engine would skip when I switched on the lights.

When I threw on the switch and touched it I got a shock. When running on the batteries the engine runs fine. Shut off the lights and run the engine on the magneto and it runs perfect. Is the trouble due to weak magnets or a short circuit in this light regulator? I want to know if it takes more current when wired with the regulator than when the car is new and without the regulator?

Delco Wiring Diagram.

From a Subscriber, Indiana.—I would like to have a diagram of the wiring of the Delco starting, lighting and ignition system as used in the 1916 Buick Six. The trouble we have is that when you pull the ignition button the armature doesn't revolve so as to allow the starter pinion to mesh with the gear when the starter pedal is stepped on. When gears do mesh the engine starts all right. What is the trouble?

A Problem in Shoeing.

From E. E. Robinson.—Will some reader of your paper please tell me how this horse should be shod? Let me know how his feet should be trimmed, about how long a toe, what angle to have his feet, how much weight in shoe, what kind of a shoe, where to put weight in shoe, and if a square or round toe should be used?

The horse is six years old, a gelding by Archdale, and is very thin-skinned and very touchy. He has a record better than 2:15 pacing, but can trot faster, only when he hits himself he will break and start to pace, and when pacing he will hit his knee boots a very little. He weighs about 900 pounds, stands 15.1 hands, goes with a low head and with a long stride without very much knee action. Stands straight on front feet, but just as soon as feet leave the ground the toes turn in and as the foot carries forward it hits the upper part of knee with front partly inside of toe just about where the front nail is clinched. He also hits his hind shins just under the spavin joint just a very little. Can protect this with hind shin boot with hock attachment. He trots straight in bike and does not carry his rear end to either side.

Making Drills.

From New Reader, Maine.—Will some of your readers give me instructions for making drills? Somewhere I have read how to make them of old files, but have forgotten just the process.

Soldering Cast Iron.

From J. K. B., Rhode Island.—Is there a way of soldering cast iron, and if so, what is used? Will some of my fellow smiths who have tried soldering cast iron give me the benefit of their experiences? I know welding is the proper way, but I want to know about the soldering method.

Hardening Plow Shares.

From H. H. Braaks, Iowa.—I wish some of your readers would give me the benefit of their experience in properly hardening soft center plow shares. The shares must be very hard for use here and have no soft spots.

Repairing Bellows.

From H. T. Smith, Tennessee.—Will some old-time smith give a new brother smith his instructions for mending a bellows? My extra bellows has a cut in it about six inches long. More than one suggestion will be appreciated.

An Engine Question.

From Old Reader, Kentucky.—Will your expert or some other mechanic explain what makes an oil engine run backward if it happens to run this way when starting it up?

A Soldering Question.

From Puzzled, North Dakota.—Why is it that you cannot solder aluminum? I have tried it several times, but cannot make the parts stick. Will some of your readers having tried the trick explain what luck they had?

Sharpen Screw Plate Die.

From G. F. Colby, North Dakota.—I would like to ask if anyone can tell me how to sharpen a screw plate die so it will take hold without so much force.

Ed. Note.—We trust that some one of our practical readers will reply to Mr. Colby's question promptly.

Says Mr. Hathenhaur Is Right.

From G. F. Colby, North Dakota.—I saw the item from G. H. Hathenhaur in the January number, and he is right about a foot going down to the shoe, where the shoe is sprung. I will bet that it will do it every time, if left long enough. I know but little about shoeing, and I am not expected to know much, although I have been shoeing horses for about 33 years; but I certainly know that much.

Locating Missing Cylinder.

From J. D. Meyers, Rhode Island.—Here I am again. Want some more information. Just as long as you hand up that invitation for free advice, you are just going to be pestered by yours truly. When I saw that invitation in the January issue about the automobile department I said to myself, "Here's where I am going to keep someone busy."

What I want to know is how to find out which of the four cylinders on a Ford engine is not firing? I saw a mechanic at a shop take off the cover of the coil box on the dash and do a stunt like someone playing the piano. He fingered the contraption like the keys of the piano and soon he exclaimed, "It's the No. 3 that's out." I asked him how he did it, and he said, "It's simple when you know how. Just short each vibrator." So will your expert or some other reader that knows ignition give me a simple explanation and instructions so I can do likewise?

PAINTING HINTS.

Suggestions for Handling Rust and Use of Brushes.

In motor car painting the keynote of success is the cleaning off the rust, says J. C. Harvie in Coach and Motor Builder. Scientists talk of "deoxidation by an electrolytic process. The object to be treated is made the cathode in an electrolytic containing phosphoric acid. In addition to its normal function of carrying the current, this acid acts as a solvent upon rust without attacking the steel panel beneath." I wish the patent success. Rust is the motor painter's enemy, and, of course, grease. But benzine conquers both. Practical painters bring it to this, the smoothing must be done perfectly, before any paint or rust preventative is applied at all. Then some advocate red lead and various metal primers. I know the value of "impenetrable varnish," but the secret is, to get the rust off, and to avoid painting metal while there is moisture in the air. That is where heated rooms and baking ovens are indispensable in quick satisfactory systems.

Need of Proper Room.

For want of a proper varnish room many an anxious painter wastes a deal of time protecting his work against the dust brought in by breezes in a roomy shop, and spends a sleepless night when he hears a high wind rise. He fears the job he left clean will be spoiled. A decent shop is the one remedy for seedy sandy varnish. A policy of makeshift is not the one to make profit.

The larger they are, in reason, the more effective they are and more profitable to the employer. The brushes some use on motor work are as unsuitable as asking a bodymaker to saw a plank with a keyhole saw. Painters seem afraid to ask employers for 2½ inch color brushes and 3 inch blenders. These easily pay for their first cost.

This remark applies particularly to heavy wagon and motor truck work. Pieceworkers know the advantage of a full sized brush. Then why conceal the advantage from the employer? It's time the painters spoke up! A good deal is expected of them. Why painters should find their own varnish brushes, and the employer find the paint brushes, I never could understand. The same preservation is needed to do proper work. Get a good varnish brush keeper. Most of those supplied free are unsuitable, top heavy, and are usually soon thrown among the lumber. There is one of good design, with a spiral brush support inside, no wires to get foul. It is much prized.

Keeping the Brush.

What is the best to keep motor varnish brushes in? Some writers say turpentine. Practical men seldom agree to this, but prefer raw oil strained into the keeper through double muslin. The brushes (when finished with) should not be scraped out, but should be hung in the keeper just as they are, fully charged with varnish. First the handles should be wiped with a clean linen rag previously immersed in turps. (Don't use fluffy cloth.) Brushes treated well will repay you. And, of course, have your second class brushes for chassis and wheels in a separate keeper. And when the motor (if it be an old one) looks like new, and would pass as new if it were not for the secondhand look of the khaki hood, paint it with a flexible restorer for shabby tops that can now be obtained in town, the basis of which is rubber, and so is dear, but it is just the "making" of an old motor job.

Digitized by Google

The Horse Is the Brake.

Asia, a new illustrated magazine on the Orient, publishes an interesting picture showing the ancient "brakes" system utilized by the Chinese for heavy downhill loads. The "brakes" consisted of a horse wearing a collar to which was attached a rope. This rope was secured to the load. By bracing his feet the horse functioned as a brake. It is needless to say that the stunt required a horse having a tough neck. The horse was whipped and forced backward up the hill when the load was going down.

Small Drilling Vise.

The following description dealing with the making of a small drilling vise appears in Work, an English publication, and was contributed by a reader. It was made to suit a small Goodel-Pratt drilling machine, which drills up to 3/8-inch, and can be modified to suit the table of any other drilling machine by so arranging that the slots for clamping to the table are exactly above the slots or holes on the table of the machine to which the vise is to be fitted.

I first made two patterns of the dimensions given, one for the vise and the other for the loose jaw, and all machining was done on the lathe, though, of course, if a planing or shaping machine is available it would be better. After cleaning out the slots with a file, the vise casting was mounted on the lathe faceplate and the underneath turned true; and to facilitate clamping to the faceplate, the pattern can be formed somewhat flat, as shown by the dotted lines. The casting was then reversed on the faceplate, so that the surface on which the loose jaw slides could be faced up as far as possible (the top of the fixed jaw being cleaned up at the same time), and the corners of the surface which could not be reached by the lathe tool were faced up with a file and by scraping, care being taken to keep the surface as true as possible.

The loose jaw was then mounted on the faceplate and one side, the top, and the bottom faced up true, and a hole bored right through the casting from the top to take the bolt. The hole was countersunk some depth to suit the upper part of the bolt, and the top of the latter was cleaned off to the level of the loose jaw. When the loose jaw is fixed on the vise the nut of the bolt is screwed up so that the jaw will slide, space being provided right across the casting to allow room for the nut. The vise casting is drilled and tapped to take the screw for tightening up as shown. It is made of hexagon mild steel and threaded 7/16-inch for 3 inches. The block has a slight countersunk hole drilled where the tightening screw bears against it. The jaws can be shod with cast steel—two old flat files let down to the right temper would answer well—but I find the vise grips well without.

I have found this vise most useful in drilling small or round work, and the way it is made, with the loose jaw free to swivel to a certain extent, makes it a useful tool for holding irregular or wedge-shape pieces.

Prices in New Zealand.

The Blacksmiths' Union at Marlborough, N. Z., has given the Farmers' Union a Roland for an Oliver, says the Coach and Motor builder. Recently the executive of the latter organization resolved that representatives of the blacksmiths be requested to appear before it and explain the reasons for the increases in the prices of shoeing. The Blacksmiths' Union has responded by requiring the Farmers' Union to come forward and say why the cost of primary products has mounted up to such a serious extent. It informs the Farmers' Union that it will be pleased to receive its representatives at an appointed place and time.

A brickbat never stops to reason, nor does a bludgeon wait for a jury.

Index to Advertisers

Akron-Selle Co., gears....4th cover
American Calk Co., calks....Front cover
Anti-Borax Compound Co., welding compounds....37
Armstrong Mfg. Co., bolt dies....36
Armstrong-Blum Mfg. Co., punches and shears....Front cover
Bailey Co., Geo. D., ball thrust bearings, 2d cove
Barcus Mfg. Co., horse stocks....35
Bertschy-Bermo Co., welding plants, Front cove
Barnett, G. & H., Co., files and rasps, Front cover
Bicknell Mfg. & Supply Co., dies....36
Bradley, C. C., & Son, shaft coupler....3d cover
Buffalo Forge Co., blacksmiths' too's....39
Burden Iron Works, horseshoes....3d cover
Bush Motor Co., automobiles....4th cover
Butterfield & Co., taps, dies and screw plates....40
Campbell Iron Co., supplies....59
Canedy-Otto Mfg. Co., blacksmiths' tools....60
Champion Blower & Forge Co., blowers....35
Capewell Horse Nail Co., horse nails, Front cover
Champion Tool Co., blacksmiths' tools, 2d cover
Chandlee & Chandlee, patents....4th cover
Columbus Anvil & Forging Co., anvil's....36
Columbus Forge & Iron Co, anvils....34
Cortland Specialty Co., welding compound, 4th cover
Cortland Welding Compound Co., welding compounds....39
Cray Bros, blacksmiths' tools....37
Diamond Calk Horseshoe Co., horseshoes....34
Durner, A. E., disc sharpeners....40
E. D. Gear Mfg. Co., gears....3d cover
Edwards, C. D., shears....36
Electric Blower Co., blowers....60
Electric Wheel Co., wheels....4th cover
Empire Mfg. Co., wheels....40
Felton, Sibley & Co., paints....33
Firestone Tire & Rubber Co....33
Fisher & Norris, anvils and vises....40
Franklin Steel Works, toe calks....36
Gardner, R., Electric & Mfg. Works, blowers....36
General Welding Co., welding outfits....59
Giant Grip Horse Shoe Co., horse shoe calks....59
Gillette Clipping Machine Co., clipping machines....4th cover
Gogel Mfg. Co., tire heaters....36
Greenfield Tap & Die Corporation, screw plates and blacksmiths' machinery, 4th cover
Gwilliam Co., ball bearings....4th cover
Hart Mfg. Co., stocks and dies....4th cover
Harvey Spring & Forging Co., auto springs....57
Hawkeye Mfg. Co., hammers....Front cover
Hay-Budden Mfg. Co., anvils....4th cover
Heller Bros., horse rasps, tools, etc....40
Higgins Spring & Axle Co, springs....59
House Cold Tire Setter Co., tire setters, hollow and spoke augers....4th cover
Jenner, H. W. T., patents....56
Kerrihard Co., hammers....59
Kimball Tire Case Co., tire protectors, Front cover
Lemoine, N., Co, hoof packing....Front cover
Linde Air Products Co., oxygen....40
L. S. P. Calking Machine Co., calking machines....39
Macgowan & Finigan Cordage Co., hammers....3d cover
Mayer Bros. Co., hammers....33
Ness, Geo. M., Jr., steel stamps....Front cover
Nicholson File Co., files and rasps....2d cover
Oneida National Chuck Co., chucks....59
Parker, C. L., attorney....56, 59
Parks Ball Bearing Machine Co., woodworking machinery....4th cover
Peck, Stow & Wilcox Co., pincers....60
Phoenix Horseshoe Co., horseshoes and toe calks....57
Porter, H. K., bolt clipper....4th cover
Prentiss Vise Co, vises....4th cover
Radical Rubber Co., hoof pads....Front cover
Rosewater Electric Co., blowers....Front cover
Root-Heath Manufacturing Co., grinders....35
Sheldon Axle & Spring Co., axles....38
Skow Mfg. Co., disc sharpeners....37
Standard Horse Nail Co., horseshoe nails, 4th cover
Standard Horseshoe Co., horseshoes. 3d cover
Star Mfg. Co., agricultural implements....36
Stokes Bros. Mfg. Co., rasps....Front cover
Superior Oxy-Acetylene Machine Co., welding outfits....Front cover
Turner Brass Works, welding outfits....40
Thompson Tuyere Iron Co., tuyere iron, 4th cover
Union Horse Nail Co., horseshoe nails....34
United States Horseshoe Co., horseshoes....37
West Tire Setter Co, tire setters, hammers....37
Wheel, B, Top & Hardware Co., supplies....58
Whisler Mfg. Co., nut splitters, jointer heads....59
Witte Engine Works, engines....57
Young, W. F., veterinary remedies....36

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co....36

Anvils
Columbus Anvil & Forging Co....36
Columbus Forge & Iron Co....34
Fisher & Norris....40
Hay-Budden Mfg. Co....4th cover

Attorneys
Parker, C. L....56, 59

Automobiles
Bush Motor Co....4th cover

Automobile Springs
Harvey Spring & Forging Co....57

Axles
Sheldon Axle & Spring Co....38

Ball Bearings
Gwilliam Co....4th cover

Blacksmiths' Tools
Buffalo Forge Co....39
Butterfield & Co....40
Canedy-Otto Mfg. Co....60
Champion Blower & Forge Co....35
Champion Tool Co....2d cover
Cray Bros....37
Greenfield Tap & Die Corp....4th cover
Heller Bros Co....40
Nicholson File Co....2d cover
Peck, Stow & Wilcox Co....60

Blowers
Buffalo Forge Co....39
Champion Blower & Forge Co....35
Champion Tool Co....2d cover
Electric Blower Co....60
Gardner, R., Electric Mfg. Works....36
Rosewater Electric Co....Front cover

Bolt Dies
Armstrong Mfg. Co....36
Greenfield Tap & Die Corp....4th cover

Bolt and Rivet Clippers
Porter, H. K....4th cover

Calking Machines
L. S. P. Calking Machine Co....39

Calks, Horseshoe
American Calk Co....Front cover
Diamond Calk Horseshoe Co....34

Calks, Toe
Franklin Steel Works....36

Chisels
Champion Tool Co....2d cover
Peck, Stow & Wilcox Co....60

Chucks
Buffalo Forge Co....39
Oneida National Chuck Co....59

Clipping Machines
Gillette Clipping Machine Co....4th cover

Dies
Bicknell Mfg. & Supply Co....36

Disc Sharpeners
Durner, A. E....40
Mayer Bros. Co....33
Skow Mfg. Co....37

Drills
Buffalo Forge Co....39
Champion Blower & Forge Co....35
Witte Engine Works....57

Farriers' Tools
Barnett, G. & H., Co....Front cover
Champion Tool Co....2d cover
Heller Bros. Co....40
Peck, Stow & Wilcox Co....60

Files and Rasps
Barnett, G. & H., Co....Front cover
Nicholson File Co....2d cover
Stokes Bros. Mfg. Co....Front cover

Forges
Buffalo Forge Co....39
Champion Blower & Forge Co....35

Gasoline Engines
Witte Engine Works....57

Gears
Akron-Selle Co....4th cover
E. D. Gear Co....3d cover

Grinders
Root-Heath Mfg. Co....35

Hammers
Champion Tool Co....2d cover
Hawkeye Mfg. Co....Front cover
Kerrihard Co....59
Macgowan & Finigan Cordage Co....3d cover
Peck, Stow & Wilcox Co....60
Mayer Bros. Co....33
West Tire Setter Co....37

Hollow Augers
House Cold Tire Setter Co....4th cover

Hoof Packing
Lemoine, N., Co....Front cover

Hoof Pads
Radical Rubber Co....Front cover

Hoof Parers
Champion Tool Co....2d cover

Hoof Nippers
Champion Tool Co....2d cover

Hoof Shears
Champion Tool Co....2d cover

Horseshoes
Burden Iron Works....3d cover
Diamond Calk Horseshoe Co....34
Phoenix Horseshoe Co....57
Standard Horseshoe Co....3d cover
United States Horseshoe Co....37

Horseshoe Calks
Diamond Calk Horseshoe Co....34
Giant Grip Horse Shoe Co....59

Horseshoe Nails
Capewell Horse Nail Co....Front cover
Standard Horse Nail Co....4th cover
Union Horse Nail Co....34

Horse Stocks
Barcus Mfg. Co....35

Nut Splitters
Whisler Mfg. Co....59

Oxygen
Linde Air Products Co....40

Paints and Varnishes
Felton, Sibley & Co....33

Patents
Chandlee & Chandlee....4th cover
Jenner, H. W. T....56
Parker, C. L....56, 59

Pincers
Peck, Stow & Wilcox Co....60

Punches
Champion Blower & Forge Co....35

Punches and Shears
Armstrong-Blum Mfg. Co....Front cover
Peck, Stow & Wilcox Co....60

Reamers
Greenfield Tap & Die Corp....4th cover

Screw Plates
Butterfield & Co....40
Champion Blower & Forge Co....35
Greenfield Tap & Die Corp....4th cover

Shaft Couplings
Bradley, C. C., & Son....3d cover

Shears
Edwards, C. D....36

Spoke Augers
House Cold Tire Setter Co....4th cover

Springs
Higgins Spring & Axle Co....59

Steel Stamps
Ness, George M., Jr....Front cover

Stocks and Dies
Butterfield & Co....40
Champion Blower & Forge Co....35
Greenfield Tap & Die Corp....4th cover
Hart Mfg. Co....4th cover

Supplies
Campbell Iron Co....59
Wheel, B, Top & Hardware Co....58

Swages
Champion Blower & Forge Co....35

Tap and Drill Sets
Greenfield Tap & Die Corp....4th cover

Threading Machines
Greenfield Tap & Die Corp....4th cover

Tires
Firestone Tire & Rubber Co....33

Tire Bending Machines
Buffalo Forge Co....39
Champion Blower & Forge Co....35

Tire Heaters
Gogel Mfg. Co....36

Tire Menders
Greenfield Tap & Die Corp....4th cover

Tire Protectors
Kimball Tire Case Co....Front cover

Tire Setters
Buffalo Forge Co....39
House Cold Tire Setter Co....4th cover
West Tire Setter Co....37

Tire Shrinkers
Buffalo Forge Co....39
Champion Blower & Forge Co....35

Tire Upsetters
Buffalo Forge Co....39
Champion Blower & Forge Co....35

Tongs
Champion Tool Co....2d cover

Tool Grinders
Phoenix Horseshoe Co....57

Trucks
Akron-Selle Co....4th cover

Tuyere Irons
Buffalo Forge Co....39
Champion Blower & Forge Co....35
Thompson Tuyere Iron Co....4th cover

Vises
Butterfield & Co....40
Fisher & Norris....40
Prentiss Vise Co....4th cover

Veterinary Remedies
Young, W. F....36

Wagons
Akron-Selle Co....4th cover

Welding Compounds
Anti-Borax Compound Co....37
Cortland Welding Compound Co....39

Welding Outfits
General Welding Co....59
Superior Oxy-Acetylene Machine Co, Front cover
Turner Brass Works....40

Welding Plants
Bertschy-Bermo Co....Front cover

Welding Supplies
Linde Air Products Co....40

Wheel Dishers
House Cold Tire Setter Co....4th cover

Wheels
Electric Wheel Co....4th cover
Empire Mfg. Co....40

Woodworking Machinery
Buffalo Forge Co....39
Parks Ball Bearing Machine Co....4th cover

Wrenches
Champion Tool Co....2d cover

Wrenches (Knife Handle and Pipe)
Peck, Stow & Wilcox Co....60

Digitized by Google

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

will be inserted under this head at 3 cents a word, including the address, for each insertion, payable in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York.

PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT.

Patents

PATENTS FOR INVENTIONS.

H. W. T. JENNER, patent attorney and mechanical expert, 608 F Street, Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trade-marks registered.

PATENTS.

C. L. PARKER, attorney-at-law, and solicitor of patents. American and foreign patents secured promptly. Handbook for inventors sent free upon request. McGILL BUILDING, Washington, D. C.

For Sale

FOR SALE.

Gasoline tank and pump, 2" retreading moulds and cash register. VANDERPOOL CO., Springfield, O.

FOR SALE.

Make money easy. While business is good. Vulcanize tires. Our book tells you how. $1.00. VANDERPOOL CO., Springfield, Ohio.

FOR SALE.

Blacksmith shop, with or without tools. Good location for horseshoer. Owing to poor health, I am obliged to retire. Write to FRANK RETTIG, Wahpeton, N. Dak.

FOR SALE

Lot 65x250, having wagon, blacksmith, woodworking machine shop and seasoning sheds; 10,000 feet of lumber in oak plank, tongues, bolsters and maple axles. Iron stock, tools and machines. Good location for small manufacturing establishment. JOHN BRUENN, Durand, Wis.

HUB, SPOKE AND WHEEL MACHINERY FOR SALE.

Consisting of West Cold Tire Setter, Moyer Hub Boring and Boxing Machine, Defiance 60 Ton Hydraulic Wheel Press. 3 Mortising Machines, 3 Wood Turning Lathes, 3 Spoke Lathes, 3 Tenoning Machines, Felloe Rounder, Felloe Polisher, Hub Reamer and many other machines not mentioned, together with Pulleys, Hangers, Couplings, etc. Address, NESS BROTHERS & CO., York, Penna.

FOR SALE

Blacksmith shop in a town of 1,200. A bargain if taken at once. Splendid location for welding plant. Reason for selling, poor eyesight. Write to JAMES M. McGHIE, Exeter, Nebraska.

WHITE OAK WAGON POLES

3"x6" at Butt, 3"x3" at Point, 12 ft. Lengths

F. F. BOWN MFG. HOUSE, P. O. Box 500, PITTSBURGH, PA.

FOR SALE—IMMEDIATE DELIVERY—NEW MACHINES.

5-in. Bench Jointers. $20.00; 9-in. Complete Jointer, No. 125, $35.00; 13-in. Complete Jointer, $55.00. Can you afford to build your own Jointer Table when you can get a good, complete Jointer at the above prices? If so, we can furnish you with Square or Circular style cutter heads, made especially for wood frame tables 5-in. to 17-inch cut and in price from $10.00 up. Catalogue for the asking. W. L. SHERWOOD, Kirksville, Mo.

FOR SALE.

1915 H. D. Motorcycle, three-speed electric, with speedometer. Machine very fast and powerful. Just overhauled; new rear tire. Must sell. Price, $135.00. $25.00 down, balance C. O. D. Address F. SENSEMAN, Mechanicsburg, Penna.

For Sale

FOR SALE

300 sets carriage and wagon hubs XX Elm and Oak, sizes 3½ x 6½ to 10 x 14. Big bargain to anyone who can use them. Address HARRY KLENERT, 325 East 124th Street, New York City.

FOR SALE.

Blacksmithing Business and Property. Frame shop 40x24. The lot is situated on the corner, size 50x120 feet. The yearly business averages between $4,600 and $5,400. There is enough work for two men. The shop is equipped with electric power and is in the coal mining region of Southern Saskatchewan, about 22 miles north of Portal, the gateway of Canada. Estevan has a population of 2,500. The owner is asking $4,500 for this property, including machinery and tools and would be willing to sell stock at invoice price. Terms are half cash. Address H A. NASH, Estevan, Sask., Canada.

FOR SALE.

Fine old established blacksmith and wheelwright shop; two-story building, 30 feet by 70; location excellent; well equipped for business; large country trade. Owner has recently died. Address for price and further particulars, A. B. S., Box 822, Chatham, N. Y.

FOR SALE.

Barcus Shoeing Stocks in first-class condition, with three arms and also new gurt, $75. A. J. HENION, Pompton Lakes, N. J.

FOR SALE.

DRILL PRESS. TRENTON ANVIL. New 40-lamp Electric Light Plant, Engine Lathe, MARINE ENGINES, AVERY 3-Ton TRUCK, BIG FOUR GAS TRACTOR, 60 H.P. CASE, 36-inch Steel SEPARATOR, 50-lb. Little Giant Trip Hammer, 60 H.P. RAMBLER Automobile, Oliver Typewriter. Enclose reply stamps. J. A. LOFFELMACHER, Fairfax, Minn.

FOR SALE.

Three 20-in. x 8½-ft. Heavy Duty Roulsted screw-cutting lathes, double back geared, 2-in. hollow spindle, compound rest, complete equipment, thoroughly overhauled and in A-1 guaranteed condition $550.00 each. Send for photograph. LUCAS & SON, Bridgeport, Conn.

"BACK TO THE LAND."

Real estate has produced more wealth than any other source. Any banker will tell you that real estate is the basis of all security. If I can show you that with my co-operation and an investment of less than Five Dollars you can own a piece of real estate that may make your fortune, would it look good to you? If so, write me. Address FRANK P. CLEVELAND, Real Estate Expert, 1623 Adams Express Building, Chicago.

FOR SALE.

Parts for Sale—Overland 38-39-79, Oakland 35, E. M. F. all models, Stoddard-Dayton H10, Buick 10-16-17-19-25-30-31-35, Empire 31, Regal 30, Maxwell I 3 and 2-cylinder, Hudson 20, Mitchell 10, Metz 20, Reo 11-12, Brush. 50-inch Little Giant Hammer, 400 Blower, 3-foot grindstone, Barcus Rack. THE BONE YARD, Washington, Iowa.

FOR SALE.

Vulcanizing Auto Tires is a growing business. Our plants are easy to learn how to operate and prices save you about 30%. B. AUTO TIRE EQUIPMENT COMPANY, Cincinnati, Ohio.

Personal

PERSONAL.

Catarrh makes life miserable. Why suffer? Send address for simple and immediate help. G. S. STOKES, Mohawk, Florida.

Tires

Double Tread Tires

Notice Our Prices Before Going Elsewhere

PRICE LIST

Size	Plain	Size	Plain
30x3	$5.00	35x4	$9.00
30x3½	5.50	36x4	9.50
32x3½	6.50	36x4½	10.00
32x4	7.00	36x5	10.00
33x4	7.50	37x4½	10.00
34x4	8.00	37x5	10.50
34x4½	8.50		

For Non-Skid, 50 cents more on all sizes.

We Carry a Full Line of New and Used Tires & Tubes

GINSBERG & BERKOWITZ, Inc.

236 WEST 48th STREET, NEW YORK

DOUBLE TREAD TIRES

GUARANTEED

SPECIAL OFFER TO AGENTS. Write for Catalogue

Get our special price on new tires

M. LIBEN & CO.

205-AK West 48th St. New York City

Wanted

WANTED.

A blacksmith in each county of the United States to solicit subscriptions for The Blacksmith and Wheelwright; experienced mechanics who may be unable to work at their trade from ill-health or from being partially disabled by some accident can make a good living. For further particulars address M. T. RICHARDSON CO., 71-73 Murray Street, New York.

WANTED.

Second hand House Cold Tire Setter, with punch and shear, or with shear. Must be cheap. J. L. SCOTT, 4048 Laclede avenue, St. Louis, Mo.

WANTED.

Good all-around blacksmith. Young married man preferred. Top wages for right man. Address M. W. ABTS, Morrill, Nebr.

WANTED

Blacksmith to begin work about March 15th. Must be sober and with a few years' experience in blacksmithing. Address OLE SLOTTO, Fillmore, N. D.

WANTED.

TO BUY A BLACKSMITH AND HORSESHOEING SHOP ON SMALL PAYMENTS OR TO RUN ONE ON PERCENTAGE BASIS. BEST REFERENCE. ADDRESS N. S. ADAMS, ROODHOUSE, ILL.

WANTED.

Second-hand large power press drill; second-hand large power press band saw and second-hand large power jointer. Will sell second-hand Barcus horse stock, as good as new, for $25.00. Have no use for it. GEO F. STIEFENHOEFER, Barrington, Ill.

Miscellaneous

QUICK COLLECTIONS.

Send your accounts to-day to a live wire firm and get your money NOW! Established 25 years; collections made everywhere. WILLIAM H. DODD, 87 Nassau St., New York. Phone 6231 Cortland.

CHANCE TO MAKE SOME MONEY.

We want agents in all parts of the country to sell our books on horseshoeing, carriage building, carriage painting, etc. There are hundreds of mechanics (blacksmiths and wheelwrights) in different parts of the country unable, by reason of impaired health or age, to work at their trade, who could take hold of these books and make a good living out of them. A blacksmith can talk up a book on blacksmithing better, of course, than a man who knows nothing about the business. Write at once for terms and full particulars to M. T. RICHARDSON CO., publishers, 71-73 Murray Street, New York City.

Gears

GEARS & SHAFTS

Transmission gears and shafts, differential gears and axle shafts in stock for over 125 makes (500 models) of pleasure cars and trucks. Obsolete, Orphan and Current models.

Dealers and repairmen, send for our 125-page price list and make a good profit on your repair work.

AUTO GEAR CO., Inc.

844 Eighth Avenue, New York, N. Y. — 1461 S. Michigan Ave. Chicago

275 Marietta St., Atlanta, Ga.

NO SECOND-HAND PARTS OR JUNK

Phoenix Horse Shoes and Bulldog Calks.

The well known line of Phoenix horse shoes and bull dog calks made by the Phoenix Horse Shoe Company is familiar to most of our readers. This company has large rolling mills at Joliet, Ill., and Poughkeepsie, N. Y., but the main office of the company is in the Roderick Bldg., Chicago, Ill., and all requests for samples or other inquiries should be addressed to the main office at Chicago.

Bailey Ball Thrust Bearings.

A great many of our readers are now taking up automobile repair work and those who are in this line of business will be interested in the line of ball thrust bearings manufactured by the Geo. D. Bailey Company, 1124 So. Michigan Ave., Chicago, Ill. Rear axle trouble, it is stated by the manufacturers of this bearing, can be entirely stopped by installing the Bailey ball thrust at the left or gear side of the differential of the Ford or of the Chevrolet 490. The Bailey construction replaces the flat thrust washers. The Bailey bearing is made of the finest materials, carefully heat treated and ground. It has 18 ¼-in. balls of the highest grade, and having a capacity for six times the maximum thrust, every bearing holds an unqualified guarantee that it will "stand up" under all conditions and strains.

The list price of the Bailey Ball Thrust Bearing is $3.75 with the regular dealer discount to blacksmiths. This is a live specialty which will give the blacksmith who repairs automobiles a good profit and at the same time please and satisfy the customers.

Good Tools for Blacksmiths.

A large line of excellent tools for the blacksmith's trade is manufactured by the Lourie Mfg. Company, Springfield, Ill. This line includes the well known "Scientific" tire setter made by this company, also a screw arbor press, the Hydraulic arbor press and the No Smoke forge hood. The last named is a great convenience as well as provides comfort in any blacksmith shop. Readers who are interested should write for circulars and prices direct to the manufacturer.

For the Plowing Season.

The plowing season is close at hand and any of our readers who may need plowshares or other similar supplies for agricultural implements should not fail to write for catalog and prices to the Star Manufacturing Company, Carpentersville, Ill. This company manufactures a complete line of plowshares, listershares, moldboards, subsoilers, landside points, shovel points, drill points, plow points, seeder points, landside plates and cultivator shovels. The quality of Star steel shapes is guaranteed. These shapes are made from soft center, solid cast or crucible steel with best material and workmanhip.

Northwestern Horse Nails.

The Northwestern horse nails are well known for high quality wherever used. These nails are manufactured by the Union Horse Nail Company, Chicago, Ill., and any of our readers who have never tried these nails should write for samples and prices direct to the main office of the company where all inquiries will be cheerfully answered.

Lemoine's Hoof Packing.

This is a standard packing and it is excellent for dry, hard, contracted hoofs, quarter cracks, corns and thrush. The manufacturers state that this packing never fails to do the work. Horseshoers who are interested should write for sample and prices to N. Lemoine Company, P. O. Box 88, Framingham, Mass.

SUBSCRIBE FOR

The Blacksmith and Wheelwright

$1.00 The Year

Tires

BUY EARLY AND SAVE MONEY

Double Tread Tires and Tubes

GUARANTEED

Come to the Tire Clearing House—here are prices—clear cut and plain as daylight. We buy wholesale the best "try out" Tires—and you get the benefit—you want truthful tires, and truth is never crushed to earth if given a square deal—real truth is puncture proof—

SO ARE OUR TIRES.

Size	Plain	Non-Skid	Tubes
28x3	$4.40	$4.95	$2.00
30x3	5.50	6.05	2.00
30x3½	6.60	7.15	2.50
32x3½	7.15	7.70	2.75
34x3½	8.25	8.80	3.00
30x4	7.70	8.25	2.75
32x4	8.80	9.35	3.00
33x4	8.80	9.90	3.50
34x4	8.80	9.90	3.50
35x4	9.90	11.00	3.60

Tires

Get your order in quick for goods listed here—by all means get in touch with us for further information about our special process—it means money in your pocket. Get in right—write today—yes—today.

Look up rating in Dunn's or Bradstreet's.

Size	Plain	Non-Skid	Tubes
36x4	$9.90	$11.00	$3.60
32x4½	9.90	11.00	3.75
34x4½	11.00	12.10	4.00
35x4½	11.00	12.10	4.10
36x4½	11.00	12.10	4.25
37x4½	12.10	13.20	4.35
34x5	11.00	12.10	4.50
35x5	13.20	14.30	5.00
36x5	13.20	14.30	5.00
37x5	13.75	14.85	5.00

For (non-skid) sizes up to 32x4, 50c extra; all other sizes $1.00 extra.
For rebuilding your old tires we charge you 60% of the above prices.

B. LIBEN & COMPANY

261-A West 54th Street NEW YORK CITY 112-A East 110th Street

THE HOME OF DOUBLE TREAD TIRES

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

Service

CAR owners will generally estimate the quality of your service by the quality of the product you sell.

Satisfaction to car owners — satisfaction and profit to dealers—that is the ultimate aim of Harvey Service.



PRACTICALLY UNBREAKABLE

THERE'S A HARVEY JOBBER NEAR YOU
Our new catalogue giving complete measurements of over 900 styles of Springs is yours on request

HARVEY SPRING & FORGING CO.
919 - 17th Street, RACINE, WIS.



I Will Sell You A Better Engine—on Your Own Terms—Cash, Payments or No Money Down

I Can Make You The Best Price

IMMEDIATE SHIPMENT Now!

90 Days Trial—5-Year Guarantee

Let me ship you my Special Model Kerosene Engine using 8-cent Kerosene instead of high-priced gasoline, to earn its own cost the first three to six months. Thousands are making money with WITTE Engines---Superior in design, construction and durability. Easy starting battery or magneto. Every engine shipped ready for business, including Speed Regulator and Free Equipment.

Four Plans of Purchase—Buy for Cash, on Payments, Bank Deposit or No Money Down. Use engine 90 days. See how little it costs for fuel and how easy it is to operate on kerosene, with a WITTE. You don't have to wait for your engine---I ship at once---make you the best price. I build engines exclusively---sell them direct to my customers at factory prices. You get your engine when you want it.

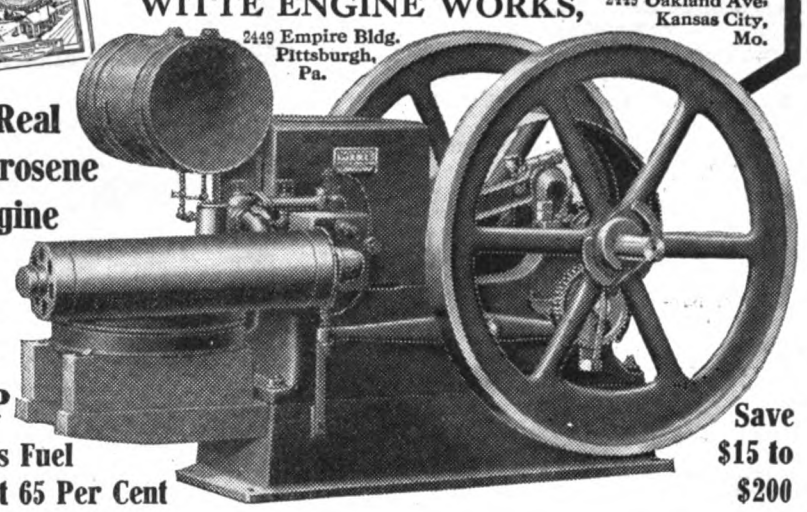
WITTE HIGH GRADE ENGINES
STATIONARY AND PORTABLE



On the market continuously for 31 years without a break. Why pay more than my factory price to get quality, or buy a cheap engine to get a low price. **My Free Book,** "How to Judge Engines" is copyrighted. It tells how I have been able to reduce manufacturing costs, why vertical values are best, why I use the highest grade semi-steel instead of cast iron, why kerosene engines must be specially made for kerosene, all about vaporizing fuel, built-in adjustable speed regulator, automobile ignition and other desirable features. You can see the engine you want before you pay me a dollar. Write today for my low factory prices on kerosene engines---the lowest possible consistent with quality saving you $15 to $200.---ED. H. WITTE.

WITTE ENGINE WORKS, 2449 Empire Bldg. Pittsburgh, Pa. 2449 Oakland Ave. Kansas City, Mo.

A Real Kerosene Engine 2 to 22 H-P



Cuts Fuel Cost 65 Per Cent

Save $15 to $200

PHOENIX HORSE SHOES

CONSTANT DEMAND IS THE BEST PROOF OF THEIR SUPERIORITY.

PRACTICAL TO THE HIGHEST DEGREE. MADE OF UNEXCELLED MATERIAL.

ASK ANY USER

BULL DOG CALKS

HOLD FIRMLY TO THE SHOE.
NEVER JUMP OUT WHEN SET.
EASY TO DRIVE IN SHOE.
PERFECT IN EVERY DETAIL.

FOR SALE BY ALL DEALERS ——— WRITE FOR SAMPLES

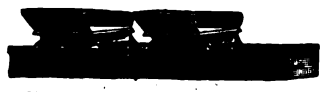
We are the Largest Horse Shoe Manufacturers in the World



PHOENIX HORSE SHOE COMPANY
CHICAGO, ILL.

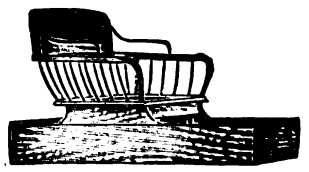
ROLLING MILLS AND FACTORIES } JOLIET, ILL. POUGHKEEPSIE, N.Y.

Digitized by Google



No. 244. BODY AND SEATS

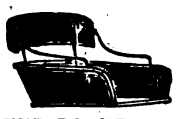
Price, no seats .....$8.25 and up
Price with seats..... 11.95 "



STICK SEAT BODY
$8.58 and up

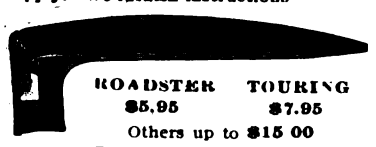


PIANO BODY
With seat.....$6.07 and up
Without seat..... 4.87 "



ROUND CORNER SEAT
Untrimmed..$3 00 and up
Trimmed..... 8.00 "

You can make $5.00 in a few hours to apply this Auto Roof Cover. Easy to apply. We furnish instructions



ROADSTER $5.95 TOURING $7.95
Others up to $15 00

CURTAIN LIGHTS
Sticktite



No sewing. Cost $1.00 and up. Parcel Post Paid. You can make 100% profit.



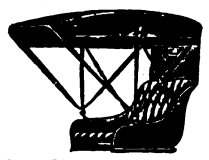
BUGGY GEARS
Each $12.50
With Wheels and Shafts...$26.90 and up

Parcel Post Paid

Discount in quantities.

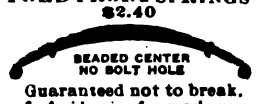
The time has come that it is to the Carriage Repairman's interest to do Auto Repairing as well as Carriage and Wagon Work.

Get our 36 page catalogue giving dealer's price on Tops, Wheels, Springs, Commercial Bodies, Trailers, Fenders, Seat Covers, Tires, etc. that will make you extra profit.



AUTO SEATS—Top Seats
Seat ....$9.56 and up
Cushion and back... 7.63 "
Top..... .....12.84 "

FORD FRONT SPRINGS
$2.40

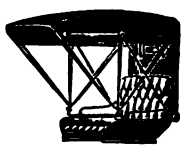


BEADED CENTER NO BOLT HOLE
Guaranteed not to break.
Can furnish springs for any make car.

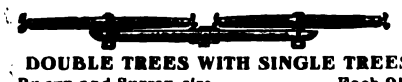


PORTAGE

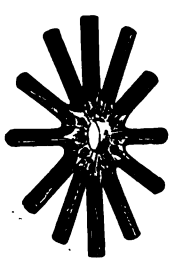
30 x 3 Tires sell for $12, cost you $10 delivered by Parcel Post. Other Sizes in proportion.



TOP SETS
Seat .....$1.55 and up
Cushion..... 1.88 "
Back..... 2.06 "
Top..... 9.94 "



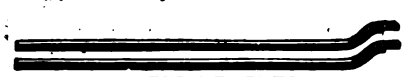
DOUBLE TREES WITH SINGLE TREES
Buggy and Surrey size.....Each 95c



SPIDER WHEELS
Avoid delays in repairing broken Auto and Carriage Wheels.
Auto Spider $2.20 and up.
Buggy Spider $1.90 and up.



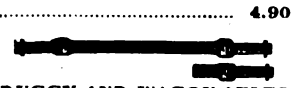
POLES
In the white.....$3.90
Painted 4.90



BENT REACHES
Assorted sizes.....10 for 75c



POLES
Buggy or Surrey size.....Per bundle, $7.50



BUGGY AND WAGON AXLES
$1.95 and up
We carry all sizes.



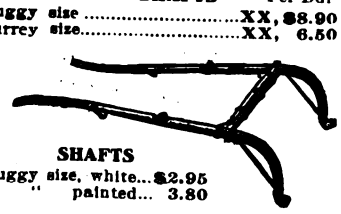
STRAIGHT REACHES
Assorted sizes.....20 for 75c



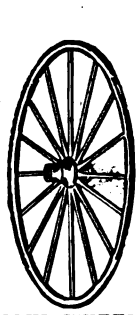
AXLE BEDS
Assorted sizes—drop.....14 for 60c
Assorted sizes—arch.....8 for 60c



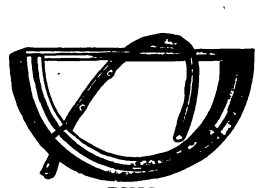
SHAFTS Per Bdl
Buggy size .....XX, $8.90
Surrey size.....XX, 6.50



SHAFTS
Buggy size, white...$2.95
" painted... 3.80



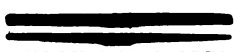
LIGHT WHEELS
With Steel Tire on, $7.80 and up
With Rubber Tire on, $16.80 and up
We make all sizes.
Auto Wheels with Demountable Rims $14.45



RIMS
We carry all sizes.
Plain Rims.....$1.25 and up
Beveled Rims ... 1.50 "
Bored and Rounded Rims 1.80 "
15 pieces bored and rounded rims, assorted sizes, for 75c



SPRING BARS
Assorted sizes .....14 for 75c



BUGGY AND SURREY SINGLE TREES
Assorted .....6 for 75c



Roadster Tops $18.90
Touring, $22 95

AUTO SEAT COVERS
$4.95 and up
We recover your old Auto Frame.
Send for sample of goods we use in our Tops and Seat Covers.

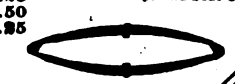
PRICES SUBJECT TO CHANGE OWING TO UNSETTLED CONDITIONS OF RAW MATERIAL MARKET. BETTER ORDER NOW.



WHEEL HEAD RIVETS
Assorted sizes
8 lbs. for.....75c

BUGGY SPOKES

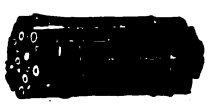
	Per 100
1 in., Sar. Pat.	$1.80
1 1/16 in., Sar. Pat.	2.10
1 1/16 in., C. B.	2.25
1 7/16 in., Sar. Pat.	3.50
15/16 in., Warner Pat.	1.95



Elliptic Springs
$1.10 and up

Send for our large **CATALOGUE**
On Carriage, Wagon and Auto Parts and learn how we do it.
Our freight offer will interest you.
Adjust your wants to the sizes and styles we furnish at the above prices and save money.

B. WHEEL, TOP & HDWE. CO.
1102 Sycamore Street CINCINNATI, OHIO



WOOD HUB SPOKES

	Per set
2 in.	$1.90
2¼ in.	2.10
2½ in.	2.90



HEAD BLOCKS
Assorted sizes,
8 for 75c



DASHES

20 in. drill	$0.20
17 in. leather	1.20
26 in. leather	1.20
24 in. leather	2.60



PARAMOUNT SPOKE WEDGES
1000 Assorted Sizes Spoke Wedges 60c

=BOOKS FOR= BLACKSMITHS

"PRACTICAL BLACKSMITHING."—Four volumes. Compiled from the practical articles which have appeared from time to time in The Blacksmith and Wheelwright, and covering the methods of doing various jobs of work very thoroughly. Should be in the hands of all good blacksmiths, wherever located. By mail, $4.00. With The Blacksmith and Wheelwright one year, $4.75. Either of these volumes are sold separately. Price, postage prepaid, $1.00 each.

"COMPLETE CARRIAGE AND WAGON PAINTER."—A work of nearly 200 pages, giving in plain language detailed directions for painting carriages, wagons, etc., with full instructions in all the various branches. By mail, $1.00. With The Blacksmith and Wheelwright one year, $1.75.

"EVERYBODY'S PAINT BOOK."—A book on indoor and outdoor painting which should find a place in every household in the land. It contains a large number of illustrations. By mail, $1.00. With The Blacksmith and Wheelwright one year, $1.75.

"THE PRACTICAL HORSESHOER."—Compiled from the practical articles which have appeared in the columns of The Blacksmith and Wheelwright from time to time, and contains a great variety of information of value to smiths who have horses to shoe. By mail, $1.00. With The Blacksmith and Wheelwright one year, $1.75.

"PRACTICAL CARRIAGE BUILDING."—Two volumes. Compiled from the practical articles which have appeared in The Blacksmith and Wheelwright from time to time. The information contained therein has been contributed by skilled workmen from all parts of the country, and is thoroughly reliable. By mail, $2.00. With The Blacksmith and Wheelwright one year, $2.75. Either of these volumes are sold separately. Price, postage prepaid, $1.00 each.

"GAS, GASOLINE AND OIL ENGINES."—Up-to-date on explosive motors for all power purposes. By Gardner D. Hiscox, M. E. By mail, $2.50. With The Blacksmith and Wheelwright one year, $3.00.

"HARDENING, TEMPERING, ANNEALING AND FORGING OF STEEL."—A new work treating in a clear and concise manner of modern processes for the heating, annealing, forging, welding, hardening and tempering of steel. By Joseph V. Woodworth. By mail, $2.50. With The Blacksmith and Wheelwright one year, $3.00.

M. T. RICHARDSON COMPANY
PUBLISHERS
73 Murray Street, NEW YORK CITY

900 Pages instead of 824 **1918—SIXTH EDITION** 3362 Illustrations instead of 2000

STILL $3.32 prepaid **DYKE'S AUTO ENCYCLOPEDIA** STILL $3.32 prepaid

Entirely re-written, hundreds of illustrations and many new subjects added. Practically a new book. A non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 50 **Instructions**—Simplified and Practical.

3362 **Illustrations**—the kind you understand at a glance.

2 **Supplements**, part printed in two colors, treating on the construction, operation, repairing and adjusting of the **FORD** and **PACKARD**—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.

775 illustrations and 279 pages on **Electric Ignition, Electric Starters** and **Generators**, etc.

51 pages and 79 illustrations on the **Delco** system alone.

60 pages and 254 illustrations on **Adjustments, Tests**, etc., of leading **Electric Systems**.

154 pages and 1189 illustrations on **Repairing**.

Oxy-Acetylene welding. **Axle, differential** and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.

27 pages and 180 illustrations on **Tires** and **Tire Repairing**.

44 pages and 119 illustrations on **Carburetion**.

89 pages and 291 illustrations on **Engines** and **Parts**.

16 pages on **Digest of Troubles**.

6000 lines to the **Index**. This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. **Index** begins on **colored** paper, easy to refer to.

Dictionary is also included, which gives the meaning of motoring terms.

Inserts: There are five—printed in colors. New features you never before saw or heard of in one of the inserts.

You must see this SIXTH Edition in order to appreciate just how complete a book it really is—Order NOW.

HOW TO BECOME AN EXPERT AUTOMOBILE MECHANICIAN

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion subject so thoroughly, you can adjust any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

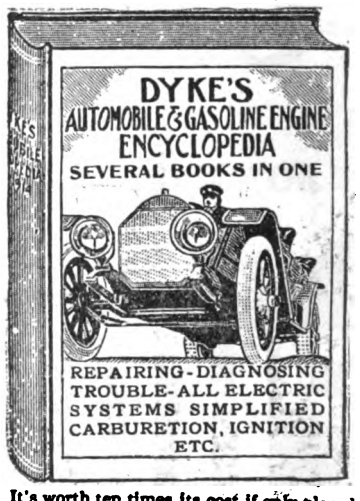
You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical Automobile Book in America. Price $3.32 Prepaid.

Address all orders to

THE BLACKSMITH & WHEELWRIGHT
73 MURRAY STREET NEW YORK



It's worth ten times its cost if only placed on the shelf and used as a reference.

Advertising Rates in the Blacksmith and Wheelwright made known on application

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

HIGGINS QUALITY SPRINGS—For Replacement

No hole. No bolt. No hump. No felt. No center breakage. Guaranteed alike at all points. Out-serve and out-sell all others. Immediate shipments. Write for Catalogue C-1917 and Dealers' Discounts.



Higgins Spring & Axle Co.
Dept. 10, Racine, Wis.

PATENTS

C. L. PARKER
Ex-Member Examining Corps, U. S. Patent Office
Attorney-at-Law and Solicitor of Patents
American and foreign Patents secured. Trade marks registered. Searches made to determine patent ability, validity and infringement. Patent suits conducted. Pamphlet of instructions on request.
McGill Building WASHINGTON, D. C.

"NATIONAL" BLACKSMITHS' DRILL CHUCK



Made especially for Blacksmithing and Carriage Work. Positive, durable, strongest, self-cleaning, always works, quickest to change Drills, casts no shadow, will save its cost over other Chucks in saving of time. BUY THE BEST. Money refunded if not as represented. Ask your jobber for it, or send direct for prices and circular.
ONEIDA NATIONAL CHUCK CO., Oneida, N. Y.



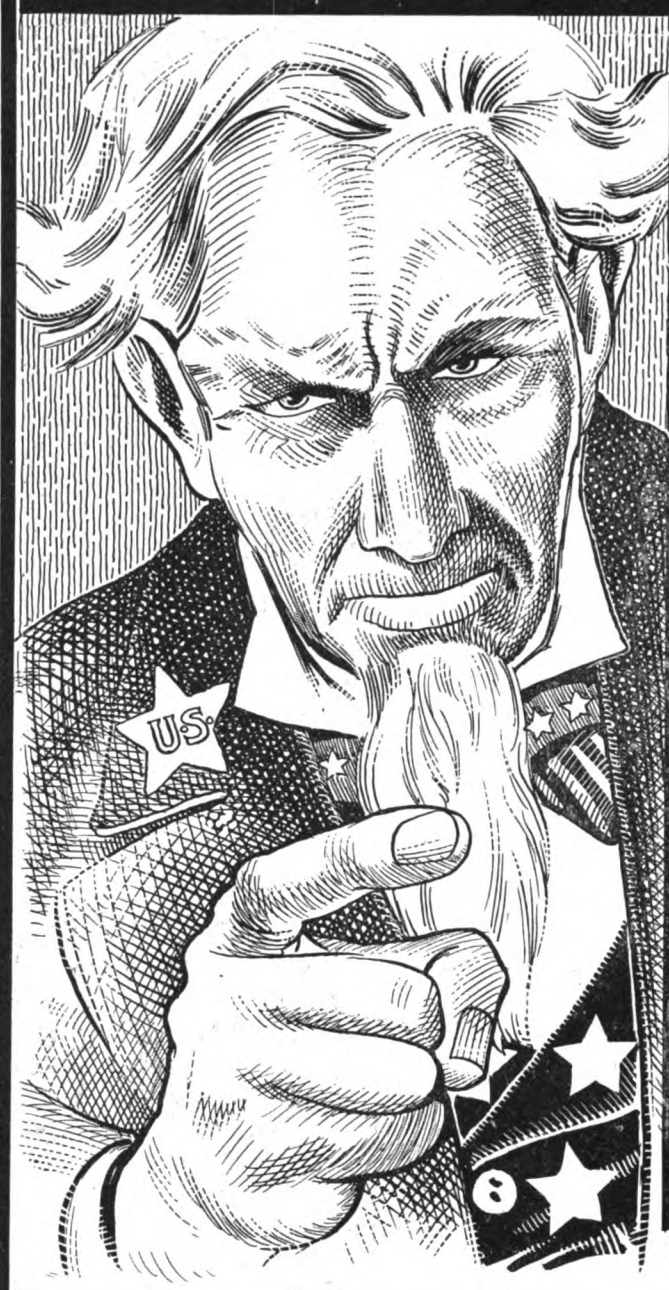
THE WOOD WORKER'S FRIEND
Get directions for building table and operating our Jointers. This information is valuable to wood workers. We manufacture 20 styles and sizes. Try a Jointer Head 30 days, if you are not pleased, return at our expense. Get prices.
Manufactured by WHISLER MFG. COMPANY, Gibson, Iowa

The Campbell Iron Company

Wholesale Automobile, Garage, Machinists, Blacksmith and Implement Supplies, Hardware Specialties. Duplicate Parts for Fords carried in stock.
Write for new catalog for equipment and tools for the Garage and Auto Repair Shop. 817 Cass Ave., St. Louis, Mo.

Do you want anything? Is your shop for sale, or do you want to buy a shop or hire a man? If so, a "Want" advertisement in THE BLACKSMITH AND WHEELWRIGHT will bring you good results. See terms at the head of the "Want" Department on another page.

"I'LL TAKE CARE OF THE WAR YOU BOYS WHO CAN'T GO—MUST TEND TO BIZNESS"



and there's no better way of attending to business than to stock up on

GIANT GRIP SHOES, CALKS, and TOOLS.

With MEN, business will go right along just the same as ever—molly-coddles don't count.

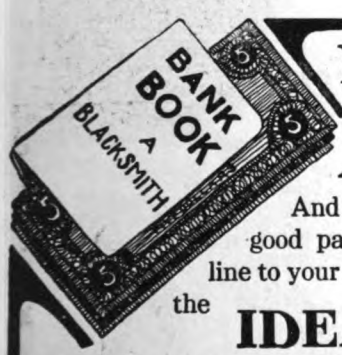
Giant Grip Calks you'll find to be a separation of the real from the apparent—the permanent Genuine Calk from the ordinary.

There is no effective substitute for that long and practical experience which is father of safe and conservative initiative. Many years of Shoe, Calk, and Tool making enables us to surely maintain certain advantages over others.

Don't let Progress catch you walking backward!—Write us to-day for literature.

GIANT GRIP HORSE SHOE CO.
Manufacturers of the original Drive Calk.
OSHKOSH, WISCONSIN

F.M.



IF YOU WANT A FAT BANK ACCOUNT

And an extra good paying side line to your business, the

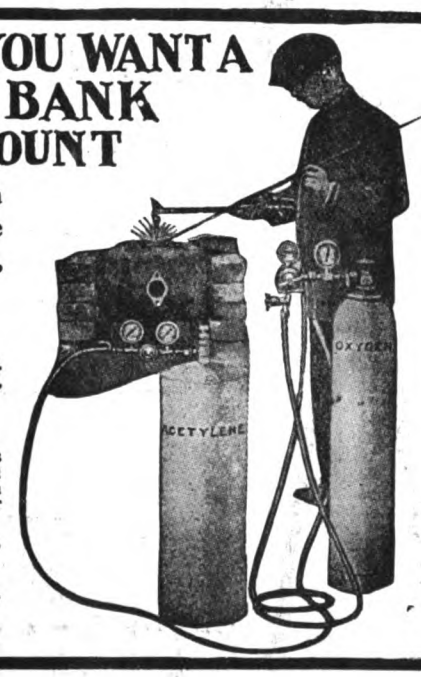
IDEAL Welding Outfit

Will do the trick.

Cold weather causes more breaks in metals than any other cause, so if you are equipped with our "IDEAL" welding outfit to repair breaks in axles, gear cases, chassis, cylinders, and other parts, you will reap the cream of business.

Come in *now* and beat the other fellow to it.
Write *today* for full particulars

General Welding Company
363 14th St., Hoboken, N. J.



I CAN take you out of a hole and make you win the goal—I take the "old-timer" and make him a climber—I make the present beginner a future winner.

Men who walk hand in hand with me, land with me—on the top rung with the victors!

I AM THE KERRIHARD POWER HAMMER

I Do the Work of Four Men

Write for full information

THE KERRIHARD COMPANY
Kerrihard Station Red Oak, Iowa, U. S. A.



Subscribe to The Blacksmith & Wheelwright, $1.00 Per Year

Digitized by Google

The Better Your Equipment The Bigger Your Profits

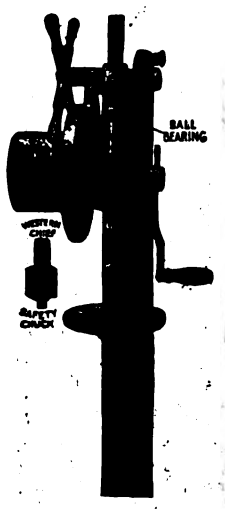
Buy CANEDY-OTTO

AND INCREASE YOUR INCOME

Once Tried, Always Used : There's a Reason—Quality

OVER 200 DIFFERENT STYLES

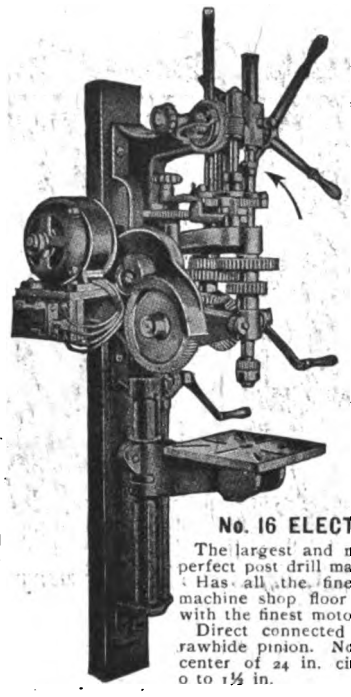
SEND FOR CATALOGUE No. 12



No. 19 DRILL

A low-priced combined hand and power self-feed drill.

Drills to center of 16½ in. circle.



No. 16 ELECTRIC DRILL

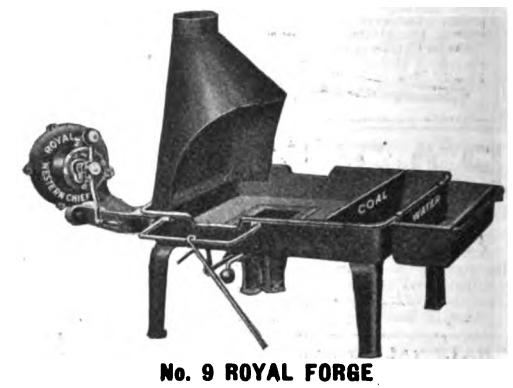
The largest and most mechanically perfect post drill manufactured. Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.

Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1½ in.



No. 100 ROYAL FORGE

The most popular forge ever made. Fan, 12 in. Hearth, 31½x45½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x50 in. Blower, 12 in.



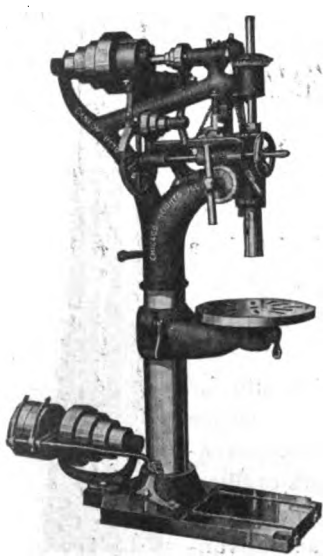
Blower, 12"
Wt., 135 lbs
Height, 47"

ROYAL BLOWER

(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.

Fire pot is 8x9 in. inside.



No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.

All machines are tested before leaving the factory, and guaranteed in every respect.

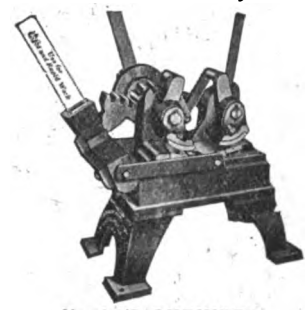
Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

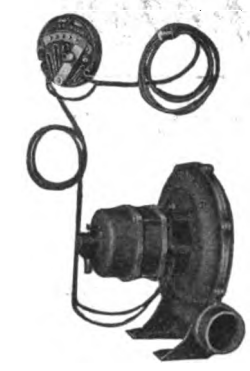
Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS



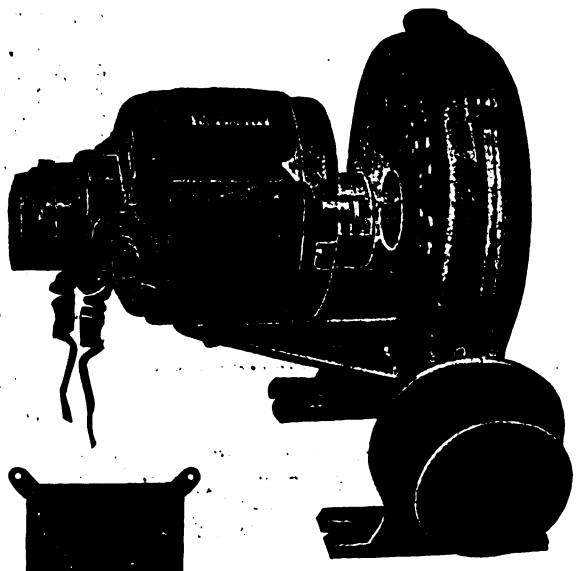
No. 1 1/2 SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



No. 8 ELECTRIC BLOWER

The best outfit money can buy.



"ONE FIRE"

"MARVEL" $35.00

A. C. or D. C.
or
UNIVERSAL MOTORS

Extra Large
Ring Oil Bearings

Case Hardened
Armature Shaft

The cut above shows the inside design and mechanical construction of our OIL RING BEARING MOTORS used on our "ONE FIRE" MARVEL.

With the enlarged oil wells and CASE HARDENED SHAFT, you get long wearing qualities and ruggedness found only in a MARVEL BLOWER. As long as there is ANY oil in the oil-well, the RING revolving on the CASE-HARDENED SHAFT keeps a STREAM OF OIL on the bearings.

This prevents OLD AGE.

Show this cut to the best mechanical engineer you can find, and ask him his opinion regarding our claims.

You naturally want the BEST and the MOST that your money will buy, and in a Forge Blower you will find those qualities in a MARVEL.

Any of the LEADING HARDWARE FIRMS will ship you any one of our MARVEL BLOWERS on 30 days' trial.

NOW is the time to improve your shop equipment.

Ask YOUR Dealer to have us send you one on 30 days' free trial. Unless you get a RING OIL BEARING "MARVEL" Blower, you are not getting the MOST your money will buy.

15 Different Sizes. Descriptive Circular Mailed on Request.

ASK YOUR DEALER.

ELECTRIC BLOWER CO.,

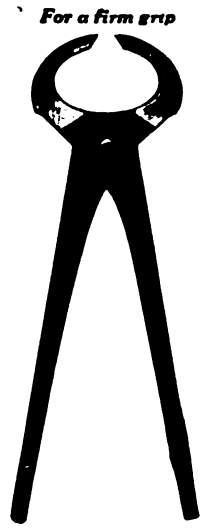
352 Atlantic Avenue, BOSTON, MASS.

PEXTO



Tools that "Stand the Gaff"

For a firm grip



Pexto Shoeing Pincer

Almost any tool you buy will do its work well for a while. But the real test of merit is the test of long hard service.

Not merely what will it do today, but a year or more from today—that's the question to be answered.

After a year of pulling and yanking, will the jaws of your Shoeing Pincer still close with a bulldog grip, without binding or sticking?

Will your Hoof Parer still cut cleanly and easily, without sawing or pulling?

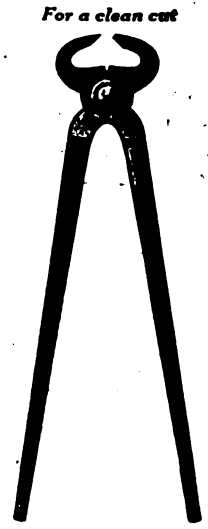
If they bear the Pexto trade mark, "PEXTO," they will.

"I like Pexto tools," said a blacksmith, "because they 'stand the gaff.'"

Pexto tools have been on the market for 96 years. Made by the manufacturers of the largest line of hand tools in the world.

If your dealer can't supply you, write us.

For a clean cut



Pexto Nipper and Parer

The Peck, Stow & Wilcox Company

Mfrs. Mechanics' Hand Tools, Tinsmiths' and Sheet Metal Workers' Tools and Machines, Builders' and General Hardware.

Southington, Conn. Cleveland, Ohio

Address all correspondence to 209 W. Center St., Southington, Conn.

Digitized by Google

ESTABLISHED 1880

THE BLACKSMITH & WHEELWR

The Pioneer Journal

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon B

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered

Vol. LXXVII. No. 3 NEW YORK, MARCH, 1918

BUYERS' GUIDE AND INDEX TO ADVERTISEMENTS, PAGE 82

BEST HOOF PADS

Strong, tough canvasback, reinforced by new process ingredient—easily takes the place of a leatherback which is more expensive. High gravity stock in the heel too—new equipment in a big new factory enables us to turn out quantities to meet the demand—no waiting—Send for sample price list and learn something.

KAPLAN—Heavy Pads
PEARL—Light Pads
Furnished in 14 sizes—see list.



RADICAL RUBBER CO.
117 Gerry Street
BROOKLYN, NEW YORK



Saw Those Heavy Bars ON A MARVEL Power Hack Saw

Machine stops when work is cut off. Requires very little power.
Price is Low. Write Us.
Ask for reply by return mail.

ARMSTRONG-BLUM MFG. CO.
340 N. Francisco Ave., Chicago, Ill., U. S. A.

STEEL STAMPS
BURNING BRANDS
RUBBER STAMPS
STENCILS
GEO. M. NESS, JR.
61 FULTON ST. NEW YORK
Send for price list.



SUREGRIP CALKS
American Calk Co.
DETROIT, - - MICH.

THE TEETH IN
BLACK DIAMOND RASPS
ARE MINGLED
So as to Cut Clean and Free and Leave no Furrows In the Work

Twelve Medals of Award by Jurors



At International Expositions

C. & H. BARNETT COMPANY
Black Diamond File Works, PHILADELPHIA, PA.
Owned and Operated by NICHOLSON FILE CO.
Copy of Catalog sent Free to any interested file users upon application.

The Horse Nail You Need



"Capewel

horse nails appeal str
to the expert shoer.
him it is of the utmos
portance how nails
and hold. Whether a
be used or a good
have to be thrown aw

In making Capewell nails the needs of the shoer have been closely studied. When he orders Capewell nails he knows he will get the best nail in the world at a fair price—not the cheapest regardless of quality.

Economical—safe—reliable

The Capewell Horse Nail
HARTFORD, CONN.
Leading Horse Nail Makers of the

AETNA STEEL TOE CALKS
Made by THE AETNA NUT CO., Southington, Conn.
BLACK HORSE BRAND

BEST SHAPE
BEST SPUR
TO DRIVE
BEST STEEL



TOE AND HEEL CALKS
SOLD BY ALL DEALERS

Stokes Bros.' Improved H
Every Rasp Warranted Perfe



STOKES BROS. MFG. CO., Fre



THE HORSE'S FRIEND
If you do not handle Corona Wool Fat Compound ask for FREE SAMPLE and our Dealers Proposition.
For Hard and Contracted Hoof, Quarter Cracks, Corns, Grease Heel, Scratches, Wounds, and sores of almost any nature on man or beast.
Good profit on sales for you.
Box 2 The Corona Mfg. Co., Kenton, O.

STAR STEEL SHAPES

PLOWSHARES LANDSIDE PLATES PLOW POINTS
LISTERSHARES LANDSIDE POINTS SEEDER POINTS
MOLDBOARDS SHOVEL POINTS SUBSOILERS
CULTIVATOR SHOVELS DRILL POINTS
Soft Center Solid Cast Crucible Steel

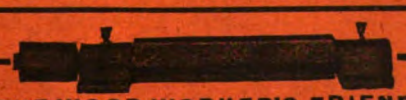
STAR MANUFACTURING CO., Carpentersville, Ill.

I CAN take you out of a hole and make you win the goal—I take the "old-timer" and make him a climber—I make the present beginner a future winner. Men who walk hand in hand with me, land with me—on the top rung with the victors!

I AM THE
KERRIHARD POWER HAMMER
I Do the Work of Four Men
Write for full information
THE KERRIHARD COMPA
Kerrihard Station Red Oak, Io

STEEL STAMPS
LETTERS and FIGURES
For Marking Your Tools and Your Product
NAME PLATES OF ALL KINDS
S. D. CHILDS & CO.
DEPT. 2
136 S. CLARK ST. CHICAGO

HORSESHOERS
It pays to pack the horse's hoofs with Lemoine's hoof packing. It has no equal for dry, hard, contracted hoofs, quarter cracks, corns and thrush. It never fails to do the work.
N. LEMOINE COMPANY
P. O. Box 88 FRAMINGHAM, MASS.



THE WOOD WORKER'S FRIEND
Get directions for building table and operating our Jointers. This information is valuable to wood workers. We manufacture 20 styles and sizes. Try a Jointer Head 30 days, if you are not pleased, return at our expense. Get prices.
Manufactured by WHISLER MFG. COMPANY, Gibson, Iowa

Digitized by Google

SHARP Calks



Made in 3 Size Blades

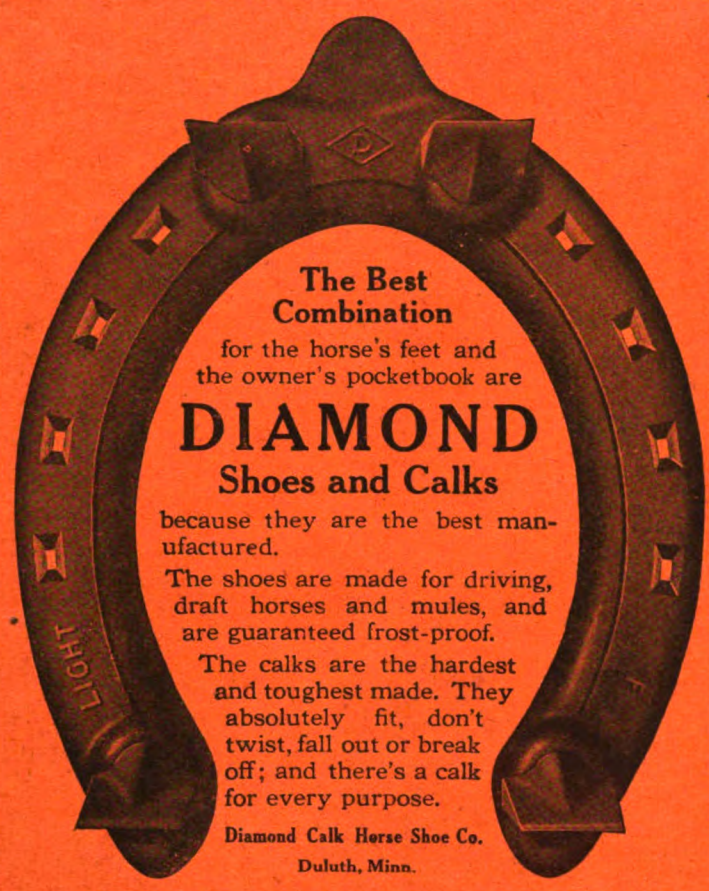
Big.
Standard.
Short or Pad Calk.

DULL Calks



Made in 2 Size Blades

Standard.
Short or Pad Calk.



The Best Combination

for the horse's feet and the owner's pocketbook are

DIAMOND

Shoes and Calks

because they are the best manufactured.

The shoes are made for driving, draft horses and mules, and are guaranteed frost-proof.

The calks are the hardest and toughest made. They absolutely fit, don't twist, fall out or break off; and there's a calk for every purpose.

Diamond Calk Horse Shoe Co.
Duluth, Minn.

Ask for Our New Catalog and Price List

ROUND Calks

Both Sharp and Dull.



Each made in 2 Size Blades

Standard.
Short or Pad Calk.

BLOCK Calks



Standard Blade Only

"IDEAL" LAWN MOWER GRINDER

A BIG MONEY-MAKER.
Many of our customers make $300 in one season. You can do as well.



Patented
Dec. 29, 1908
Mar. 1, 1910

"You Grind It as You Find It."

Grinds all makes of Mowers perfectly in 15 minutes without removing wheels, ratchets or reel-knife. Has perfect Skate Sharpener Attachment for sharpening skates. Operated either by hand or power. Ball-bearing; easy running. Will do the work so much BETTER, QUICKER and EASIER you cannot afford to be without it. Nearly 10,000 in use. Fully guaranteed. Sold on easy-payment terms.

WRITE TODAY for catalog and full information.

Also makers of the "PEERLESS" Horse Lawn Mower Grinder.

THE ROOT-HEATH MANUFACTURING CO.
PLYMOUTH, OHIO

"E-Z" WELDING COMPOUND

is the best **BECAUSE**

It works Equally good on all Kinds of steel.

It welds at **lower heat** than any other.

It **sticks** to metal at a **very low** heat.

It leaves **no scale.**

USE IT ONCE AND YOU WILL ALWAYS WANT IT

Crescent Welding Compound

MAKES SMOOTHER WELDS THAN ANY OTHER

It is fine for plow work or where parts are fastened together before welding, or for making split welds, finishing heats, or for welding under dies, etc., etc.

CRESCENT WELDING COMPOUND TRADE MARK

It insures smooth finish and perfect welds on Toe Calks.

"Money back" from any jobber if "E-Z" or Crescent does not give perfect results.

We will send samples free of charge.

MADE ONLY BY

Anti-Borax Compound Co.
FT. WAYNE, IND.

Digitized by Google

"F-S" PAINTS



"F-S" Products Stand the Most Rigid Inspection.

Your good work will stand even higher at inspection when you use "F-S" Superfine Coach Colors on your carriage, coach and automobile bodies. The best of material is used as in all "F-S" products—ground in gold-size Japan.

"Economic efficiency is necessary to win the War."

FELTON, SIBLEY & CO., Inc.

Manufacturers of Colors, Paints, Varnishes since 1863

136-140 North Fourth Street, Philadelphia

(147)

Sell the Spring You Would Use On Your Own Car—

Put yourself in customer's place. —that will make more business for you—and eventually, for us.



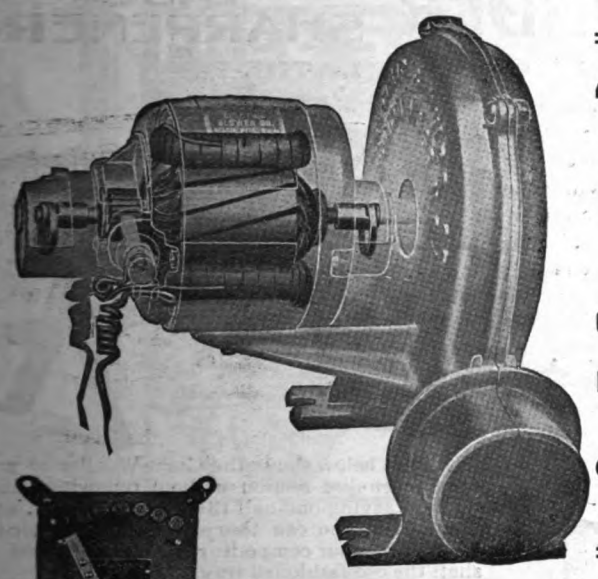
PRACTICALLY UNBREAKABLE

THERE'S A HARVEY JOBBER NEAR YOU

Our new catalogue giving complete measurements of over 900 styles of Springs is yours on request

HARVEY SPRING & FORGING CO.

919-17th Street **RACINE, WIS.**



"ONE FIRE"

"MARVEL" $35.00

A. C. or D. C. or UNIVERSAL MOTORS

Extra Large Ring Oil Bearings

Case Hardened Armature Shaft

The cut above shows the inside design and mechanical construction of our OIL RING BEARING MOTORS used on our "ONE FIRE" MARVEL.

With the enlarged oil wells and CASE HARDENED SHAFT, you get long wearing qualities and ruggedness found only in a MARVEL BLOWER. As long as there is ANY oil in the oil-well, the RING revolving on the CASE-HARDENED SHAFT keeps a STREAM OF OIL on the bearings.

This prevents OLD AGE.

Show this cut to the best mechanical engineer you can find, and ask him his opinion regarding our claims.

You naturally want the BEST and the MOST that your money will buy, and in a Forge Blower you will find those qualities in a MARVEL.

Any of the LEADING HARDWARE FIRMS will ship you any one of our MARVEL BLOWERS on 30 days' trial.

NOW is the time to improve your shop equipment.

Ask YOUR Dealer to have us send you one on 30 days' free trial. Unless you get a RING OIL BEARING "MARVEL" Blower, you are not getting the MOST your money will buy.

15 Different Sizes. Descriptive Circular Mailed on Request.

ASK YOUR DEALER.

ELECTRIC BLOWER CO.,

352 Atlantic Avenue, BOSTON, MASS.

Would You Sell Your Life For $65?

You wouldn't part with even an arm or a leg for that figure, would you?

Yet every vicious horse you shoe is likely to do more damage in the twinkling of an eye than can be repaired at several times the cost of **Barcus Stocks.**

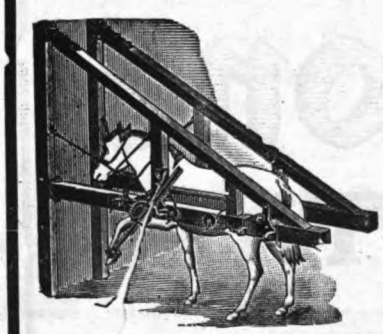
When you place a horse in a Barcus Stock, he is harmless—he cannot hurt either you or himself. Costing only $65 it is cheap insurance, indeed.

BARCUS STOCKS not only furnish the logical way to observe "Safety First," but they are also a positive aid to good shoeing. The BARCUS is a modern Stock—automatic working parts instead of the bothersome ropes, straps and blocks that made the old style stock almost more of a nuisance than a help.

If you don't know about **Barcus Stocks** you owe it to yourself and your family to write **at once** for the complete details.

The Barcus Mfg. Co.,

Wabash, Ind.



Please send me full particulars regarding your Horse Stocks without any obligation on my part.

Name.....

Town..... *State*.....

Digitized by Google



Massive in Appearance Light in Weight



Cushion

IT is the generous measure of rubber that gives Firestone Carriage Tires the width and thickness which add so much to the appearance of the "turnout."

It is the quality of the rubber that allows extra size and resiliency without extra weight.



Internal Wire

Firestone Carriage Tires give thorough satisfaction in comfort, wear and appearance, so uniform that they wear evenly to the channels.



Side Wire

Firestone Dealers win new buyers who become regular customers. Write for attractive proposition to dealers.

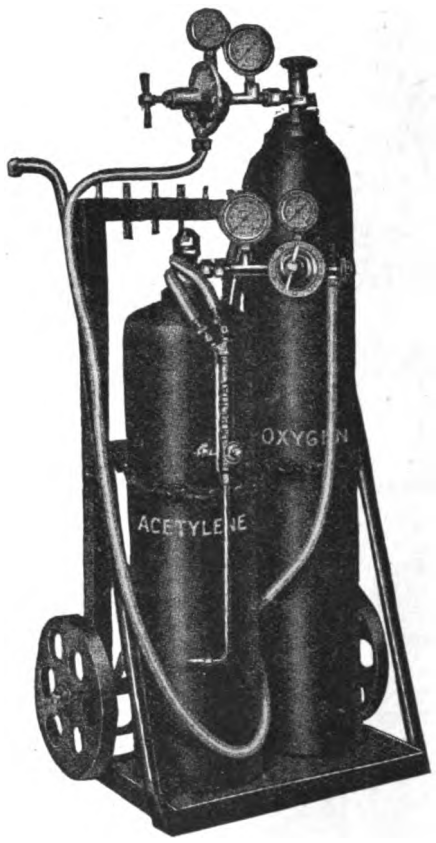
FIRESTONE TIRE & RUBBER COMPANY, AKRON, OHIO

Branches and Dealers Everywhere

Firestone Carriage Tires

EQUIP NOW FOR REPAIR WORK PROFITS

National Thrift will make 1918 the greatest year for Repair Work ever known. Prepare now to handle a large volume of automobile machinery, tool and metal repair work of all kinds, by installing **IMPERIAL WELDING AND CUTTING EQUIPMENT.** It pays for itself through added profits, proving itself to be a real industrial necessity.



Practical Mechanics grasp the operation of the process quickly, and with a little practice soon become efficient welders. Do not permit the most profitable work to go elsewhere—equip now—you will never regret it—particularly if you select an Imperial Outfit.

When you buy Imperial Equipment, it is a case of receiving **Full Value** for your money.

You not only obtain maximum efficiency and economy of operation, finely made apparatus, etc., but every detail of the equipment—the convenient carrying case, extra long, high grade hose, two gauges to each regulator (when most makers furnish only one), generous quantity of welding supplies—all contribute to make Imperial Equipment the best "buy" at any price.

Do not be misled by low prices. Insist on knowing what you get for your money.

GET THE FACTS. Our new illustrated catalog shows work actually done, gives cost of operation and other valuable data. Write for copy today.

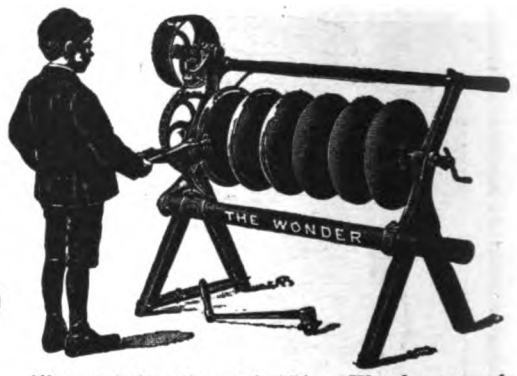
IMPERIAL BRASS MFG. CO.

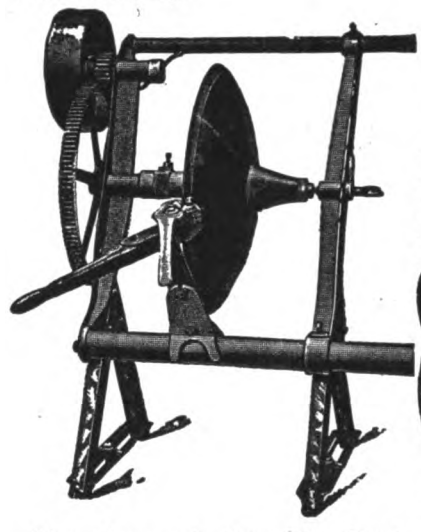
512 S. RACINE AVENUE, CHICAGO, ILL.

THE WONDER DISC SHARPENERS

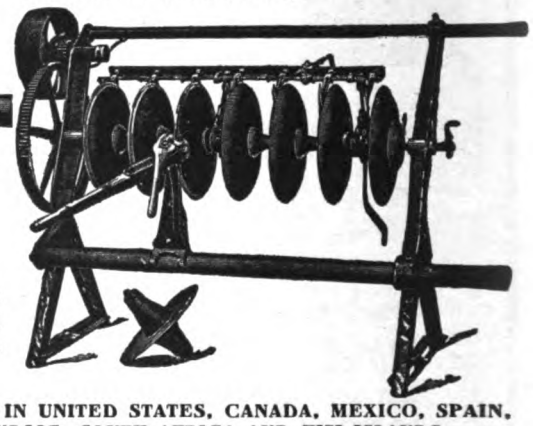
BUILT LIKE A LATHE

This cut shows the Little Wonder at work on a whole section of discs. This machine is especially adapted for sharpening disc harrows. While the Little Wonder is being successfully used to sharpen plow discs of 22 inches or less, we would recommend the Giant Wonder where disc plows are used extensively.





The cut below shows the Giant Wonder at work on a seven-disc section without removing discs, thereby saving one-half the time and labor, as in many cases you can sharpen a whole section of discs while your competitor is taking his off the shaft the old fashioned way.



The above cut shows the Giant Wonder at work on disc plows. Will sharpen any size from 12 to 32 inches in diameter.

FOR SALE BY LEADING JOBBERS IN UNITED STATES, CANADA, MEXICO, SPAIN, AUSTRALIA, ARGENTINE REPUBLIC, SOUTH AFRICA AND FIJI ISLANDS.

A. E. DURNER, Manufacturer EVANSVILLE, WIS., and BRANDON, MAN., CAN.

ADDRESS ALL INQUIRIES TO

A. E. DURNER; Head Office, Evansville, Wis.

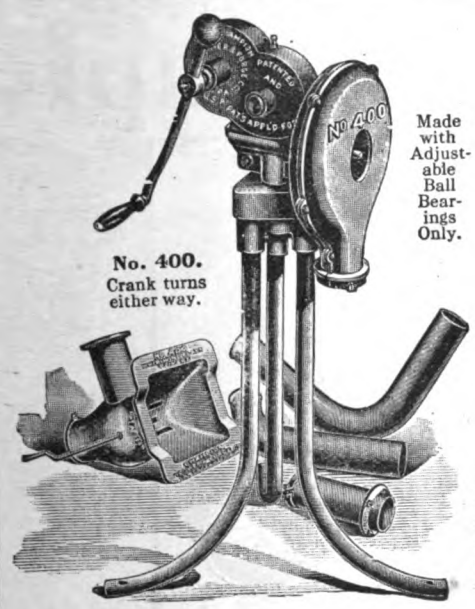
Both size machines are equipped regular, long enough to take in 8 disc section. Special length furnished for 10 and 12 disc section at small cost.

I hold the original patent on this style sharpener. I could build them cheaper, but I won't. I would build them better, but I can't. Write for testimonials from your neighbor. Did you ever buy a cheap machine that gave satisfaction?

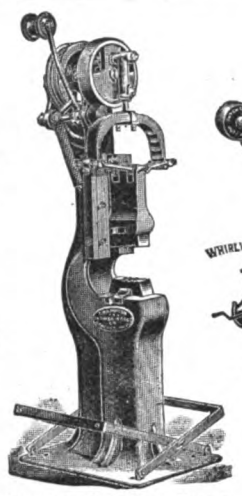
THINK ABOUT IT, THEN BUY A WONDER.

Digitized by Google

THE FAMOUS "CHAMPION" BLACKSMITH TOOLS



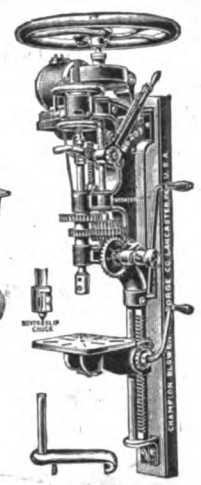
No. 400. Crank turns either way. Made with Adjustable Ball Bearings Only.

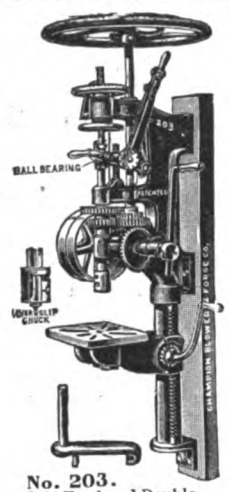


Hercules Patented Power Hammer. Weight of ram, 65 pounds. The power hammer with the flexibility in stroke of a hammer in a mechanic's hand.



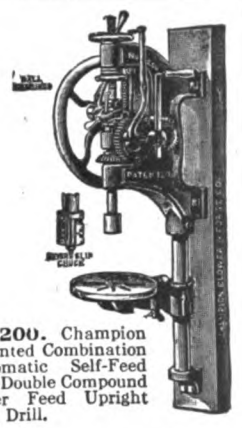
No. 408. Steel Blacksmith's Forge.



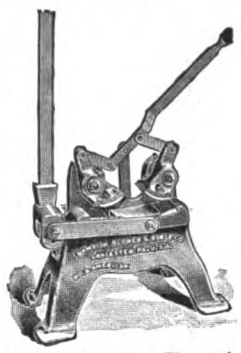


No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.

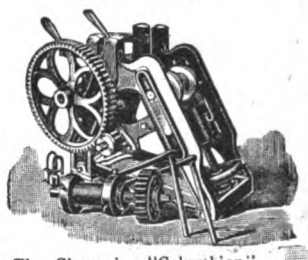
No. 203. Self-Feed and Double Compound Lever Feed Drill.



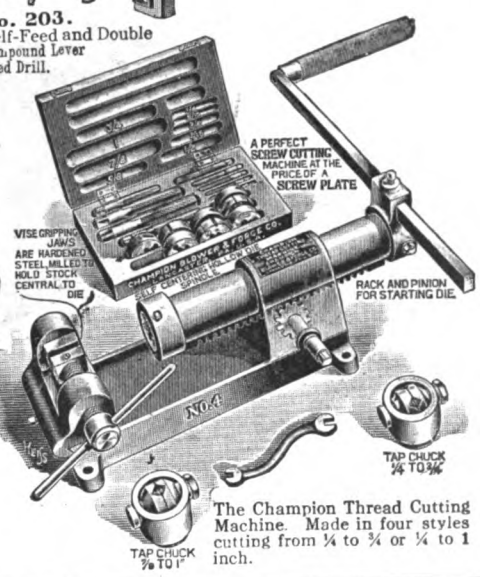
No. 200. Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



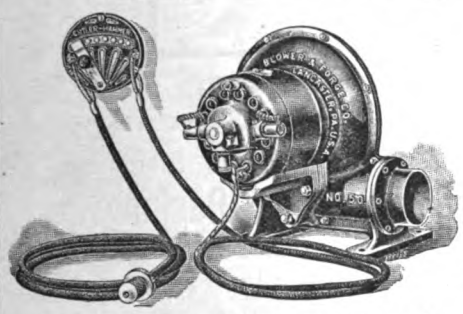
No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



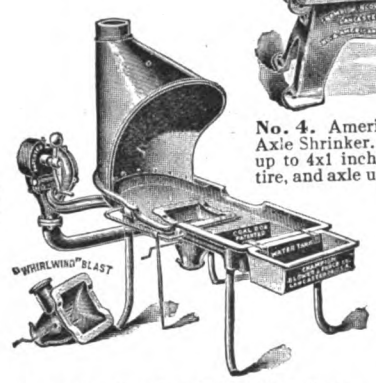
The Champion "Columbian" Tire Bender. Made in 3 sizes.



The Champion Thread Cutting Machine. Made in four styles cutting from ¼ to ¾ or ¼ to 1 inch.



No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower with a Universal Motor for both direct and alternating current, either 110 or 220 volts, with Detached Rheostat for six speeds, and Steel Pressure Blower case, for all kinds of general Blacksmith work.



No. 433. Cast Iron Blacksmith's Forge.

Don't Fail to Get 1917 Catalog

Before purchasing a Hand Blower, Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA·U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

FREE SAMPLE OF FLUX



WELD TRADE A MARK CAST

A SUPERIOR FLUX FOR

OXY-ACETYLENE WELDING

"WELD-A-CAST" Flux No. 1 for Welding Cast Iron.

Eliminates pin holes and blow holes, leaving the metal soft.

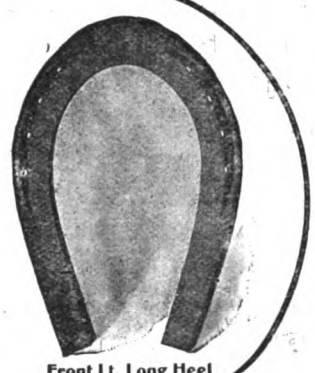
"WELD-A-CAST" Flux No. 3 for Welding Brass, Bronze, High Speed Steel, and all High Carbon Steel.

Prove it! Write for Sample.

CORTLAND WELDING COMPOUND CO.

CORTLAND, N. Y.

UNITED STATES
HORSE AND MULE SHOE
ARE REAL TRADE WINNER



Front Lt. Long Heel

PERFECT ALL THROUGH AND EASY TO FIT



Hind Lt. Lon

Prove It Out On Your Next Ord

Carried in Stock by All Jobbers

A Handsome Souvenir Watch Fob Given Away Free To All Blacksmiths and Horsemen Upon Request.

WRITE FOR OUR LATEST CATALOG No. ILLUSTRATING OUR COMPLETE LINE

Manufactured By

United States Horse Shoe C

ERIE, PA.

Digitized by Google

Mr. WHEELWRIGHT!

If someone were to show you a sure way to increase your profits, and at the same time enable you to produce a better grade of work, you would take advantage of the offer. Then let us call your attention to the **Batavia Rubber Tire Applying Machine,** whose operation is simplicity itself, and whose construction is of the very best material and labor.

It is universally acknowledged as the last word in Tire Applying Machines, and we are the proud possessor of thousands of letters of recommendation from the leading wheelwrights and carriage-makers in the United States and Canada.

Below is a cut of the No. 1 Machine, showing loops in rubber for compression and arrangement of wire for brazing.



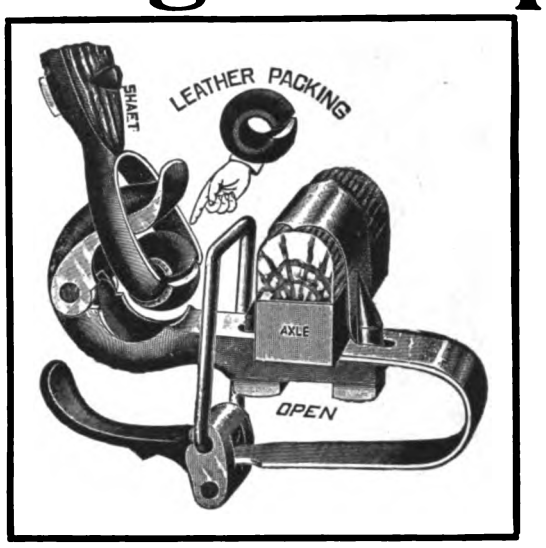
No. 1 Machine will apply ¾ in. to 1¾ in. rubber tire, and No. 2 Machine will apply ¾ in. to 2 in. rubber tire.

Write us for descriptive pamphlet and prices AT ONCE.

THE BATAVIA RUBBER CO., BATAVIA, N.Y.

Manufacturers Pneumatic and Solid Truck Tires

THE BRADLEY BALL-BEARING Carriage Coupler



All-Steel, Noiseless, Quick Shifting, Ball Bearing

The ONLY Carriage Shaft Coupler that is furnished with a

One-Piece Moulded Leather Packing

A packing that will outwear any other packing ever made. It fits the ball and socket. It is held in place by a spring steel retaining ring. It may be put on and taken off in a jiffy, and it stays where it is put.

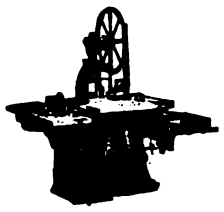
MADE IN FIVE SIZES.

Pony—Buggy—Surrey—Delivery—Express

To fit axles 3-4 inch to 2 1-4 inch

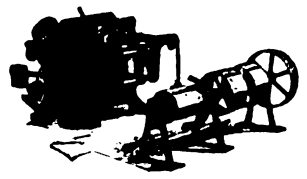
Your Jobber Can Supply You.

C. C. BRADLEY & SON, Syracuse, N. Y.



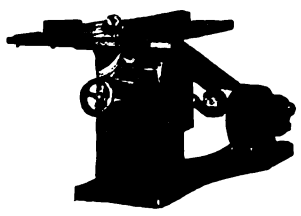
CRESCENT

UNIVERSAL WOOD WORKERS

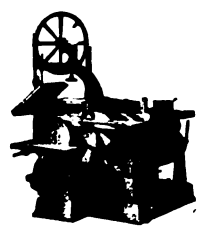


are very popular right now as shortage of labor will soon be general, but there will be more work than ever to be done. The best solution to this vexatious problem is for you to install labor saving equipment such as may be had in the CRESCENT line of Universal wood workers, band saws, jointers, saw tables, planers, disk grinders, shapers, swing cut off saws, hollow chisel mortisers, borers, variety wood workers.

Today is the time for you to investigate the CRESCENT line.



SEND FOR OUR CATALOG.



THE CRESCENT MACHINE CO.

203 MAIN STREET LEETONIA, OHIO

Edwards Shears

For twenty years the Two Leading Low Priced Shears in the U. S., representing the Greatest Value for the Least Money.

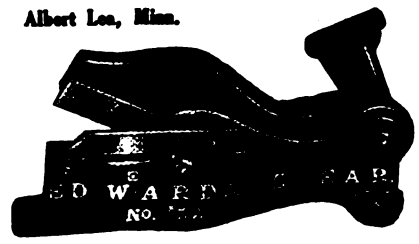
No. 5, weighs 200 lbs., cuts 4x½ inch soft steel.
No. 10, weighs 430 lbs., cuts 4x¾ inch soft steel.

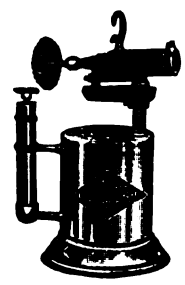
At their price you should have had one long ago. Order one from the first iron man that calls on you. They All Sell Them.

Write for descriptive circular and prices.

C. D. EDWARDS

Albert Lea, Minn.





JOBBERS!

Turner Kerosene Torch

(No. 426)

is a rapid seller. Meets all requirements of a good blow torch. Produces a steady, powerful blue flame. Not affected by wind or bad weather.

Catalog or our complete line for the asking.

THE TURNER BRASS WORKS, Sycamore, Ill., U. S. A.

B. S. Alder, 30 Warren St., New York, N. Y., Eastern Representatives.

THE ARMSTRONG MFG. COMPANY

BRIDGEPORT CONN., U.S.A. **NEW YORK OFFICE 248 CANAL STREET**

like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



"Makers of the Genuine ARMSTRONG Stocks and Dies."

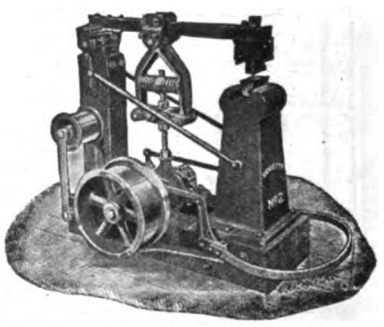
The HAWKEYE HELVE HAMMER'S Built in Three Sizes.

12 years in successful operation. Fully guaranteed. Note the principle of stroke. Double the capacity of any upright hammer of the same weight and price.

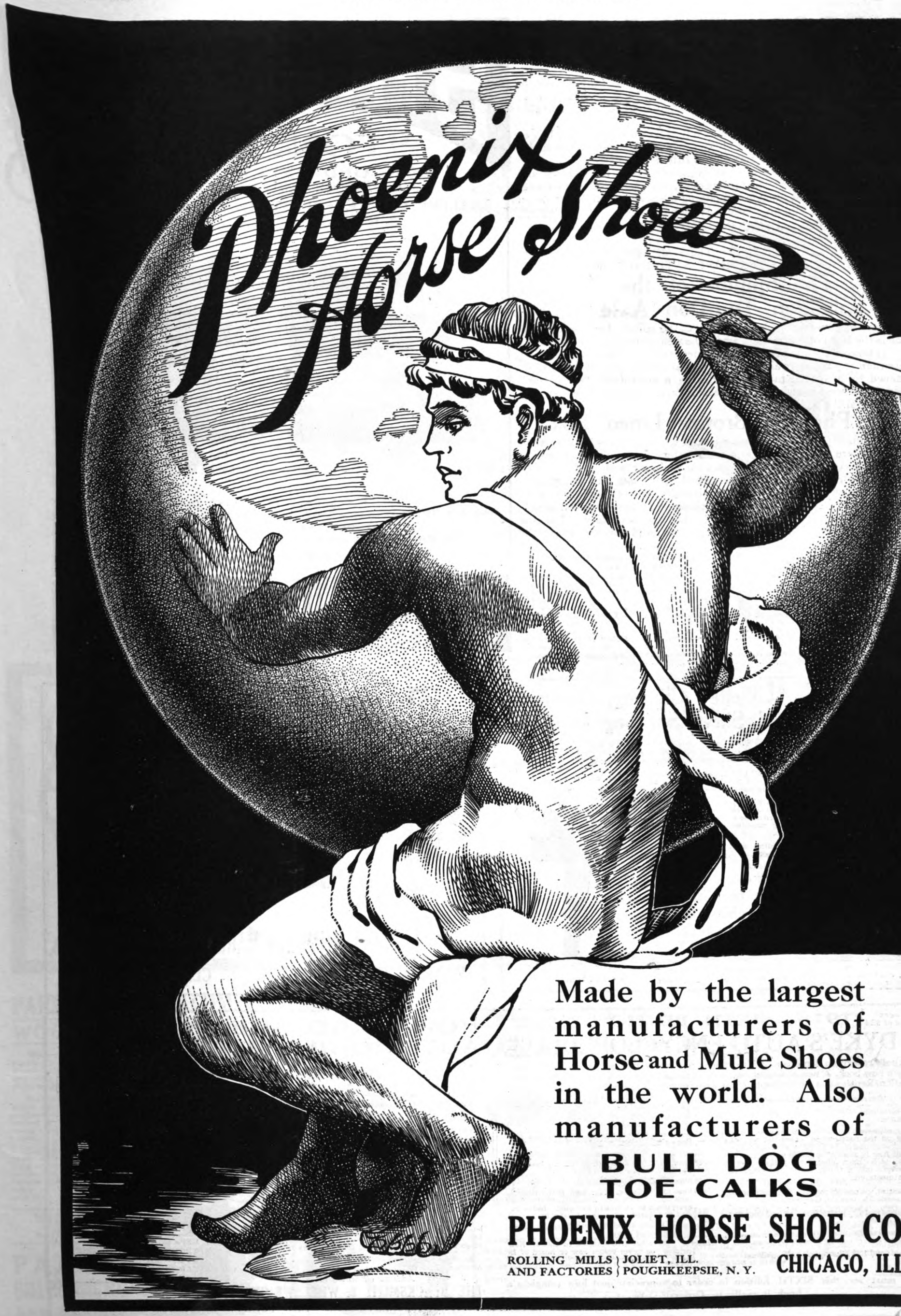
For price and descriptive literature write,

The Hawkeye Mfg. Co.

CEDAR RAPIDS, IOWA, U. S. A.



Digitized by Google



Made by the largest manufacturers of Horse and Mule Shoes in the world. Also manufacturers of

BULL DOG TOE CALKS

PHOENIX HORSE SHOE CO

ROLLING MILLS AND FACTORIES } JOLIET, ILL. POUGHKEEPSIE, N. Y.

CHICAGO, ILL

Digitized by Google

WAGON BUILDING

"Build me a wagon that will last forever."

"Sorry, Sir, but 'axle troubles' (due to wear—wear on the spindle, or on the box, or both) make it impossible."

You've often received a specification like that and been obliged to give that answer—haven't you?

The Sheldon "TON-DON"—an axle that will not wear, run hot or break—allows your meeting the requirements of the man who wants a wagon to last forever, **and we have told him so.**

The Sheldon "TON-DON" was originally made for buggies and carriages. Its success was so instantaneous and pronounced that we were deluged with requests for an axle embodying the same principle for use on Delivery, on Business and on Express Wagons.

Hence, the "TON-DON" CONCORD EXPRESS.
In EFFICIENCY—The HIGHEST.
In CONSTRUCTION—The SIMPLEST.
In SERVICE—The MOST SATISFACTORY.

The Spindle of the Sheldon Ton-Don Axle

Ordinary axles wear flat on the bottom of the spindle because the bottom side is the point of contact and where the wear of the spindle is concentrated. It takes a spindle of unusual hardness to resist this wear—greater hardness than any ordinary axle affords. The spindle of the "TON-DON" is hardened by a special process, producing a wearing surface of such hardness that a fine file makes no impression on it—yet the center remains soft or "natural."

The Phosphor-Bronze Lined Box

The peculiarity of this box lining is that while somewhat softer than the spindle, there is no perceptible wear after thousands of miles of running, but becomes harder and more wear-resisting with use.

Phosphor-Bronze (of a mixture which increases its toughness, smoothness under friction, and wear-resisting qualities) is a metal used for making the propellers of ocean steamships, bearings for locomotives, crank-shaft bearings for automobiles and other fine machinery. Imagine what a metal must be to meet such conditions, and you will grasp the advantages of applying such metal to axle purposes.

THESE AXLES CARRIED IN STOCK BY THE FOLLOWING JOBBERS AND CAN BE OBTAINED AT MANUFACTURERS' PRICES.

Baltimore, Md.....E. Scott Payne Co.	Providence, R. I....Congdon & Carpenter Co.
Boston, Mass.....E. P. Sanderson Co.	Rochester, N. Y.....Burke Iron & Steel Co.
Buffalo, N. Y.....H. D. Taylor Co.	San Francisco, Cal....Waterhouse & Lester Co.
Chicago, Ill.....E. D. Kimball Co.	Scranton, Pa.....Bittenbender & Co.
Cincinnati, O.....G. B. Schulte Sons Co.	Seattle, Wash.....Gray Bros. Co.
Indianapolis, Ind.....W. J. Holliday & Co.	Springfield, Mass.....Chas. C. Lewis & Co.
Los Angeles, Cal.....Percival Iron Co.	St. Louis, Mo.....Sligo Iron Store Co.
Milwaukee, Wis....Shadbolt & Boyd Iron Co.	Washington, D. C.....Louis Hartig
Pittsburgh, Pa.....McLean & McGinness	Wilmington, Del. ....Delaware Hardware Co.
Portland, Oregon.....J. E. Haseltine & Co.	Bridgeport, Conn.....Chapman & Bangs Co.
Ft. Wayne, Ind.....Mossman, Yarnelle & Co.	San Antonio, Texas . Heusinger Hardware Co.
New Orleans, La. .....Joe. Schwartz & Co.	

SHELDON

"TON-DON"

CONCORD EXPRESS STYLE

NOT A BALL OR ROLLER BEARING—BUT

ANTI-FRICTION—EVERLASTING—INTERCHANGEABLE

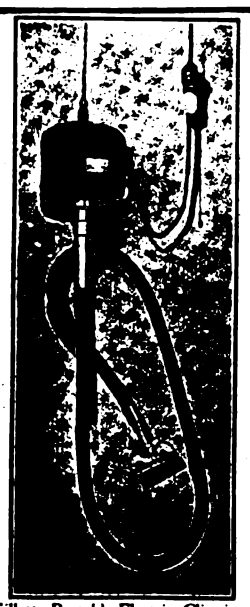
IT WILL NOT CUT, HEAT OR STICK



NOTICE THE PATENTED OILING DEVICE
HAS ALL THE ADVANTAGES OF FRICTION AND ANTI-FRICTION AXLES WITHOUT THEIR DISADVANTAGES
"TON-DON" MEANS KNOWN QUALITY WITHOUT FANCY PRICE
MADE ALSO FOR BUGGIES AND SURRIES

SHELDON AXLE & SPRING CO.,
WILKES-BARRE, PA.

LARGEST AXLE FACTORY IN THE WORLD.



Gillette Portable Electric Clipping, Shearing and Grooming Machine for Direct or Alternating Currents.

"Gillette" Clipping, Grooming and Sheep Shearing Machines

Experience of a quarter-century in making flexible shaft Hand and Power Machines for Clipping Horses, Mules, Dogs, Cows and for shearing Sheep, Etc., has given us an expert knowledge of this art.

"GILLETTE" Clipping machines and parts are guaranteed as to materials and workmanship.

"GILLETTE" cutters are unexcelled and can be used on any stated make of flexible shaft clipping machine. Efficiency is our aim.

Grinding and repairing is our specialty.

Renewal and repair parts carried on hand.

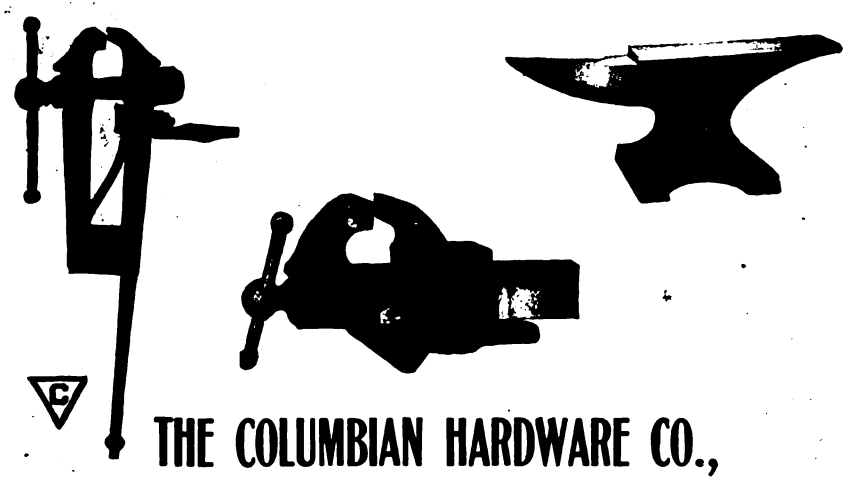
Gillette Clipping Machine Co.
129-131 West 31st Street
NEW YORK, N. Y.

Illustrated Price List Free.
Order Direct or Through Your Dealer



"Gillette" Cutter and Handle.

COLUMBIAN Vises & Anvils



THE COLUMBIAN HARDWARE CO.,
MANUFACTURERS CLEVELAND, OHIO.

900 Pages instead of 824 **1918—SIXTH EDITION** 3362 Illustrations instead of 2000

STILL $3.32 prepaid **DYKE'S AUTO ENCYCLOPEDIA** STILL $3.32 prepaid

Entirely re-written, hundreds of illustrations and many new subjects added. Practically a new book. A non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 50 **Instructions**—Simplified and Practical.

3362 **Illustrations**—the kind you understand at a glance.

2 **Supplements**, part printed in two colors, treating on the construction, operation, repairing and adjusting of the FORD and PACKARD—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.

775 illustrations and 279 pages on **Electric Ignition, Electric Starters** and **Generators**, etc.

51 pages and 79 illustrations on the **Delco** system alone.

60 pages and 254 illustrations on **Adjustments, Tests**, etc., of leading **Electric Systems**.

154 pages and 1189 illustrations on **Repairing**.

Oxy-Acetylene welding. **Axle, differential** and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.

27 pages and 180 illustrations on **Tires** and **Tire Repairing**.

44 pages and 119 illustrations on **Carburetion**.

89 pages and 291 illustrations on **Engines** and **Parts**.

16 pages on **Digest of Troubles**.

6000 lines to the **Index**. This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. **Index** begins on **colored** paper, easy to refer to.

Dictionary is also included, which gives the meaning of motoring terms.

Inserts: There are five—printed in colors. New features you never before saw or heard of in one of the inserts.

You must see this SIXTH Edition in order to appreciate just how complete a book it really is—Order NOW.

HOW TO BECOME AN EXPERT AUTOMOBILE MECHANICIAN

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion subject so thoroughly, you can adjust any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

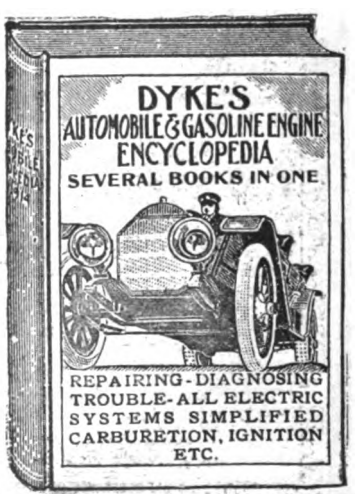
You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical Automobile Book in America. Price $3.32 Prepaid.

Address all orders to

THE BLACKSMITH & WHEELWRIGHT
73 MURRAY STREET NEW YORK



It's worth ten times its cost if only placed on the shelf and used as a reference.

Digitized by Google

"Buffalo"

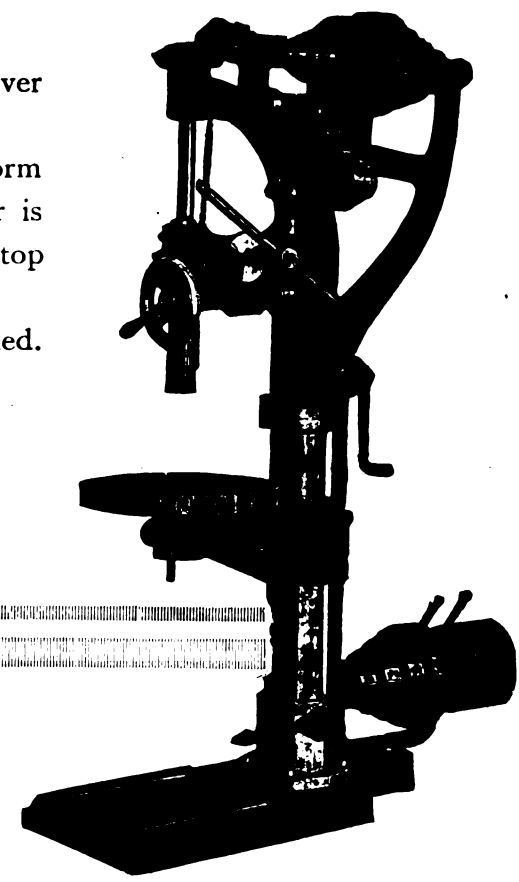
For the Auto Repair Shop

The repairing of automobiles calls for accurate workmanship and this means good tools

The Buffalo No. 5, 20-inch Back-Geared Drill is a machine tool designed for the very highest class of work that may be demanded in the repairing of automobiles. It can be changed instantly from plain to back-geared drive. Has eight speeds, three power feeds, together with hand and lever feed.

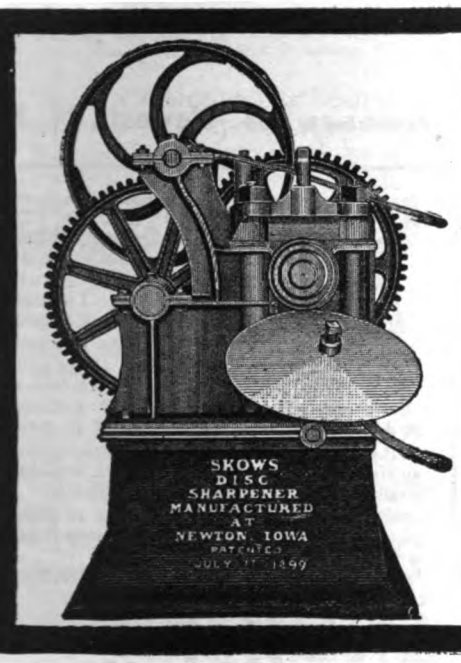
All gears are machine-cut; worm feed wheel runs in oil; crown gear is bronze brushed. Automatic feed stop insures accuracy.

All parts carefully made and fitted.



May we send you detailed information and prices?

Buffalo Forge Company, Buffalo, N. Y.



SKOW'S ROTARY DISC SHARPENER
IS A BIG MONEY MAKER IN ANY SHOP

MADE $229.50 IN A LITTLE OVER 2 MONTHS

We Shipped This Machine from Factory on January 10th, 1914

SKOW MFG. CO., Newton, Iowa. Nora Springs, Iowa, March 18, 1914.

Dear Sirs:—We have sharpened 78 discs on our "Skow Roller" to date, which brings us $229.50 and the end is not yet. Now can you make us a casting like No. 15 with the shank straight up for rolling coulters. We have tried them on the roller and it is O. K., but should have the casting No. 15 as above mentioned. Let us hear from you if you can make us one. Send us your bill and we will remit for same.

VOLKMAN & SEAMAN.

700 of These Machines in Use **Sharpens Cultivator and Plow Discs of All Sizes by Cold Rolling**

Gives a Better and More Permanent Sharp Edge Than is Possible by Any Other Method

Ask Your Jobber for Skow's Disc Sharpener. Write Us for Descriptive Circulars.

SKOW MANUFACTURING CO., NEWTON, IOWA, U. S. A.

PARKS' SINGLE and COMBINATION WOOD WORKING OUTFITS

We were the originators of the Circular Saw, Band Saw, Jointer combination; our latest improvement is the 6-inch jointer with under-cut attachment for sizing material—joints by passing material over the cutter and sizes it to thickness by passing it back under the cutter head. All parts of the machine ready for instant use.

Machines are made in large quantities which enables us to sell at the lowest prices and to make very prompt shipment.

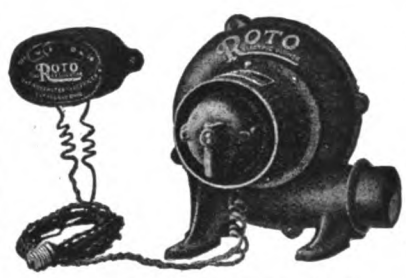
This combination in your shop will make your woodwork a pleasure and at the same time reduce the cost of this work so that machine will soon pay for itself.

Write for Catalog.



PARKS BALL BEARING MACHINE CO.
North Side Station, Cincinnati, Ohio

The ROTO ELECTRIC BLOWER $27.50 COMPLETE



N. B.—The above price is subject to change without notice.

THE U. S. GOVERNMENT

Wants everybody to avoid waste. Why should the middleman come between you and the maker? Our direct plan of selling

ELIMINATES THE MIDDLEMAN.

The latest model AIR COOLED ROTO BLOWER is better than any $35 or $40 Blower on the market. It will weld the largest size axles or the lightest calks. No forge is too large for this Roto. It will make your work easier—Save 50% of your time—Let you do twice the work in less time—Costs only 2 cents per day to run and is fully guaranteed.

The Navy Department Uses The Roto

It surely ought to be good enough for you if it can pass government inspection. You can't go wrong by sending us the coupon for a free trial. If it doesn't satisfy you in every respect send it back at our expense. That's fair isn't it?

CUT OUT THE COUPON
SEND IT TODAY DO IT NOW!

THE ROSEWATER ELECTRIC CO.
5516 KINSMAN ROAD CLEVELAND, OHIO

Send me by.....An AIR COOLED ROTO BLOWER with one year's guarantee, complete with cord, plug and Speed Regulator. I will return it to you at the end of 30 days, if it does not give me entire satisfaction, and if I keep it, I will pay you $27.50 at the end of 30 days.

Name.....Address.....

Current.....Voltage.....Cycles.....

Your Electric Light or Power Company Will Give You This Information

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

LINDE OXYGEN SERVICE

Asks Fifty-Fifty Cooperation from Its Thousands of Patrons

WE believe we have the service capacity to supply the requirements of every user of Oxygen. We have sixty-four big factories and distributing stations, located in the heart of Oxygen consuming districts—each of these factories and stations are backed by huge stocks maintained at our other stations located on Continental Trunk Lines.

And we are adding thousands of new cylinders monthly to the hundreds of thousands we have in commission—a grand total more than sufficient to meet even war-time requirements.

But We Must Have the Cooperation of Patrons to Keep the Cylinders Rolling

Empties must be returned to us promptly.

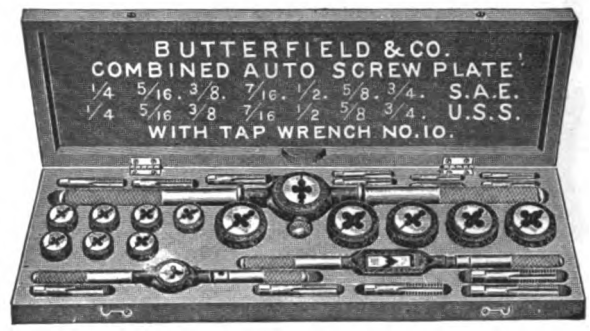
This vital factor in the maintenance of the standard of service in which all our interests are mutual must be apparent to every Oxygen user. To this end we ask you to do your bit—**see that the empties are gathered promptly and shipped with equal promptness to us via the quickest route.**

THE LINDE AIR PRODUCTS CO.

"Largest Producers of Oxygen in the World"

42nd Street Building **New York City, N. Y.**

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.

New York Store: 126 Chambers Street

The Horse Rasp of Quality



Ask your Dealer for the

IMPROVED HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, **"Slim," "Light," "Slim Light"** and **"Fine Cut."** Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial. New catalogue mailed free on application.

HELLER BROTHERS CO. *Established in 1836* **Newark, N. J.**

Extract from page 324 of the June, 1917, issue of The Horseshoers' Journal.

Horseshoeing business in Albany opened very quietly this spring. In fact, we still feel the harmful effect that the drive calks has done the business, but strikes in the building line has also effected trade, a large number of horses owned by contractors are remaining unshod, and are still carrying (to May 10th) their winter shoes of drive calk variety.

CHAR[illegible] W. KIRK.

ARE YOU *in this boat?*



John Wiseman Says to Bill from Missouri:

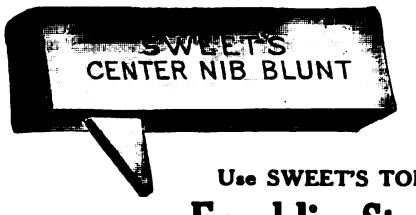
"It's time for a lot of you fellows to wake up. Ram your hand down into your pocket and see if the cash jingles with the merry sound as of yore.

"If not, why not?

"There's a Reason, of course. And that reason is that you've been using calks that the owner can replace himself. Naturally his horses come less frequently to your shop. You have less business—less cash to jingle in your jeans.

"Do you get the idea?"





Every set of welded calks you put on helps to keep your shop full because the horses must be brought to you to have the worn calks replaced. And the users are satisfied users, too.

Use SWEET'S TOE CALKS—"The Cold Cut Dreadnaught."

Franklin Steel Works, JOLIET, ILL. CAMBRIDGE, MASS. HAMILTON, ONTARIO.

No. 2.

Mend Broken Castings

Braze in your own forge with Braziron.

BEST COMPOUND FOR BRAZING CAST IRON.

If your jobber does not handle it, write us.

THE A. & J. MANUFACTURING CO.,
559 West Lake Street
Chicago, Ill.



ABSORBINE
TRADE MARK REG. U.S. PAT. OFF.

Reduces Bursal Enlargements, Thickened, Swollen Tissues, Curbs, Filled Tendons, Soreness from Bruises or Strains; stops Spavin Lameness, allays pain. Does not blister, remove the hair or lay up the horse. $2.50 a bottle at druggists or delivered. **Book 1 R free.**

ABSORBINE, JR., for mankind—an antiseptic liniment for bruises, cuts, wounds, strains, painful, swollen veins or glands. It heals and soothes. $1.25 a bottle at druggists or postpaid. Will tell you more if you write. Made in the U. S. A. by

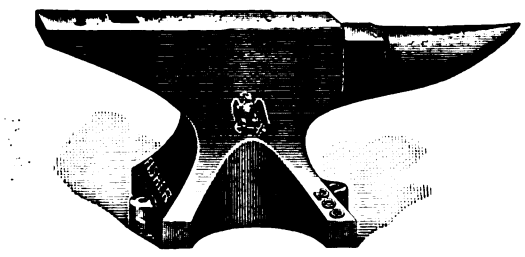
W. F. YOUNG, P. D. F., 55 Temple St., Springfield, Mass.

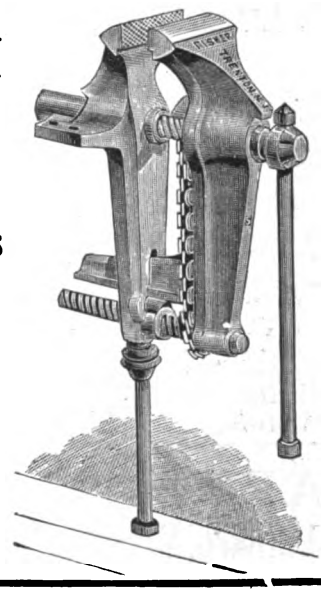
1843 EAGLE ANVILS 1918
AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE
BLACKSMITH AND WHEELWRIGHT

Vol. LXXVII. No. 3. NEW YORK, MARCH, 1918. TERMS ONE DOLLAR A YE

Design, Construction, Operation and Repair of Motor Vehicles

Part II—Explaining the Strokes of the Four-cycle Engine and Firing Orders of Engines With More than One Cylinder

BY CLIFTON EGERT, M. E.

The internal combustion engine may be divided into two classes, those operating on the four-stroke or four-cycle principle and on the two-stroke or two-cycle principle. The two-cycle engine has been discarded by manufacturers of motor vehicles; that is, of automobiles; and inasmuch as a car with a two-cycle engine may be considered a rarity and not likely to come to the blacksmith for repairs, it will be dismissed from these discussions.

The Four-Cycle Engine.

The operation of the four-cycle engine is not complicated; that is, the strokes are very easily learned, and it is very important that the blacksmith desiring to master the motor vehicle should learn the strokes because they play an important part in the repair of the automobile engine. If one does not understand the strokes he will find it difficult to retime the valves, to replace and retime the ignition apparatus, and similarly it will be found that a knowledge of the action of an engine is almost indispensable.

The best way for the novice to master the strokes of the four-cycle engine is to disregard the valves, the valve mechanism, etc., for the time being, and study the strokes or cycle of operations. Referring to Fig. 4 it will be seen that the strokes, which are intake or suction, compression, firing and exhaust, are shown by sketches.

It is well to explain, however, that the action of a single-cylinder engine or a 12-cylinder is the same insofar as the strokes are concerned. Each cylinder has a piston which moves up and down in the cylinder, a movement termed the stroke of an engine. This stroke is defined in inches, and when you hear someone say an engine has a five-inch stroke it means that the piston moves five inches, that the distance it travels from the bottom to the top of the cylinder is five inches. The bore is the diameter of the cylinder.

How Piston Works.

The piston of a cylinder is a cylinder or shell having an open end. At the upper part of the piston is a pin or rod termed the piston pin or wristpin. This is mounted in the piston and in such manner that a bearing is provided for the upper end of the connecting rod. The connecting rod, so named because it forms a connecting link between the piston and the crankpin of the crankshaft, is shown

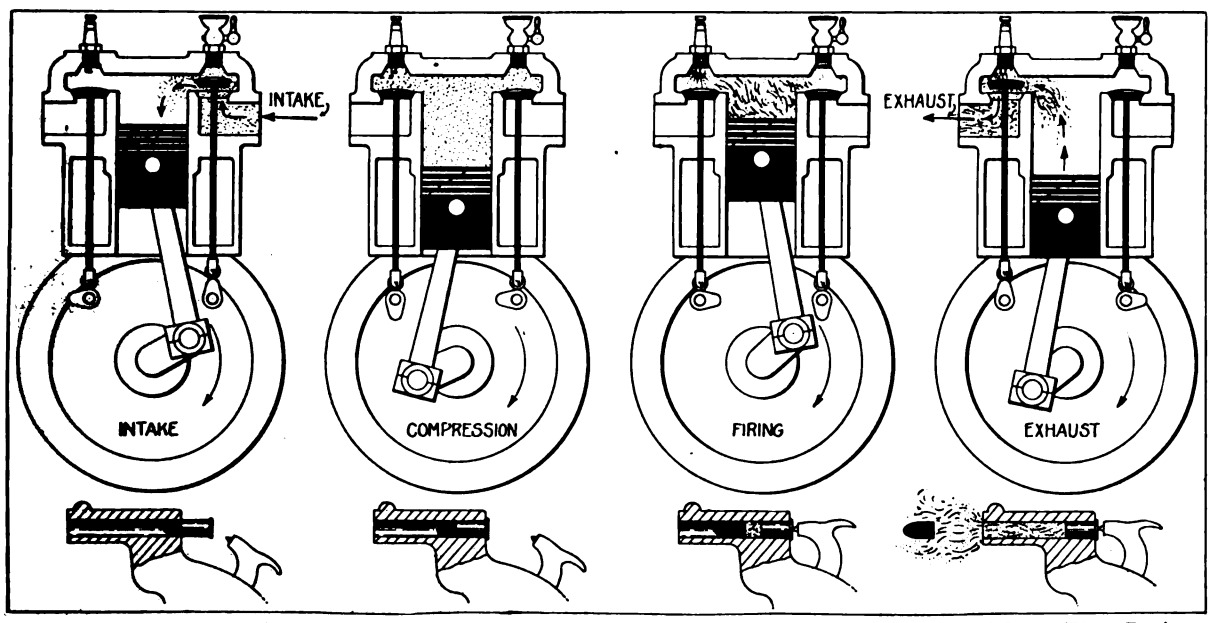


Fig. 4—Illustrating the Four Strokes of the Four-Cycle Engine, the Position of the Piston, Valves, Etc., During Each Stroke and Showing How the Strokes May Be Compared to the Loading, Firing, Etc., of a Pistol.

with the piston, crankshaft and flywheel at Fig. 6.

The upper end of the connecting rod grasps the wristpin in such manner that when the piston moves up and down and the crankshaft end (connecting rod end) of the rod describes a circle, the wristpin or the bearing end of the connecting rod will oscillate. The movement is very limited and it may interest the reader to learn that with the Ford engine the wristpin moves but .21-inch during one complete revolution of the crankshaft. If one will examine the illustration at Fig. 6 he will see that the lower end of the connecting rod, sometimes referred to by the repairman as the big end of the connecting rod, has a split bearing; that is, it is made in two sections and that these sections are held together on the crankshaft bearing by bolts locked with nuts. The bolts are termed connecting rod bolts.

With the arrangement described the piston moves up when the crankpin, or that part of the crankshaft to which the big end of the connecting rod is attached, completes half a circle or moves from its bottom position to a top position. By studying the sketch at Fig. 6 it will be seen that the pistons are numbered 1, 2, 3 and 4. The No. 1 piston at the bottom of the stroke and the big end the connecting rod is at the bottom. If crankshaft be turned half a revolution No. 1 piston would occupy a position simi to that shown by the No. 2 piston. To m from the position shown by the No. 1 pis to that held by the No. 2 piston requi half a revolution, or 180 degrees. This a stroke or one movement of the piston. Th far we have seen that it requires one mo ment (stroke) up and one down to compl one revolution of the crankshaft.

Single-Cylinder Engine.

To simplify matters we will assume th we have a single-cylinder engine, one hav but the single piston, etc., and that the eng is of the four-stroke or four-cycle type. ferring once more to Fig. 4, which shows strokes of this single-cylinder engine, it v be seen that the piston has been at the of its stroke and is starting downward or the suction or intake stroke. It is termed suction stroke because the piston fits snu in the cylinder and when the piston mo down it creates a suction. With the inta valve open the air laden with gasoline (m ture) is drawn into the cylinder.

The intake or suction stroke is not exac the up and down movement as generally valve remains open longer; that is, the inta stroke is not confined to half a revolution 180 degrees movement of the crankshaft, is longer. However, this will be explai under the head of valve timing, etc.

Compression Stroke.

When the piston completes the down str it is in the position shown by the No. 1 pis at Fig. 6. The crankshaft has made hal revolution. The next stroke is the compr sion stroke, so termed because the inta and exhaust valves are closed and beca the mixture in the cylinder is compressed squeezed into a small space when the pis comes up and completes its upstroke or co pression stroke. This takes another h revolution of the crankshaft. The piston v now be as shown by piston No. 2.

From this it will be seen that one revo tion of the crankshaft is required to obt the intake and compression stroke, or t strokes. The third stroke is the firing stro We have the piston at the top of the cylin as shown by piston No. 2 and with the m ture compressed. The conditions obtaini may be compared to an old-fashioned muzz loading gun. We have poured in the pow and rammed home the wadding. We a now ready to fire the gun.

Firing Stroke.

A spark is utilized to fire the powder the gun and a spark is employed to ignite

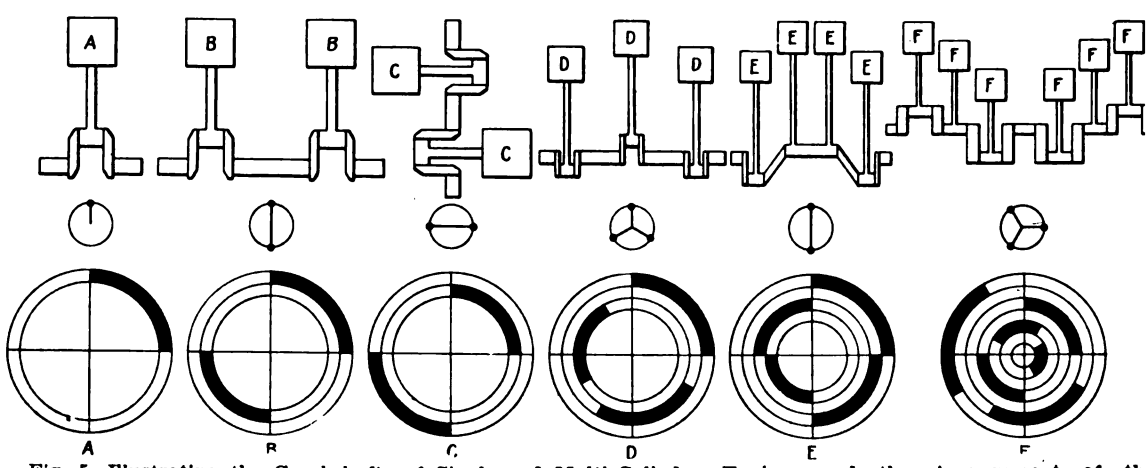


Fig. 5—Illustrating the Crankshafts of Single and Multi-Cylinder Engines and the Arrangement of th Crankpins—The Black Sections of Circles Show the Power Strokes.

fire the compressed mixture in the cylin of the gasoline engine. An electric spar used for the work, and how it is obtained used will be explained under the head of ig tion.

Digitized by Google

When the spark ignites the compressed and inflammable mixture in the cylinder the gases formed expand, or, in other words, an explosion takes place. The gases, being confined, seek an opening, and being more powerful than the resistance of the piston, etc., force the piston downward. The result is that the piston is driven downward with considerable force. This is the third or power stroke, and with the completion of the stroke the crankshaft has made 1½ revolutions. And during

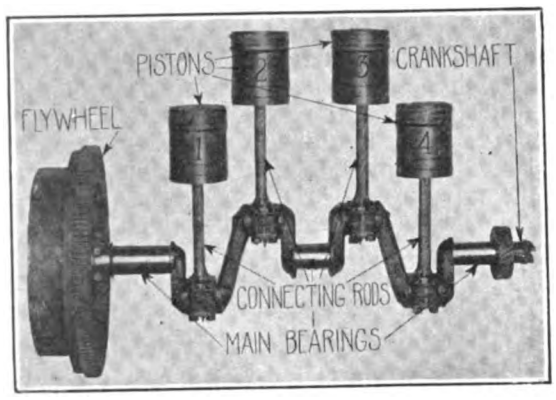


Fig. 6—Flywheel, Crankshaft, Connecting Rods and Pistons Assembled to Show How Pistons 1 and 4 and 2 and 3 Are in the Same Plane.

these three strokes the piston has made two down and one up stroke, the intake, compression and firing strokes.

Exhaust Stroke.

We have now shown three of the four strokes. When the piston is driven downward on the firing stroke the burned products of combustion seek an outlet and must be removed from the cylinder before a new charge of mixture is introduced. The stroke used for clearing the cylinder of the burned gases is termed the exhaust stroke. This exhaust stroke requires half a revolution of the crankshaft, and with it completed the crankshaft has made two complete revolutions to obtain one useful power or firing stroke.

The strokes are shown at Fig. 4 and the valves and their positions during the strokes are also shown. As may be noted the intake valve is open and exhaust closed when the charge (suction stroke) is being drawn in. The intake and the exhaust valves are closed during the compression stroke, also during the firing stroke. If they were not it would not be possible to compress the mixture into a small space and during the firing stroke there would be no energy if the gases escaped during their expansion. During the exhaust stroke the exhaust valve remains open, while the intake remains closed. A little study of the diagram of strokes will enable the reader to master the strokes of the four-cycle engine.

Multi-Cylinder Engines.

From the above description it will be seen that with the four-cycle engine we obtain but one useful stroke (power) and that three strokes are used or wasted to obtain the working stroke. These useful strokes and the principle of multi-cylinder engines are shown by the diagrams at Fig. 5, these illustrating one, two, three, four and six-cylinder engines. A multi-cylinder engine is one having more than one cylinder.

The construction of a crankshaft; that is, the arrangement of the throws is of interest and of value. The crankthrows are arranged much in the same manner as the crank of a grindstone, and we may carry the comparison farther by calling the connection at the crank the big end of the connecting rod.

A single-cylinder engine has but one crankpin, such as shown at Fig. 5. With this type of engine there would be but one power stroke or impulse during two complete revolutions of the crankshaft, as previously explained. This type of engine requires a heavy flywheel to overcome the resistance to the piston when the compression and other strokes are taking place.

The sketch at B shows a two-cylinder vertical engine having a crankshaft in which the crankpins are on the same plane. The two pistons move up and down simultaneously. Referring to the circles or diagrams showing the strokes, and assuming that the outer represents the strokes (four) in one cylinder while the inner that of the other cylinder, it will be seen that the power strokes occur at 180 degrees, or, in other words, an impulse is obtained during each revolution of the crankshaft, or two during two complete revolutions. The sketch at C shows a two-cylinder engine crankshaft of the horizontal or double opposed type. Here it will be seen that the crankpins are set at 180 degrees, and the power strokes occur as with the other engine.

Three-Cylinder Engine.

With the three-cylinder engine, vertical, the crankshaft of which is shown at D, the crankpins are set at 120 degrees apart. This means that they are set at thirds of a circle. Instead of one explosion we will obtain three with two complete revolutions of the crankshaft. This makes for a more even turning movement of the crankshaft.

The sketch at E, Fig. 5, shows the arrangement of the crankpins of the four-cylinder engine, and another view is shown at Fig. 6. With this arrangement there occurs four power strokes during two complete revolutions of the crankshaft, and these strokes follow one another.

With the four-cylinder engine the crankpins are placed at 180 degrees, or on the halves of the crank circle. The crankpins of the No. 1 and No. 4 pistons are in the same plane as are the pins of the No. 2 and No. 3. This is made clear by the illustration at Fig. 6, which shows the No. 1 and No. 4 pins down. The turning movement or power impulses are more even than with the three-cylinder, one stroke following another, but they do not overlap as they do with the six-cylinder engine, the crankshaft of which is shown at F.

Six-Cylinder Engine.

With the six-cylinder engine instead of having two explosions each revolution, we have three or six for two complete revolutions of the crankshaft. The crankshaft of the six-cylinder engine is practically the same as two three-cylinder engines secured together and so that pistons No. 1 and No. 6 are in the same plane. Pistons No. 2 and No. 5 travel together as do pistons 3 and 4.

The circles A to F inclusive, Fig. 5, illustrate by means of the black portions the power strokes of engines from one to six cylinders. From this it will be seen that the more cylinders the more even the turning movement. Relative to the eight and 12-cylinder engines they are merely two four and two six-cylinder engines doubled up. Instead of eight cylinders in a row and vertical, two sets of fours are set at an angle of 45 degrees apart or in a V form. The 12-cylinder consists of a similar arrangement of two six-cylinder engines. These eights and twelves are not so complicated as one would think. If one masters the four and the six-cylinder engine and applies the principles to the eight and twelve, the rest will be

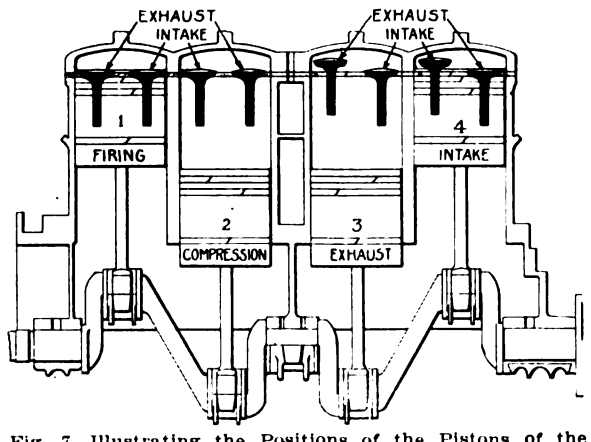


Fig. 7—Illustrating the Positions of the Pistons of the Ford Engine With Firing Order 1-2-4-3 and Showing Position of Valves with the No. 1 Cylinder Ready to Start Firing.

easy. The firing orders of the last named engines are practically the same as a four or six, except a cylinder fires in the right bank, then in the left bank, and so on.

Firing Orders.

Inasmuch as we are mostly concerned with four and six-cylinder engines, the firing orders of these will be explained and discussed. Taking up that of the four-cylinder, four-cycle engine we find that there are but two firing orders, and these are 1-2-4-3 and 1-3-4-2. This means that with the 1-2-4-3 firing order the No. 1 cylinder fires first, the No. 2 second, the No. 4 third and the No. 4 last. With the other firing order, 1-3-4-2, which is commonly used, the cylinders fire as follows: No, 1, No. 3, No. 4, No. 2. The following tables are of value and should be studied, for they show the firing orders of the two methods named, as well as show what is taking place in each cylinder during each stroke or half revolution of the crankshaft:

FIRING ORDER 1-2-4-3.

Cylinder 1	Cylinder 2	Cylinder 3	Cylinder 4
1—Firing	Compression	Exhaust	Intake
2—Exhaust	Firing	Intake	Compression
3—Suction	Exhaust	Compression	Firing
4—Compression	Intake	Firing	Exhaust

FIRING ORDER 1-3-4-2.

Cylinder 1	Cylinder 2	Cylinder 3	Cylinder 4
1—Firing	Exhaust	Compression	Intake
2—Exhaust	Intake	Firing	Compression
3—Intake	Compression	Exhaust	Firing
4—Compression	Firing	Intake	Exhaust

These firing orders and what each piston is doing during the firing, exhaust, intake or compression stroke of say the No. 1 cylinder, is easily understood if in studying the tables one will remember that if the No. 1 cylinder is about to fire that it will move downward when the firing stroke takes place. The No. 2 piston must come up (see Fig. 6) and if the firing order of the engine be 1-2-4-3, as is the case with the Ford engine, then the No. 2 cylinder will be compressing when the No. 1 fires (see table). If the reader will remember that each cylinder is one stroke behind the other and that the order of strokes must conform to the firing order, he should not experience trouble in mastering the principles.

The reason why a four-cylinder engine must fire as stated and a further explanation of the strokes of this and the six, eight and 12-cylinder engine will be given in the next installment.

(To Be Continued.)

Allowance for Fitting Tires.

No hard and fast rule can be laid down for this work, says a writer in an exchange, as much depends on what type of wheel is to be tired. Also it will depend on what facilities one has for cooling out the tires when shoeing. Tires that are shrunk on with a sinking platform, with a body of water sufficient to cool the tire out before it has a chance to burn or char the felloes, will not require so much nip or allowance as would a tire that was being cooled out by going round it with buckets or cans of water. This applies more so to the heavy class of wheels, as, the tires being more heavy, it takes longer before the water being poured on takes any effect. Assuming it is all new work that the particulars are asked for, the following particulars will meet the requirements: For the lighter class of vehicles, for wheels from 2 feet 6 inches up to 3 feet 6 inches in diameter, allow from ¼ inch to ⅜ inch, plus the spaces between felloe joints; and for wheels from 3 feet 8 inches up to 4 feet 10 inches allow from full ⅜ inch to ⅝ inch, plus the felloe joints. For the heavier class of wheels, from 3 feet to 4 feet in diameter, allow from ⅝ inch to ⅞ inch; from 4 feet 2 inches to 5 feet in diameter allow from 1 inch to 1⅜ inches. It is pointed out that these rules are given on the assumption that all the joints in the wheel are well home, that is, the spokes are well down in the hub, the felloes well down on the spoke tangs, and the joints of the felloes well up. Should the wheels not answer these conditions, allowance must be made for same.

Livestock Increases.

Livestock in the United States on Jan. 1 was valued at $8,263,524,000, the Department of Agriculture announced recently. That was an increase of $1,527,912,000 over a year ago.

In numbers horses have increased 353,000; mules, 101,000; milch cows, 390,000; other cattle, 1,857,000; sheep, 1,284,000, and swine, 3,871,000.

Horses numbered 21,653,000 and were valued at $2,248,626,000; mules, 4,824,000 (value, $621,064,000); milch cows, 23,284,000 (value, $1,643,639,000); other cattle, 43,546,000 (value, $1,780,052,000); sheep, 48,900,000 (value, $577,867,000); swine, 71,374,000 (value, $1,392,276,000).

Digitized by Google

ANCIENT BLACKSMITHING.

Hindoos Among the Early Workers of Iron Who Forged a Form of Steel.

While the earliest records of smiths are to be found among the Egyptians, as noted in a previous issue, there are a number of interesting references to the blacksmith among other ancient peoples.



Fig. 1.—A Hindoo Blacksmith of the Period of Alexander the Great Blowing a Charcoal Fire with His Mouth.

In Western Asia.

Iron must have been worked among the Hindoos very early, as there are several passages mentioning it in the Rig Vedas, some of which were composed about 2000 B. C. In

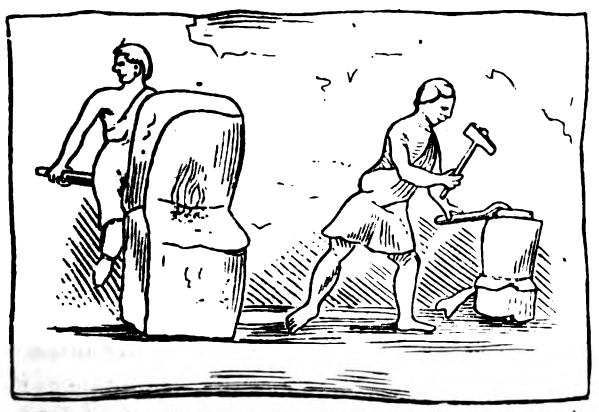


Fig. 2.—An Ancient Greek Forge and Crude Anvil.

one hymn the fire-god is described as "burning the woods like a smelter", and "whetting his splendor like an edge of iron."

Even in legendary times the Hindoos were famous for their wootz iron, which was essentially a form of forged steel. There is at Delhi a famous wrought iron pillar perhaps 2800 years old which is about 60 feet high, and 16 inches in diameter at its base.

A present of thirty pounds of wootz iron was given by a Hindoo prince to Alexander the Great. At that time the Hindoo smith employed a little jar of charcoal and blowpipes which he worked with his mouth. This is illustrated at Fig. 1, a Hindoo picture of a little later period, which we are enabled to reproduce. Later were invented the goat skin bellows which were constructed out of the entire skin.

Early Workers in Iron.

The Babylonians did not work in iron as early as the Egyptians or Hindoos, nor were the Jews familiar with it before their settlement in Egypt.

Even after the Exodus the smiths of Canaan were admittedly far superior to the Jewish, for we read in I Samuel XIII, "there was no smith found throughout all the land of Israel, for the Philistines said, Lest the Hebrews make them swords or spears: but all the Israelites went down to the Philistines, to sharpen every man his share and his coulter, and his axe, and his mattock."

We read also that Jabin, the King of Canaan, was enabled to oppress the Israelites because he had 900 chariots of iron, which is suggestive of the importance in war of the smith in those days.

Among the Greeks.

The smith was well known to the Greeks at the time of Homer, who describes Vulcan's fabrication of the shield of Achilles, and mentions that his furnace was blown by twenty bellows. The method of making steel must also have been known, for it is described how the hot stake which Ulysses drove in the only eye of the Cyclops hissed "as t axe hisses loudly when some smith plung it into the cold water to temper it."

The Greeks, not only of Homer's day b all through their history, lived chiefly in t Age of Bronze. Much of their furniture w of bronze, as well as the handles of the swords and knives, their shields, and the armor.

Iron, however, was often used for the bla

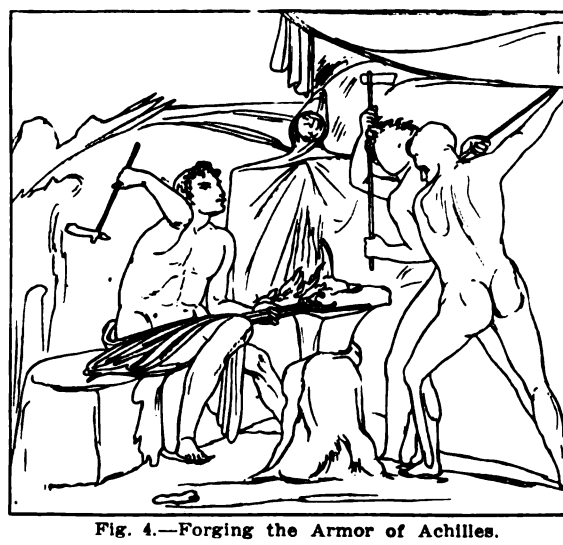


Fig. 4.—Forging the Armor of Achilles.

of the knives, the point of the plowshare and the tires of their chariots.

Greeks Early Smelters.

There are several ancient Greek picture of smiths at work. Some of them illustrat a furnace which seems to have been first d veloped in smelting. In fact, we must r member that at that period the Greek smit often smelted his own ore as well as forge the metal. The furnace as shown in th picture, and illustrated at Fig. 2, was a roun stack not much higher than a man. Th form, however, was suited to give a stron draft. One picture shows a workman ha concealed by the stack, who is undoubted blowing the fire with the bellows. Sever pictures reveal on top of the stack a kett that was probably used to melt such meta as copper and tin, which, it will be remem bered, were mixed to form bronze.

An archaic and rather striking Greek pi ture of a blacksmith at his anvil is shown Fig. 3. His helper is holding a bar of h metal on the anvil by means of a pair pincers, while the smith is beating the b with a hammer. Both the long handled ham mer and pincers made with cross piec

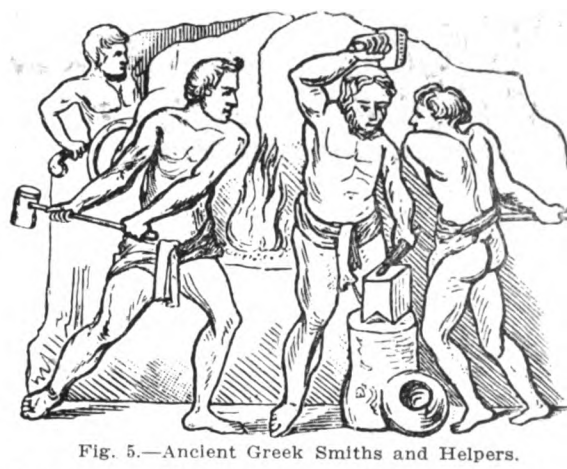


Fig. 5.—Ancient Greek Smiths and Helpers.

appear for the first time in the Greek perio

Another scene representing the forgin of the armor of Achilles is shown at Fig. while in still another is depicted three smith at work at an anvil, which is much the sam shape as at present, is depicted by Fig. 5.

(To be Continued.)

Poor business, poor pay—scant grass an thin milk are closer related than some peop suppose. Wage-earners should remembe this.

If any man thinks there is any time save in rushing things, let him run his team the plow and see how a blown horse ac when he gets down to pulling.

It is better to have good intentions tha none at all, but it's the fruit and not th blossom that makes a pie.

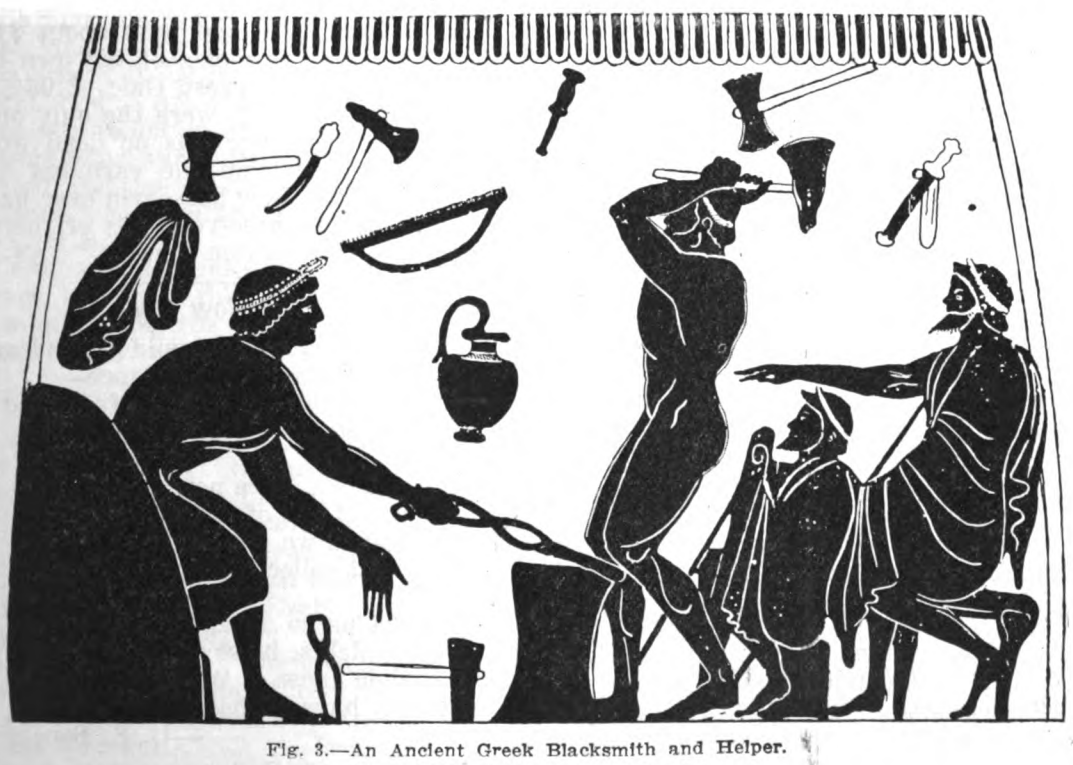


Fig. 3.—An Ancient Greek Blacksmith and Helper.

Digitized by Google

Entries and Interest Increasing in Prize Photo Contest

Despite the fact that only a short time has elapsed since the prize photo contest was inaugurated, we are receiving a large number of photographs from smiths all over the country. It is impossible to use all of the pictures in the one issue, so we trust those who do not see their shop reproduced will not be disappointed. Photos are used in turn. Perhaps yours will be the next one to be published.

The condition of the photograph, its size or quality, is not the deciding factor in the contest. A contestant sending in a photo taken with a small camera, or a snap shot, is just as likely to win as not. Prizes are not to be awarded on the quality of the picture, but what the picture reveals. So if you have not sent us a photo, do so at once. The picture will be returned to you and a present made of the cut if you desire it. When sending photo please state if you wish the cut.

Prize Photo No. 15.

From L. Heidenrich, Oregon.—I am sending you for entry in the prize photo contest a photograph of myself and a pile of horseshoes. The pile is about 14 feet high and



A Unique Photograph, a Monument of Horse Shoes 14 Feet High and Four Feet Wide.—It Shows that L. Heidenrich Has Been Very Industrious.

four wide. This represents some of my work, and while I was building the pile I used over 3,000 pounds of Capewell horseshoe nails. When this pile was sold it brought $100 cash.

Prize Photo No. 16.

From A. E. Roe, Michigan.—I am sending you a photograph of my blacksmith shop. I built this shop 12 years ago, and have occupied it ever since. It is 24 feet wide and 68 feet long, painted drab and is a two-story building.

It is well equipped with machinery, having one electric blower, one hand-blower, Royal H., electric lights, eight horsepower I. H. C. gasoline engine, one drill press, rip saw, cut-off saw, jointer, emery wheel, force-water pump with hose attached, a large punch and shear.

The front end of shop is for horseshoeing and the center is for doing repair work. The machinery is in the rear end of shop.

The adjoining building is my garage, in which I store and repair cars. I sell gasoline, have an up-to-date Bowser pump, 550 gallon underground tank; also sell motor oil, cup and transmission grease. I keep Ford repair parts, also tubes, patches and casings.

The auto in front of the shop is owned by me. I am at the wheel. In the rear seat is Lawrence Wise, blacksmith. Mike Clarey is standing on the ground. holding a wagon wheel.

I enjoy reading The Blacksmith and



Another Case of a Successful Smith Operating a Garage. —A. P. Roe, Owner, Is Shown at the Wheel of the Car. The Garage Joins the Blacksmith Shop.

Wheelwright, as there is a great deal of very helpful news in it.

Prize Photo No. 17.

From B. A. Steinke, Ohio.—The accompanying illustration shows the shop of B. A. Steinke, "somewhere in Ohio." He makes a specialty of fine horseshoeing and does a general blacksmithing business as well as woodworking. He tells his story in an interesting way and as follows:

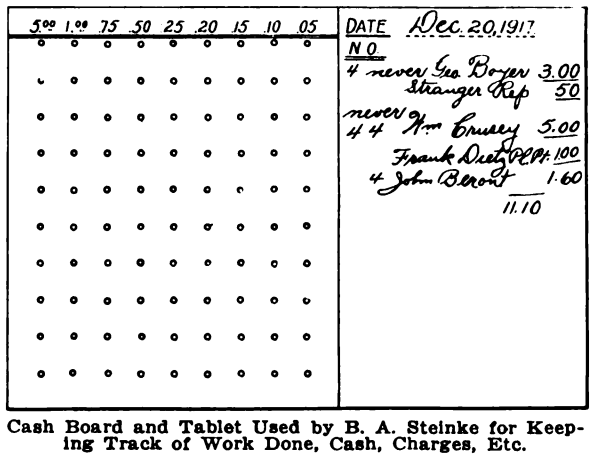
I am sending you a postal photo of my shop that we bought last March. The sign shows up well, but it does not show any of us, nor the shopful of horses, as was the case when the picture was taken. We made a good purchase when we bought the place. It is located in the center of the town and was owned by a man who grew up with the shop. There were three shops in the town and none made over a bare living.

Is Making Money.

During the ten months I have had the shop I have paid for one-half of it and provided the necessaries of life for 14, which means something in these days, as everyone knows. But I don't spend any of my money for whiskey, as many craftsmen do. That was the trouble with the man I bought out. I positively will not leave the shop during working hours to get a drink nor is there any can "rushed," for business and whiskey won't mix any better than whiskey and gasoline. I honestly believe if a man takes care of business, business will take care of him.

Now I always have had the name all around here of being a high-priced man, but I always receive as much or more for my work than any around here, but I, too, have the name of being a good mechanic and workman, which sounds better to me than being a "cheap skate" and a poor workman.

Our prices are fairly good here; we get $2.00 and $2.50 for four new common shoes and $1.20 and $1.40 for resetting and 5 cents



Cash Board and Tablet Used by B. A. Steinke for Keeping Track of Work Done, Cash, Charges, Etc.

extra each for new toes. Neverslips are $3.00 and $3.50. Setting same as old shoes and 10 cents per calk extra. Sharpening plow shares 25 to 40 cents, according to size, and cutters 10 cents. Plow points $1.00 to $1.50, heels 50 cents, and all other work accordingly.

Now here is a pointer I can give to other men where collections are not of the best. About six years ago I adopted the plan, and it works like a charm. Of course 30 days is considered cash, but after 30 days we add 5 cents on each charge, or 10 cents on each dollar. I now receive $75.00 to $90.00 out of every $100.00 cash as soon as the work is taken out of the shop, and I pay cash for everything I buy and discount all my bills. This amounts to quite an item during the year and makes a man's credit much better.

We have a system of our own for keeping a record of everything we do, the cash, the credit, the amount of shoes put on, and the customer's name we put on a tablet. We have a cash board and a cash drawer under the electric blower, where everything is handy.

How Records Are Made.

The cash board and tablet are shown in an accompanying drawing, with the cash board at the left. This board has holes, and rivets are placed in these and according to the amounts represented. On the tablet the N O stands for old shoes, and under the price with a mark run through means cash, and that is indicated on the cash board. The prices left open are charged on the day book and after 30 days put in the ledger. After 30 days the 5 or 10 cents extra charges, as previously explained, are charged.

The cash board has figures running from 5 cents to $5.00, and many figures can be easily counted or reckoned together. Every week the amount of cash, daily amount and



Shop of B. A. Steinke, Who Is Making a Success by Systematic Methods and Strict Attention to Business.

expenses are all put down in a book, also the amount of shoes, new and old, common and Neverslips, and at the end of the year we can see how we stand.

Successful Three-Year-Olds.

David M. Look, who purchased William Bradley's select stud of trotting horses, headed by Bingen, 2:06¼, and transferred them to the famous Castleton Stud, in Kentucky, a few years ago, won about $15,000 with two three-year-olds of his own breeding this year. Harvest Gale, 2:05¼, and Harvest Tide, 2:08½, were the only ones he campaigned, so there was no dead wood in the stable to eat up the earnings of the bread winners. Few horsemen ever had two such successful three-year-olds of their own rearing to race in one season.

The Slow Pay.

Lives of great men should remind us,
Lazy men stand little chance—
The less we work there grows behind us,
Bigger patches on our pants.

On our pants, once new and nobby,
Now are strips of different hue;
All because we sit and linger,
And don't collect what is due.

Then let us be up and doing,
Get our debts, however small;
For when snow of Winter strikes us,
We may have no pants at all.

—U. S. Booster.

Digitized by Google

When the Insurance Policy Does Not Protect the Insured

Describing the Various Clauses of Different Policies and When and Why One Should Read Every Word in Policy

BY FRANK A. FARRINGTON

You know as much as I do about the advisability of carrying fire insurance. You appreciate the importance of having enough fire insurance to protect you and your family against bankruptcy in case of a disastrous conflagration, but do you know all about your insurance? Do you know to a certainty that you will receive from the insurance companies, when your fire comes, the insurance money you are expecting you will get at such a time?

When to Read the Policy.

You can tell off-hand the amount of insurance you are carrying on your buildings and on your stock, but can you tell whether you will get the face value of your policies? In the cold, gray dawn of the morning after, will you be able to look over the premises where you were doing business the day before and say to yourself, "Well, it might have been a good deal worse. I've got enough insurance coming to rebuild?" Or will you then be worrying about certain clauses in your policies that you never noticed until you sat down after the fire to read those very important documents?

It is not that you have reason to doubt the soundness or the ability of your insurance companies to pay their losses, or their honesty and fairness as compared with other companies. Most companies are sound enough and honest enough. It is not that your policies are not perfectly good policies, because, no doubt, they are standard policies recognized and approved by the laws and by the insurance department of your State. The question at the all-important times will be whether you have realized just what your part in the contract was, and whether you have lived up to it.

Must Be in Writing.

The mere fact that your insurance policies are the standard form does not cause your duty to end with paying the premium. You have to do more than pay the agent what he charges you. An insurance policy is a contract, and, like all contracts, it has two parties to it, each of whom must do certain specified things. If you think your policy is going to mean anything more favorable to you than the expressed terms in it indicate, you will be disappointed. You may be able to hold the company on a verbal application to their agent for insurance, but verbal agreements about matters not mentioned in the policy will not count. It must be down in black and white.

Read the Policy.

There is just one proper time for making sure what your policy contains and that is when you accept it, or if you did not do it then, right now. After the fire starts it will be too late to obtain any special permits or to change your warranties. The loss will be adjusted on the existing form of the policy, not on what you thought or hoped it contained, or supposed it said. You would not think of entering into any other form of contract involving thousands of dollars without even reading the contract, fine print and all, but have you read your fire insurance policies?

The Responsibilities.

Find out at once just what your policy promises and just what you promise when you accept it. If you have hitherto neglected this, don't go to bed tonight without making sure of these things, even if you have to get the insurance agent out of bed to make certain of where you stand. Every provision of the policy that puts any responsibility upon you must be kept or the company will refuse to pay, on the ground that you, the assured, have not complied with the provisions of the contract.

See that your policies at all times fit your business and your plant. If you have for a long time been doing business in the same garage with substantially the same building, you may have been simply getting your original forms of policies renewed every year. The first, original policy may have fitted well enough at the time and yet changes in your methods and in your equipment may have rendered that old form of policy absolutely valueless to you. Look this up and if new warranties or permits are needed to make the policy fit, get them inserted before you are a day older. You have to pay a high rate for your insurance, so it is important to see that it actually insures you.

Insure to Cover Losses.

If your policy is only almost right, it is no good at all. An almost good policy is in the same class with an almost good egg. It is poor economy to skimp on the price you pay for insurance. If you cannot afford to pay for the kind of insurance you need, the kind that will cover your losses, you certainly cannot afford to take anything less than that in value.

You may have enough resources outside of your business so that you prefer to insure yourself, saving the premiums and taking the risk of loss. You may regard your building as fireproof and your stock may be scattered in two or three buildings, so you are not afraid of a total loss by one fire. This is, of course, up to you, and no one can know as well as you do how much insurance you ought to carry. But if your capital is all invested in your business, it is certainly a wise plan to insure to the limit.

The 80 Per Cent. Clause.

Sometimes a man is tempted to take the reduced rates offered with an 80 per cent. co-insurance clause in a policy. Do you understand what this co-insurance clause does to your policy? If you have a plant worth $10,000 and you take out insurance with the 80 per cent. co-insurance clause for $8,000 and have a fire with a loss of $5,000, you get the $5,000. But suppose, under that same clause, you take out insurance for less than 80 per cent. of the value of the property, say, $7,000. Then, with a $5,000 loss you would receive only seven-eighths of the loss. The insurance paid you would be in proportion to the loss as the insurance carried was in proportion to 80 per cent. of the value of the property insured.

Records, Etc., Must Be Kept.

With this co-insurance clause you must be able to prove that your property was insured up to at least 80 per cent. of its full value. This makes it essential for you to keep, where the fire will not destroy them, inventories and invoices and sales records so you can prove the value of the stock and the amount of the loss. This is very important, however, in the case of any form of insurance. Insurance is to provide indemnity for loss, not to give you a profit, so you must show the loss.

The "old line companies," so-called, are properly regarded as the standards of insurance safety, but it does not follow that a small mutual company may not also be safe. Companies which scatter their risks widely, perhaps insuring one garage in a town, or one in a section of the city, will not be likely to meet with large losses in that class of risks. The secret of soundness in an insurance company, after honesty in management, lies in such a distribution of risks that no great fire can wipe out its surplus.

How Rates Are Based.

The rate you pay for standard insurance is based on what the statistics have shown to be the "probabilities" of a fire in your case. Since all companies accept practically the same statistics, it is obvious that the rate charged for your chance of fire will be practically the same in all cases except in those purely mutual companies which reduce the risks by a very wide separation of risks, and perhaps even go so far as to make all their charges by means of assessments as needed.

To the rate charged for the probability of a fire must be added further charges for expenses of operating the company and for the profits to the stockholders. These charges comprise what is known as "loading the policy." Obviously, with the same table of probabilities as a basis, differences in rates must depend upon differences in the "loading" charges.

Avoid Falsification.

Any garage man would know the danger of giving the insurance, along with his application, false data that might influence the rate of premium, or enable him to secure a more favorable policy than he could get on a true representation of the situation. But not every man realizes that the omission, intentional or otherwise, of important information may prove fatal. Omission of part of the facts may be taken as evidence of intent to defraud, thus invalidating the policy. It is necessary to tell all the truth as well as to avoid falsification.

Important Details.

See that everything incorporated in the policy as a part of the warranty you give the company is accurately complied with. For example, there is the "standard chimney warranty" in some states. Are the chimneys in your building so constructed as to comply with the terms of this warranty? If not, have you arranged for permits to cover any exception? Have you put in a short tile chimney somewhere when you wanted a stove temporarily, or have you built a chimney from the "attic" up? Is there a chimney built on a bracket that would not pass inspection? The insurance companies are inclined to be very fussy about chimneys and, for that matter, they have a right to be so. Consult your agent regarding every chimney change.

Storing Gasoline.

Don't keep more gasoline or other explosive inside of your building than your policy specifically allows. See that you have a lightning clause in the policy. Take out no concurrent insurance in other companies without permission from the companies already insuring you, unless the policy already taken out contains a clause permitting such other insurance.

Is your electric wiring all in shape to pass inspection? The "Standard Electricity Permit" will make interesting reading if you have never read it before. It might possibly make expensive reading if you wait to read it after the fire.

Concerning the Agent.

There is a clause in your policy which says that "No one not authorized in writing shall be considered an agent of the company," so it is important for you to do business with a reliable and a properly accredited representative. Don't transact such business with a man of questionable methods, unless you know he is authorized to do business for the company he claims to represent.

I said that a verbal application for insurance might be binding. The best way, however, to put your insurance in force pending the arrival of the policy itself is to obtain what is known as a "binder" or temporary contract. This puts you on the safe side, regardless of the character or carelessness of the agent.

Adjoining Sheds, Etc.

Is there an annex or a shed that is a part of your insured property and that is in tumbledown condition? There is probably a clause in your policy which reads, "If a building or any part thereof fall, except as a result of fire, all insurance on such building or on its contents shall immediately cease." This is a drastic clause and worthy of attention by the man with a shaky, old lean-to anywhere on the premises.

If any kind of a chart or diagram descriptive of your premises is used in connection with the policy, bear in mind that as a part of your warranty to the company, you guar-

Digitized by Google

antee its accuracy and it is up to you to see that it is right in every particular. Your policy will be no better than that diagram, just as a chain is no stronger than its weakest link.

Assignments, Mortgages, Etc.

Don't assign your insurance policy to anyone without first getting permission from the company. The policy is very explicit about this and a form for permission as well as for assignment appears on the back of most policies.

Be careful to take up with your agent as they come up such matters as the introduction of an illuminating gas plant into any building. the placing of a chattel mortgage upon any property insured, the reduction in any way of your own interest in any of the property to anything less than full ownership, the increase in your fire risk by any means within your knowledge.

If you want to make sure that your policy covers certain things ordinarily excepted, have them specifically incorporated. Among these are property in storage or there for repairs, accounts, securities and currency, awnings, office furniture and fixtures, signs. Don't "guess" that these or other uncertain items are covered. Guesswork in insurance is expensive.

Place Losses in Writing.

When you do have a fire there are certain things you need to do. When the fire is put out, make it your business to protect the remaining property from further loss. Make out an inventory of the property. Get the damaged premises into the best possible condition. Notify the insurance company in writing of the loss.

The insurance policy provides that a sworn proof of loss must be sent to the company within 60 days of the date of the fire. The agent will supply you with the proper blank form and help you to fill it out if you wish. In this "Proof of Loss" blank there is a clause like this: "It is expressly understood that the furnishing of this proof of loss blank to the assured, or assistance in making up the proofs by an adjuster or person otherwise an agent of the company, is an act of courtesy and is not a waiver of the rights of the said company."

When Insured Lost Out.

One business man neglected these proofs, thinking something less than a sworn proof was sufficient. He sued five companies and lost every case because he had failed to do what his policy specifically stated he must do.

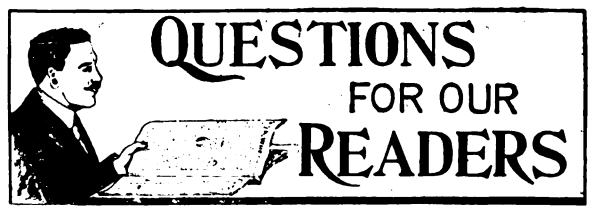
We have all heard more or less about fire insurance companies trying to get out of paying their losses, escaping on a technicality. Well, we have to admit that they are apt to settle in a technical manner, but that is all the more reason for the policyholder seeing that he understands the situation and lives up to his part of it.

There are thousands of garage men who have only their fire insurance standing between them and bankruptcy in case of a total fire loss, and a large percentage of these men have never even read their policies. If I were selling goods to these men on credit, I would feel like sending a representative to them at once to go over their policies with them—for my own safety if not for theirs.

Read Every Word in Policy.

Read your policy. Read it from beginning to end and take time to read it intelligently and understandingly. If there is anything about it that you fail to understand, get the agent of the company to make it clear. Don't remain in doubt and don't take anything for granted that is not explicitly stated in the policy. Remember that your policy expires on the stroke of the hour. A fire five minutes after the policy expires will no more be covered by that policy than a fire a year after its expiration.

Of course, you know your fire insurance policy does not cover loss by war, insurrection, riot or usurpation of power by military authorities. If you want protection under such conditions, you will have to secure it in some other way than through the ordinary insurance channels.



In this department our readers are invited to ask questions about anything concerning which they need information. There is no charge connected with it. It is as free as air. Questions require answers, and these often are as valuable to other readers as to the ones asking the questions. We urge all to make free use of this privilege. Fire all the questions at us you please. The more the better.

Rules of Department.

As has been stated so many times, this department is for the readers of The Blacksmith and Wheelwright and they have the privilege of asking as many questions as they desire. Questions are first published so as to afford all of our readers a chance to contribute an answer. By so doing the party seeking information obtains a variety of answers or, in other words, several ways of doing the work are open to him.

When an answer is desired by mail it is supplied, but the question is published unless the reader stipulates he would rather not have it published.

We want every reader of The Blacksmith and Wheelwright to send in his views on any question asked. A great many are doing this, but we want others to form the habit. By exchanging ideas we will all secure valuable information. Begin by sending in your views on the questions asked in this number.

A Question of Responsibility.

From A. E. Roe, Michigan.—I am running a garage and store a number of cars during the winter and charge for same. In case fire breaking out and destroying the cars would I be held responsible for the damage?

Setting Wagon Thimbles.

From W. S. W., Arkansas.—I would like some brother smith to tell me how much off center to set wagon thimbles on the axle to give them the right gather.

Connecting Engines.

From Chas. P. Jenkins, Sask.—I would like to know or find out if it would be possible to connect two gasoline engines to a line shaft to drive at the same speed? Could it be done by making the pulleys to suit the speed of each engine? One is a three horsepower and runs at 500 r. p. m. The other is a five horsepower and runs at 400 r. p. m. I want to use the three horsepower engine for shop tools only, and when not busy with the shop work. I want to connect the two engines on a line shaft to run a grinder.

A Question of Horsepower.

From J. C. Wilson, Washington.—Please inform me what is the difference in horsepower between an engine having the same bore and one with a four-inch stroke and one with a five-inch stroke. Take, for instance, a Ford. I understand that a Ford engine figures 22.5 horsepower with a four-inch stroke. What would be the horsepower if it had a five-inch stroke?

Repairing Storage Batteries.

From Charles H. Cragin, New Hampshire.—I repair automobiles, but I have never tackled a storage battery, to take one apart to repair it or to replace old plates with new. Can some reader tell me how to proceed and can anyone tell me of any book I can obtain that will give instructions? I have one, but it is not very complete as to storage battery repairs. Will it be all right to take the plates out of a storage battery and leave them until next spring? Would that do a battery any harm? The battery is a six-volt, three cell Exide.

A Bearing Question.

From Old Subscriber, Maine.—Noting your offer to supply information to us smiths who are taking up auto work, I want to know if any of my brother smiths can help me with this problem. One of my customers brought in a two-cylinder Ford, a chain drive car, a model F, I believe. This runs on a battery, has but one coil, and the timer has but one contact. The customer says he has lots of ignition trouble and that he was advised to use a double coil and a double timer. What I want to know is how to wire up and what to get to do the work. Also, how are the bearings of the two-cylinder engine in this car taken up and how do you know how tight to make them? Think your offer to help us old timers in auto work is a fine thing.

A Metal Question.

From J. B. V., Indiana.—Is cast iron a high or low carbon product?

Tire Vulcanizing.

From L. S. Smolka, Texas.—I wish you or some subscribers of The Blacksmith and Wheelwright would give instructions for vulcanizing automobile tires and tubes. I am interested in all auto work.

This Horse Did Not Forget.

Some few years ago in Walbridge, an old Ohio barracks, during the time when Colonel McMacken had charge of the cavalry troops and they were undergoing their regular drill and maneuvering inspection, the Colonel happened to notice a horse which he thought was getting too old for the service, says C. T. Knitsch in Our Dumb Animals. At once he ordered him disposed of to anyone who would pay a fair price for him. After considerable parley he was sold to an old farmer in the nearby village who took a considerable liking to him. They became fast friends, the old man never going anywhere by himself but always taking Bobbin with him. The farmer used him to do only light chores of hauling, his duties being regular and easy. This old animal had virtually settled down to a life of practical ease.

Even though he at one time was the favorite mount of the Colonel, like all of the fatal destinies that eventually overtake us, he was as you might call it now assigned to the ash heap. One day when the cavalry troops were staging a sham battle and inspection review before the Colonel, this old army horse who was just being harnessed to a loaded wagon and was waiting patiently for the old farmer to get aboard, suddenly heard the sound of the bugle call. The familiar notes brought back reminiscences of the past to this grand old charger. He no longer could restrain himself but gave way to his feelings and ran off, with the wagon trailing after him. When he reached the Colonel's line of horses in march, to which he felt he belonged and for whom he had so long and faithfully served, he tried to force himself into line with the rest, wagon and all.

This unusual conduct was noticed by the Colonel, whose noble heart told him at once the true instinct of the brave old army horse, and he at once sought to repurchase him from the farmer, who resisted all proposals to part with the grand old piece of horse flesh. It took a whole lot of pleading before he would give Bobbin back to his regiment, but the old man had Bobbin's future interest at heart and after they had told him how easy the horse would have it from now on he decided to let them have him at a nominal sum. After the Colonel had acquired Bobbin he ordered the men to take him to the finest field of clover they could find, and to make it easy for him for the remainder of his days. The old horse who had served his flag and country so well these many years settled down to enjoy the fruits of past memories, and the reward he had so rightfully earned.

The man who is always finding fault is a blister on another's back, with a bad case of itch on his own.

Digitized by Google

WORKSHOP EXPERIENCE

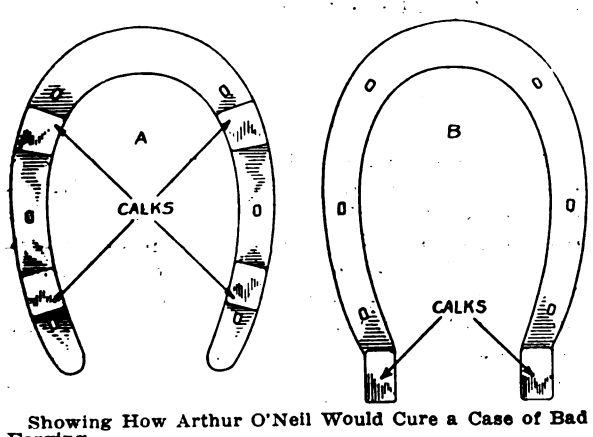


In this department our readers are invited to contribute articles explaining how they solve the various problems arising from day to day in the shop. You may have developed a method whereby a piece of work is finished quicker, easier and better than formerly, but when you have done so why not give your fellow-craftsman the benefit of your experience? No matter how simple the job may appear to you it may be one that is bothering the other fellow, so make a rough sketch of it, write a few words of explanation and send it to the editor of this department. He will have the sketch remade by an artist and fix up the article. We want every reader to join in making this department one of the features of our publication. Any suggestion for lightening one's labors in the shop will be welcomed and appreciated by your fellow-craftsman.

Disagrees With Mr. Kohler.

From Arthur O'Neil, Pennsylvania.—Mr. Kohler, in the December issue, writes of a horse in question, that he forged only on the right side; he hit both heels of the right foot every step he took. The toe of the hind foot was worn so that blood oozed out. Mr. Kohler tells how he stopped this one particular "forger" by using a light, concaved shoe on front foot, and let the shoe on the hind foot extend one inch in front of the worn toe and put on a strip of rubber about ½ inch between the shoe and the sole of the foot; made the rubber taper to the heel and project over the shoe.

Not wanting to criticise Mr. Kohler, he tells the owner that the rubber will prevent the noise when he hits front foot. I would ask, does he seek an alibi by using a rubber pad? He says he must grow a longer foot before the horse can be stopped from forging. The writer would like to ask Mr. Kohler if he expects to be able to grow a



Showing How Arthur O'Neil Would Cure a Case of Bad Forging.

longer foot so long as his charge hits? You admit that by your method he will continue to hit. Now Mr. Kohler does not tell his readers about the characteristics of the horse in question, which should be gone into carefully by every shoer before he attempts to correct a forging horse.

Mr. Kohler does not state why he used the particular method to which he refers. He does not state whether his horse was high-headed or low-headed. Whether he carried his head in a straight line or went to one side or whether he had a long pastern joint or a short pastern joint. He does not say anything about how the horse carried himself in any way. You will agree that these are all points that should be carefully investigated before any shoer undertakes to rectify a fault such as described.

All horsemen are aware that certain things cause forging, such as faulty conformation, tooth trouble, bad shoeing and bad driving. Therefore, a shoer should be well versed on the anatomy of the horse. A shoer versed in anatomy knows the fourteenth dorsal vertebrae is the axis around which the weight is poised, or the center of gravity. It is, therefore, plain that if anything affects the center of gravity your horse is unbalanced and will become faulty gaited.

If shoeing has caused your trouble it is not so hard to overcome. Level your feet, get your outside and inside walls true from cornet to the ground surface; get your angle as nearly 50 degrees as you can. Now you are ready for your shoe. For front shoe use a four-calk shoe, calks set one inch in front of your heel and 1¾ inches from center of your toe; hind shoe long heel calks 1½ inches longer than the heel of the foot. The long calk lessens the downward action behind of the flexor perforans and the quick up action of the foot will also be lessened. The four-calk shoe in front will quicken your front action and your trouble is ended.

Repairing a Bellows.

From Old Reader, Missouri.—If Brother Smith, of Tennessee, will try the following I think he will be able to mend that busted bellows. The first thing to do is to clean the leather for several inches around the cut or hole.

When perfectly dry, cut a piece of good soft, stout, tanned sheepskin, about three inches larger all round than the hole. Pare the edge of the leather, then with a toothbrush smear the leather lightly all over on the flesh side, and also that part of the leather on the bellows where the new piece is to be fixed, with rubber solution. Let the leather stand for a time to allow the solution to set, then fix the leather over the hole, rub well the leather, and leave it to dry. Next bend the leather into the folds of the bellows. If the above instructions are properly carried out, a good repair should result.

Engine Running Backwards.

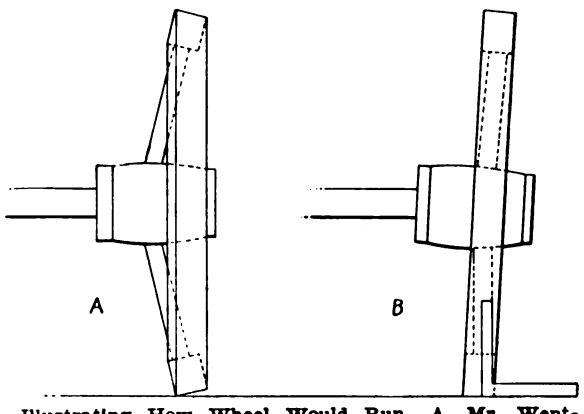
From E. K. Lee, Connecticut.—I see Old Reader, of Kentucky, wants to know why an oil engine runs backward if running this way when it is started up. If the engine be in good shape, the timing and ignition correct, it should not continue to run in a reverse direction, even if the fuel be not turned off. It is possible for the engine to make a few revolutions when running light, as although the cycle of operations would be quite out of time, it might occasionally receive a feeble impulse, say sufficient to maintain the momentum of the flywheel. But it could not run thus if carrying a load. Of course, Brother Smith understands that a two-cycle will run in either direction.

Disagrees With Mr. Wentworth.

From Thomas A. Holt, Rhode Island.—I am very much surprised to see in replying to me that a straight axle will do for any kind of a wheel, regardless of dish. I believe Mr. Wentworth will find the wheel he speaks of, dished four inches, and put on his axle would run all on the inside of the tire, but if it is set to a plumb spoke it will run flat on the ground. I would not think of putting a wheel on that was dished four inches, but would try to persuade the man to let me build the wheel over, but if I had to put it on, I would set a plumb spoke, as I should be obliged to follow the tracks.

We have a track in Rhode Island which runs 64½ inches from center to center. Neither would I put on a wheel that was dished in.

I have been working at one place for 36 years and have been setting axles here for



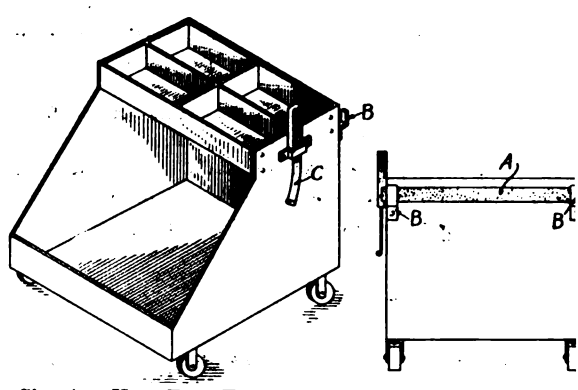
Illustrating How Wheel Would Run.—A, Mr. Wentworth's Method; B, Mr. Holt's.

the last 30 years, and find that they "talk" as Mr. Wentworth speaks of. I set all mine 3/16 to 1 inch dish of the wheel.

The illustration at A shows how Mr. Wentworth's wheel would run, all on the i side of the tire, and it would be too wi to fit the tracks. That at B is the way would make the wheel run, fitting the track I find that Mr. Wentworth agrees with n in putting just enough gather in to mal sure they do not hang back.

Making a Shoeing Box.

From Fred F. Kasserman, Illinois.—I a a reader of The Blacksmith and Wheelwrigl and have asked questions and received a swers through its columns for which I a very thankful. I have never contribute anything of value to the paper. I am enclo ing a sketch of a shoeing box, a patter which can be made in any shop. I made f mine a box which is 12 inches square i side and 10 inches high from inside to t of box, which when placed on casters stan 14 inches high to nail boxes, so they ca be reached without much effort. A shot gu shell box cut after the pattern of sketc



Showing How Fred F. Kasserman Makes a Shoeing Bo

makes a nice light box, but they are hardl wide enough.

The rasp A lays across at the back of th box in the brackets B fastened thereto an a hoof knife C at either end.

The top till is not partitioned off for nail but a tin tray with four compartments carr numbers five, six, seven and eight nail the sizes most commonly used. Should yo wish to use number nine or 10 nails, a fe can be dropped in with the number five f the time being.

The tin tray is independent of the shoein box proper and often when first trimmin a fractious horse can be lifted out. It ofte avoids spilling the nails. The tin tray made to fit the top till of the box and eac compartment is 3x4 inches square and 1 inches deep.

The casters are 1½ inches across th wheels and will roll readily on any commo plank floor.

I usually use two rasps, one sharp in t of box for leveling, and one getting dull lower part of box with clinch tongs, han mer and nippers for clinching.

The drawing will give a good idea of ho to construct the box and I feel sure whe once used it will always be used.

Would also like to ask how long the co test of shops will be open. I have no pi ture of my present shop and would ver much like to see it appear in The Blac smith and Wheelwright.

Making Drills from Files.

From B. J. K., Oregon.—I see that brother smith wants to know how drills a made from files. When forming a drill from a old file, heat and hammer out the shank en also heat the other end, and when red h hold it against a block of iron, and with coarse file form the cutting edges.

Next harden. Bring the cutting edg down to a dark straw color, and have th part above this a purple or a blue. If sprin steel be used, a light straw will do. Th tempering or making of drills from files, et can be done in an ordinary coal fire such a the house fire, for example.

How to Solder Cast Iron.

From D. K. Williams, Dakota.—Tell J. K., of Rhode Island, that he can solder ca iron, or rather make an alloy for solderin by taking 25 parts each of lead and tin a 50 parts of zinc. After the articles a

Digitized by Google

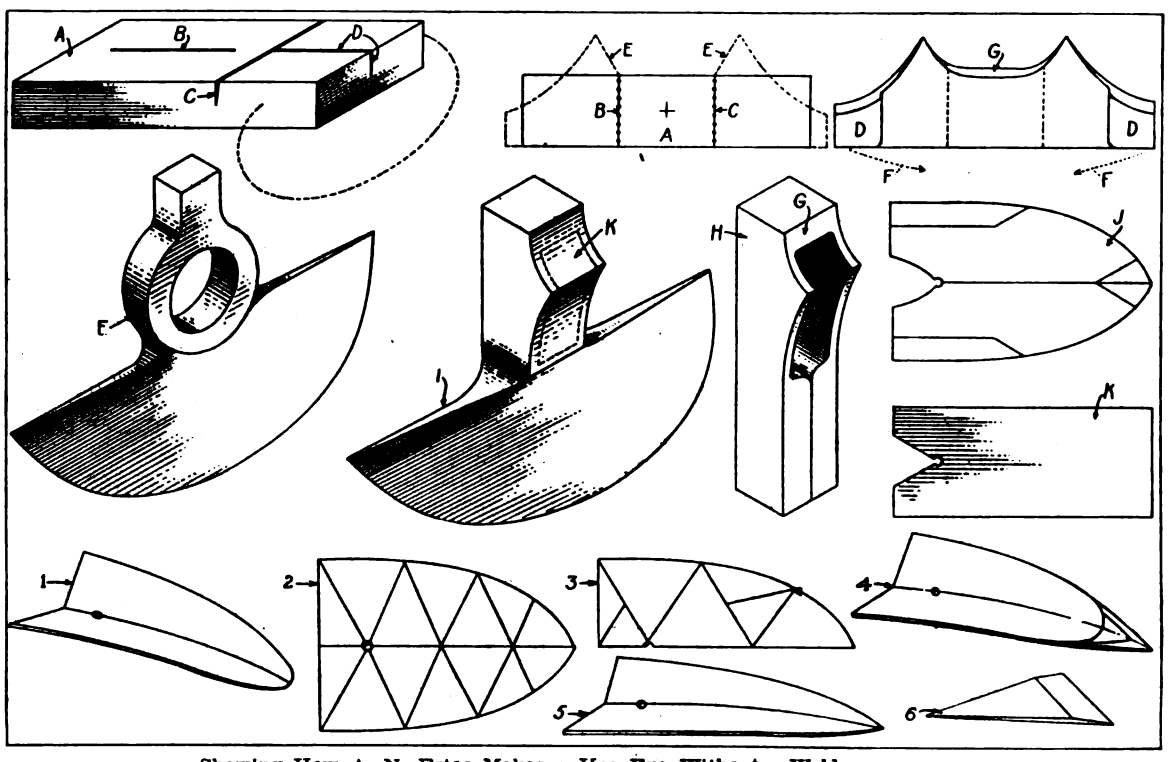
cleaned, they are covered with stearic acid, or similar flux, and the alloy applied with an extra hot soldering copper. This process is a patented one, I understand.

Turning Hoe Eye Without Weld.

From A. N. Estes, Virginia.—To turn a new style hoe eye without a weld, take a piece of soft steel A, 1¾ inch wide and ⅝ inch thick and with a sharp chisel cut clear through as shown at B. Slot two inches, then cut half through as at C, then half down as at D. Take a fuller and set in cut as at D. Drive down through as at D and out each way as shown by dotted lines. Work out as at E.

Another Method.

Take a piece of Swedish iron or soft steel like that shown at A, 6 inches long, ½ inch thick and 1½ inch wide. Find the center as at A between B and C, then make countersink dots as at line B and C. Get a good heat and hold this iron on the edge of your anvil next to you and let your blows fall heavy on same. The thick part of the eye will fall below anvil while you pound down on same as at B and C. Leave each end thick as at D. Work out your iron as at EE. Work out as at B and C, thin to about ¼ inch, then bend in the direction of the arrows, F, with heavy part as at G on the outside. Bring together as at H, take a welding heat and draw out as at I. Then take one of the plow plates I have described and lay off as at J, then work it out as at K. The fork in K fits over the eye as at I. Weld down on the top side of eye and finish up and you will have a pleasing looking hoe.



Showing How A. N. Estes Makes a Hoe Eye Without a Weld.

Never make them over 3½ to 3¾ inches wide or 5½ inches long. I get $1 apiece as fast as I can make them.

Temper heat for 1½ to 2 inches up the blade and dip for 1½ minutes in water after you have obtained a good red and hold until you think the heat above the dip will draw the temper below the dip. Draw to a sky blue, then watch the blue. Just as the last particles of blue fade out quench. If this was tool steel it would chop a white flint rock ½ inch. It will neither break, bend or batter.

Use Care in Dipping.

Be careful about your heat when dipping. Too much heat back of your dip line is fully expanded and the part dipped is fully contracted. Metal fully contracted is brittle and too much expansion behind it is bound to burst it open. And there goes our work for hours lost. Some may think the steel was no good. As this plow steel is unreliable as to temper by color, and should it be too soft at the color I have indicated, try the file test as you go along. When a dull file will barely cut it quench it, but still have some blue color left.

Here in my neighborhood I have a lot of work to do. We have a plow that is called the Malta double shovel, and the same in a three-toothed style called the Sidewipe. The plates are similar in shape, although the Sidewipe teeth are much smaller. I point the double shovel teeth for 20 cents each and the Sidewipe teeth for 15 cents each. They are used here extensively for plowing corn and seeding.

The merchants bring them in, also the teeth or plates. I point them in such a way the farmer won't buy a new plate if I will point his old ones. I won't point them but twice, as they then become too thin. I buy up all the old, worn-out ones at five cents each and they bring in a sack full sometimes. One man brought me $2.50 worth at once.

To cut them up and point others (see sketch 2) I cut open at the center line. Then I cut up all the additional lines. Then you have a three-cornered piece. Select one corner to go in to your point. The other two corners form a broad back end as shown at Fig. 6. Scarf this side out thin for one-half its distance to the end you have selected for a point. Then thin out the point of your plate to be pointed, heat and put on borax or compound. I have found E. Z. is hard to beat. Heat your piece to point as at 6. Put your piece on the under side of plate and on in such a way that its broadest way matches the width of plate. Clamp it by one of those broad, thin corners with tongs and hit light licks to fit it down light. Then take a welding heat on the other scarfed corner.

Then another heat and weld down clear across the plate.

Now, your point is on back of point, but hangs open at point, so you take a small piece you got out of the point in cutting up the old plate as at 3, select a piece to fit scarf as at 6, place this small piece between point you have stuck on as at 4, take a welding heat and finish up.

This makes your point double thickness and you can draw out long and sharp and not too thin on account of strength. I have a great advantage over some smiths, as I worked on a farm myself up to the time I was 26 years old before entering the trade. Therefore I know exactly how to please a farmer. The old-time hoe described by me was asked for by Brother H. B. L., Kentucky.

Information for Brother Meyers.

From E. K. Lee, Connecticut.—I see that brother Meyers, from Little Rhody, is a sort of persistent chap and I admire him for it. He is going after information on auto work, and as he wants to know about testing out coils and cylinders, I am going to help him all I can. I don't want my brother smiths and readers of your valuable paper to think I know it all or am looking for prestige, I am simply trying to give Brother Meyers a hand, as I would have others do for me. If we smiths do not help each other, who will?

Now as to the coil. There are four vibrating coils on the Ford car. These coils have vibrators which are like strips of thin metal and which move up and down very fast, giving off a buzzing noise when operating correctly. When the strip goes down and comes up it results in a spark at the spark plug. Now if you press down on any of these strips it stops it working. In other words, no spark can occur at the plug.

From each of the four coils is run a wire to each spark plug. Now if we hold down the vibrator of the No. 1 coil, the right hand member, that coil cannot give a spark to the plug of the No. 1 cylinder. If we hold down the vibrator, and with the cut-out open, we can hear the other three cylinders firing (exhaust). We know in case a cylinder is out that it is the one we have stopped working.

Now suppose it was the No. 3 cylinder that was out and we are holding down the No. 2 vibrator. We would hear but two explosions. It is simple. You hold down one or more vibrators as you choose. You can hold down 1, 2 and 3, and if the No. 4 is all right, you will hear it fire. If not, the engine will stop. Shift around until you find the cylinder not firing. This is like playing a piano, as brother Meyers said the driver did.

Ed. Note.—Mr. Lee's explanation is simple and we supplement it with stating that the vibrator is attracted to the core of the coil by the primary current and this attraction takes place when the primary circuit is closed; that is, when contact is established by the timer or commutator, which device times the spark. The vibrator is attracted and the contact broken as long as the primary current flows. Holding down the vibrator prevents flow of the primary current in the winding of the coil. In other words, the primary is not transformed into a secondary or a high tension current which is used for jump spark ignition.

Advice for Beginners.

From L. R. V., Washington.—As I haven't written anything for the answer department, will say a word to brother W. E. P. By all means get into the automobile game. The proper equipment would be a lathe and back-geared drill press, about a 20-inch drill press. Lathe should be not less than 14 or 16 inches, with a 6-foot bed. One 8 feet would be better. And you should also have an oxy-acetylene welding plant, as it will bring more trade and profit than anything in your shop. Complete instructions are furnished by most all first-class welding plant builders. For hand tools a complete set of automobile taps and dies and socket and S wrenches are needed. And last but by no means least, get a copy of Dyke's Automobile and Gas Engine Encyclopedia, which gives a complete list of necessary tools.

In a locality where the customary charge is 60 cents per hour, you should charge the same, for whatever you do you certainly try to do well and your time is just as valuable in your line as any other mechanic. I have been in the welding game for two years and I find it pays big and charge from $2 to $10 an hour for welding jobs and $1 an hour for blacksmith and wagon work.

My prices for shoeing are $2 and under, four shoes (new), $2.25; No. 3 and 4, four shoes (new), $2.50; No. 5, four shoes (new), $2.75; Nos. 6, 7, 8, four shoes (new), $3. Resetting one shoe, any size, 40 cents. Resetting four shoes, $1.50. Have plenty of work at these prices and haven't had a real kick in a long time. I guarantee all work and replace anything that is defective in workmanship and look pleasant, just as if I was getting money from home.

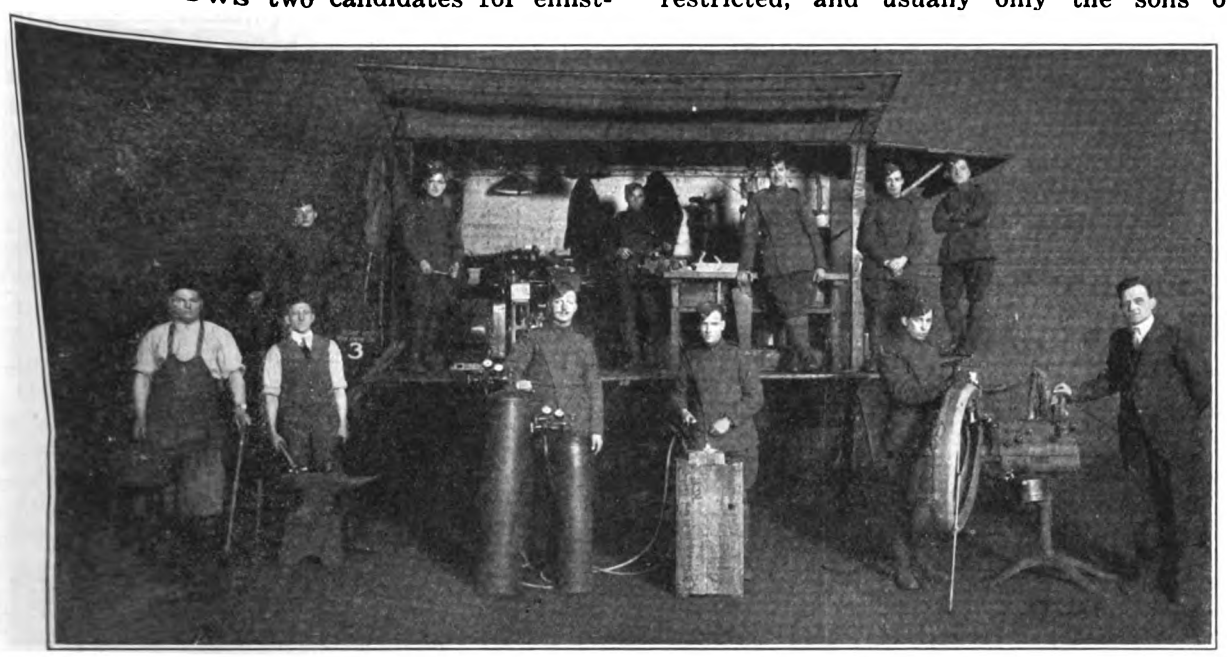
Idlers in a family or a business are money-eaters—you cannot keep a rat in a granary without finding holes in the sacks.

Digitized by Google

EXAMINING BLACKSMITHS.

Recruits Must Pass a Thorough Examination for Service in Army.

The blacksmith is playing a most important part in the great war, and he is serving his country both in the army, navy and aviation department. The accompanying illustration shows two candidates for enlistment in the aviation corps of Canada. They are being given an opportunity to demonstrate their familiarity with blacksmith work by means of the motor truck which is equipped with a special body containing the tools, machinery, etc., as shown. As may be noted, the equipment includes an oxy-acetylene welding outfit as well as a lathe, etc.



Blacksmiths Enlisting With Aviation Corps Are Required to Pass an Examination.—The School Travels on Wheels, a Motor Truck Being Utilized.

The Blacksmiths of Long Ago.

We live in an age of machinery, even in smithdom, says a writer in the U. S. Booster. The smith of to-day buys his iron and steel in bars, the smith of four to six hundred years ago had to hammer out every section by hand. He had no blower, trip hammer or emery wheel. In the beautiful gates and grilles produced by the smiths of the Middle Ages every bar had to be forged to a width and thickness to make the individual scroll or pattern. In Europe we can see hinges, gateways, grilles and altar rails that were made in the tenth or twelfth centuries, and each is a tribute to the wonderful mechanical skill of the mediaeval blacksmith.

The plowshare and reaping hook, the sword, spear and nail were the first important jobs of the ancient blacksmith. Later he formed the beautiful iron work we see in cathedrals and castles. The grilles made by the smiths of the past stand out as masterpieces of workmanship, being a part of the tombs, shrines, altars and choirs in old cathedrals. Usually they were of scroll work, being formed by the smith heating an iron bar and splitting it into various branches, each of which was twisted to conform with the design. Firmness of the iron wire and bars, perfect hammering, natural floral ornaments, neat joints and knobs are conspicuous characteristics of this work by the blacksmiths of long ago.

The armorer, or armor smith, was an important man in the days of the knights of chivalry. Beyond the weapons of war he forged the chain coats of armor, a very tedious process. Later he forged the helmets, greaves, hauberks and leg pieces of plate armor for battle use.

These ancient blacksmiths were a lesson to us as regards organization. With their brother workmen they formed strong guilds —many relics of which still are in existence in England—such as the Hammermen's Guild. In the fourteenth century these guilds were especially strong—each having a license from the king or a lord. They had special coats of arms and dresses, also banners with designs appropriate to the craft. The typical blacksmith's guild had three classes of members—the masters, journeymen and apprentices, and each was so regulated that no member could be out of employment.

All trade disputes were settled by the officials, and all craftsmen had to pass a test of proficiency at their trade. A guild member had to serve at least seven years apprenticeship, but the number of apprentices was restricted, and usually only the sons of smiths admitted to the trade. Many of the ancient monks were blacksmiths, and from them emanated a great part of the beautiful iron work in tombs and cathedrals that we can see to this day.

To any blacksmith who visits England there is an unequalled opportunity for seeing the work of these old-time craftsmen, for in every old cathedral city will be found many instances of the marvelous dexterity of these ancient smiths.

Horse Phrenology.

Possibly there is no subject more interesting to the horseshoer than that of horse phrenology, says the U. S. Booster. Different people show different traits and many times we are very much mistaken in men; on the surface some have a very quiet demeanor but have an angry temper lurking within. The round head with a short neck should be left alone, while another man, making a lot of noise, is like some dogs whose bark is worse than their bite.

So we find in horses a great variety of kinds adapted for special uses. In horses we have the same modification in temperament and intelligence, although to the ordinary observer these marks are not so clearly seen. One horse is sensitive, quick, intelligent and moves entirely by fear; another may be so wild and vicious as to endanger the safety of all who go near him. Some are quick to learn; others dull and stupid.

Like the human family, horses possess marks, forms and conditions that give some indication of the beast's general make-up. For example, the expression of the eye, like the human eye, speaks the nature of the animal. The head, lips, forehead, distance from eyes to ears, the shape of the head between the ears, distance between each eye, the nostrils, the manner in which his ears are carried, the size and color of the eye, etc., all have their special significance.

No horseshoer or horseman can afford to neglect this study of the horse, which is very interesting and of great value.

Are Prices High?

At the prices of a year ago, it would have taken 150 bushels of wheat to buy a ton of horseshoes; to-day, a ton of horseshoes can be bought for the price of about 80 bushels.

Last year, a farmer had to raise 2½ bushels of wheat to pay for having his horse shod; this year, he can have his horse shod for the price of 1½ bushels.

Was there ever a more favorable time than the present for the horseshoer to maintain his prices and for your customers to pay the price of shoeing?

By keeping up your scale, capital will be created and placed in circulation, prosperity will be stimulated, and labor kept employed at good wages.

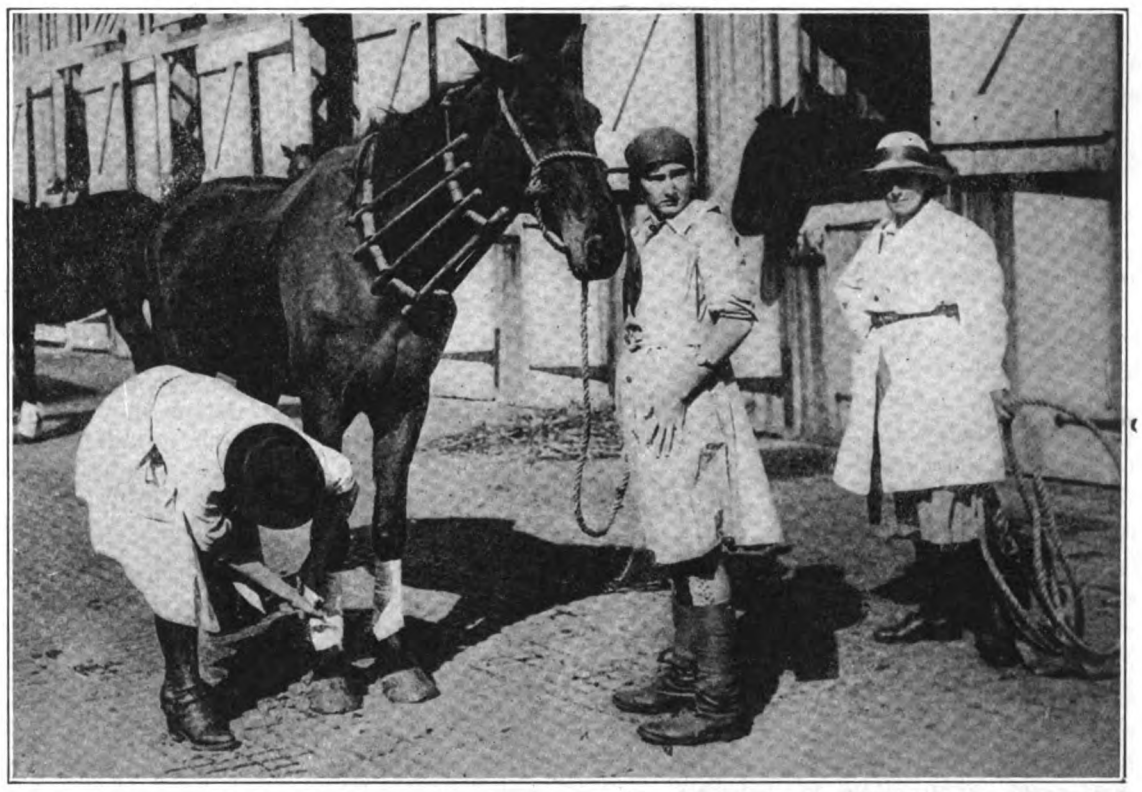
Let us keep on doing business and making money.—U. S. Booster.

Uhlan, 1.58, a Saddle Horse.

Uhlan, 1:58, the fastest trotting horse in the world, has arrived at Santa Barbara, Cal., after a swift journey across the continent to serve as a saddle horse for his owner, C. K. G. Billings, on the coast this winter. The black gelding was shipped from New York City in a special car. Uhlan is now 13 years old, and it is five years since he made the first record of 2:00 or better ever credited to a trotting horse without artificial aid, yet his legs remain fresh and he is said to be as fast as ever in a brush when Mr. Billings gives him his head.

Use Women Veterinarians.

Another field opening up to women laborers owing to the scarcity of men and due to the war, is that of veterinary surgeons. England has a number of women veterinarians and they are achieving no little success, as the horses are said to be wonderfully responsive to women's gentle methods. The accompanying illustration shows one of the women veterinarians treating a kicker's sprained hocks "somewhere abroad."



Woman Veterinary Treating Sick Horse.
Copyright, Underwood & Underwood, N. Y.

Digitized by Google

The Pioneer Journal of Its Class in the World.
Member of the Audit Bureau of Circulations.
PUBLISHED MONTHLY BY
M. T. RICHARDSON COMPANY,
71-73 MURRAY STREET, NEW YORK.
POST OFFICE BOX, 654. TELEPHONE—7377-7378 BARCLAY
CHICAGO OFFICE, 608 SOUTH DEARBORN STREET.

M. T. RICHARDSON, President and Treasurer
F. R. WHITTEN, Secretary

F. R. WHITTEN, Advertising Manager.
F. M. DAMPMAN, Eastern Representative
H. F. LUDINGTON, Western Representative

AGENT FOR GREAT BRITAIN:
ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance..$1.00
One Copy, six months, in advance.....60 cents
Single Number .....10 cents
Canadian subscriptions .....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English money.
Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

COMMUNICATIONS.

Communications on subjects appropriate for our columns solicited from all quarters. We want practical information. If you KNOW something that will benefit our readers, we shall be glad to have you write it out and send it to us for publication. All communications of this nature should be addressed to the Editor of THE BLACKSMITH AND WHEELWRIGHT, P. O. Box 654, New York.

CHANGE OF ADDRESS.

Subscribers who desire the address of their paper changed will please send the old as well as the new address.
Newsdealers can obtain THE BLACKSMITH AND WHEELWRIGHT from the news companies with whom they deal regularly.

ADVERTISING RATES SUPPLIED ON APPLICATION.

Entered as second-class mail matter at the Post Office in New York City.

SPECIAL NOTICE.—When subscribers fail to receive THE BLACKSMITH AND WHEELWRIGHT regularly, we shall take it as a favor if they will notify us to that effect.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

The Blacksmith and Wheelwright in New Zealand.

Mr. R. Hill, Matlock House, Devonport, Auckland, New Zealand, is our accredited representative in New Zealand for obtaining new subscriptions.

☞ When you change your place of residence always write to us and give your new address.

MARCH, 1918.

TABLE OF CONTENTS.

	PAGE
Classified Buyers' Guide	82
Index to Advertisers	82
Want Advertisements	83
Design, Construction, Operation and Repair of Motor Vehicles. By Clifton Egert, M. E.	69
Allowance for Fitting Tires	70
Ancient Blacksmithing	71
Entries and Interest Increasing in Prize Photo Contest	72
Successful Three-Year-Olds	72
When the Insurance Does Not Protect the Insured. By Frank A. Farrington	73
Questions for Readers	74
This Horse Did Not Forget	74
Workshop Experience	75
Making a Shoeing Box	75
How to Solder Cast Iron	75
Turning Hoe Eye Without a Weld	76
Examining Blacksmiths	77
The Blacksmiths of Long Ago	77
Are Prices Too High?	77
Use Women Veterinaries	77
Editorials	78
How Massachusetts Blacksmith Economized Space in His Shop. By James F. Hobart	79
Horse Famine After the War	80
How Poor Roads Create Bad Business in Country and City	81
A Tire-Bolting Hint	82
When the Horse Proved Up	82
Coal, $289.00 Per Ton	82

THE BLACKSMITH IS STILL KING OF THE MECHANICS.

When the motor car to a large extent displaced the carriage and the wagon and crowded out the horse, many blacksmiths were almost in despair. They saw their opportunity for work steadily shrinking year by year—fewer vehicles to repair and fewer horses to shoe. Many sold their shops and took to farming or some other occupation.

The Blacksmith and Wheelwright early saw the trend of affairs and advised its readers to learn how to repair automobiles, and kept on advising them in spite of protests from many that auto repairing was no such work as blacksmiths should be expected to do. The advice given and insisted upon from time to time took root, after a while, and today thousands of blacksmiths all over the land are repairing motor vehicles and are making more money than they ever made at blacksmithing alone.

And why should not the blacksmith do this work?

The motor car is a vehicle, complicated, of course, as compared with the horse-drawn vehicle, but by no means too complicated for a good mechanic to comprehend.

The important thing is to learn the principles of the gasoline engine, what each part is expected to perform, and when there is trouble how to discover where it is and the remedy. This information can be secured to a considerable extent from books, but a few weeks, more or less, if possible, spent in an automobile repair shop under an intelligent mechanic will put any good blacksmith in possession of the information he needs for undertaking repairs on motor cars. Of course, he will find himself learning all the time as new points of trouble come up.

Another feature is looming up to benefit the blacksmith, and that is tractor repairing. Tractors are coming into use more and more, everywhere. Soon every farm of any size will own one or more tractors. These will all have to be repaired from time to time, and the blacksmith is the man to do this sort of work, if he will only fit himself for it.

Instead of the passenger and commercial car killing or injuring the business of the blacksmith, it is in reality providing him with a kind of work far more profitable than he ever had before.

EVERYONE CAN HELP.

In our last issue we urged our readers to assist in bringing about a repeal of the outrageous second-class postage law which was passed at the last session of Congress, raising postage on all periodicals from 300 to 900 per cent., to go into effect July 1st next.

If strong pressure is not brought to bear upon Congress, the law is likely to stand as it is, and in that case it will probably result in all periodicals raising their subscription rates at least 50 per cent.

As a reader of The Blacksmith & Wheelwright, and probably some other periodicals, you are very much interested in having this law repealed so as to keep the subscription rates where they are.

It may occur to some of our readers that just writing a letter to their Congressman and the two Senators from their State isn't going to do a great deal of good; but if they take this view of the matter they are decidedly mistaken. If all the readers of The Blacksmith & Wheelwright would write letters to Congressmen and Senators, it would have an effect beyond what they may think it would.

It is contended by those who were instrumental in having this law passed that the post office department loses a large sum of money every year from carrying second-class matter at less than it costs to do it. It is a question whether this is true or not. They claim that the rate ought to be raised to eight or nine cents a pound to cover the cost, and still the Postmaster General boasts that the department makes money on carrying parcel post packages and that such packages on an average do not cost more than three cents a pound. It should not cost any more or as much to handle periodicals than to handle all sorts of merchandise under the parcel post system.

The sooner our readers act in this matter the better. Each one should find out the name of his Representative in Congress and address him House of Representatives, Washington, D. C., and ask him to vote in favor of a repeal of this law, on the ground that the increase in postage isn't necessary and that the public should be entitled to its reading matter at no increased cost over what it has been paying. Also each reader should write to the two Senators from his State, addressing them Senate Chamber, Washington, D. C. If you don't happen to know their names, ask your Postmaster. He will know. Let us hope now that every reader who hasn't already done so will write such letters as we have requested, and immediately.

THE BLACKSMITH'S OPPORTUNITY.

So many mechanics connected with the automobile repair shops and garages of the country have either volunteered or been drafted into the army that there is said to be a shortage everywhere of men capable of properly repairing motor vehicles. This would seem to be the blacksmith's opportunity to get into the automobile repair line. Those who have been hesitating and in doubt should hesitate no longer, but endeavor to fit themselves to repair automobiles as soon as possible.

As has been pointed out in these columns time and again, the blacksmith is really the logical man to make repairs of this sort because of his mechanical skill. Where a blacksmith is not familiar with the working of an automobile engine, he ought to purchase some good book on the subject, such, for instance, as Dyke's Automobile Encyclopedia, which gives full details, and if studied carefully should enable any blacksmith in a short time to qualify himself for making the necessary repairs in connection not only with engines, but with any other part of an automobile.

WAR-SAVINGS STAMPS AND THRIFT.

The majority of the readers of The Blacksmith and Wheelwright are familiar with the War-Savings Stamps issued by the Government. If not, they should be. The plan is exceedingly simple. You pay, or rather you loan, the Government $4.14 any time during March. On January 1, 1923, the Government will pay you $5.00. As may be easily figured this is good interest on your investment. And no one questions the soundness of the investment. The entire country is back of the loan. As the months progress you pay the Government a few cents more; that is, if you buy stamps in April they will cost you one cent more and a cent additional for each month, so buy early.

Cards can be obtained at almost any post-office, and if you do not wish to pay the entire amount you can pay 25 cents a week, until the entire amount has been paid. The cards cost you nothing. Not only will your small loan help the Government win the war, but it encourages thrift and the habit of saving.

WHY NOT SELL TRACTORS?

Why should not blacksmiths become agents for the sale of tractors? They know all the farmers for a considerable distance around their shops and every blacksmith could take an agency for the sale of tractors and make money. It would be a good thing to do for more reasons than one. Of course, when a blacksmith has sold a tractor to a farmer and anything happens to it the farmer is most likely to come to him for any repairs needed rather than go to someone else. We suggest to our readers the desirability of investigating the tractor proposition and of becoming agents for these machines.

FREE FOR THE ASKING.

Inasmuch as we give every contestant in the prize photo contest the half-tone or cut used in reproducing the picture of his shop, we will appreciate every entrant advising us at the time he sends his photo if he wishes the cut sent him. This cut is given FREE. There is no expense attached to it. We even pay the postage. Photos will be returned when requested. These cuts will prove very useful for advertising purposes and can be used on bill heads, letter heads, postals, etc.

Digitized by Google

How Massachusetts Blacksmith Economized Space in His Shop

Ingenious Location of Power Hacksaw and Metal Rack—How Locating Emery Wheel in Center of Room Saved Time and Labor

BY JAMES F. HOBART

During the past year the writer has been roaming around the country from New Hampshire to Louisiana and has visited many shops. He has seen lots of interesting things. In a little shop in Massachusetts, almost up on the New Hampshire line, a smith had built himself a new shop upon the site of his old one, and had just completed some hinges for the heavy swinging doors in front, which could be opened almost wide enough to let two wagons pass abreast.

The hinges, as shown at Fig. 1, had been made entirely from old tires which had been removed on account of thin metal and badly rounded corners. The rounded corners, by the way, were retained, and added considerably to the appearance of the hinges. The parts of the hinges were made tapering to a certain extent, and evidently had been formed by welding together several widths and thicknesses of old tires.

The upper tire on the door was of much more elaborate appearance than the lower hinge. The ornate upper one is indicated at D and the lower hinge at E. In reply to a query as to why he did not make both hinges alike, the smith said "What's the use? Nobody ever pays much attention to the lower hinge. It is the top one which they always look at, so I put most of the work into the top one and made the lower hinge rather plain."

Making the Hinges.

The sketch shows the making of the hinge so plainly that I won't need to talk about it much, but there was a thing or two in both these hinges which was rather unusual. Each hinge was supported upon a big hook, one of which is shown at A. This hook was driven into the side of the building and a hinge hung, but not touching the hook, which was made of iron or soft steel.

The hinge did not rest directly upon the hook A, but upon a brass washer C which had been placed underneath the hinge B. A piece of sheet brass, apparently a little more than 1/16-inch thick, had been rolled up and driven into the hole in the hinge B. There was a solid brass or composition metal surface between A and B at all points and the smith said he had never been troubled with the hinges rusting or sticking since he put them in place.

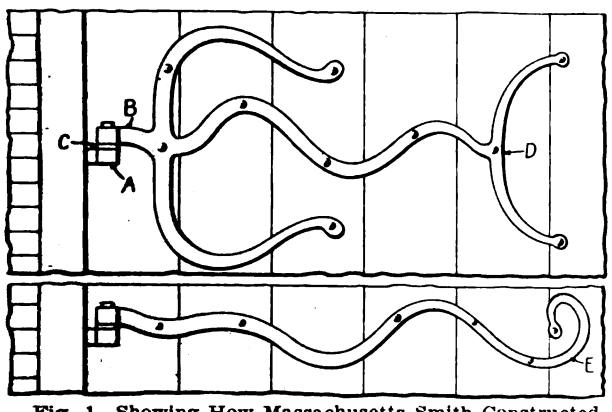


Fig. 1—Showing How Massachusetts Smith Constructed Hinges from Old Tires.—Note Novel Method of Bushing Hinge With Brass Washers.

A Corner Hacksaw.

When a smith has power in the shop, a power driven hacksaw is a pretty good thing to invest in. Some smiths object on account of the great amount of room required by one of these saws.

But one smith overcame this trouble by placing the saw right close in a corner. Stock was kept in a little tightly boarded building just outside of the shop side door, and the smith rigged up a little metal grating, made from old wagon tires. The grating was about 12 feet long, just the length that a couple of old tires chanced to make it, with other bits of tire riveted in between the two, just a foot apart. The ends of each short piece were turned square, punched and riveted to the two long pieces of tire. In fact, the rack was a regular ladder.

The rack was supported in a level position, just flush with the power hacksaw, so that a bar to be cut could be thrown upon the little 12-inch wide grating when pulled from the storage house rack. A sliding shutter uncovered a hole through which the bar of metal was pushed into the shop.

The tool took up very little room. The bar of steel remained outside the shop and out of the way. About all the room taken up was that required by the length of steel which was being cut from the bar. And

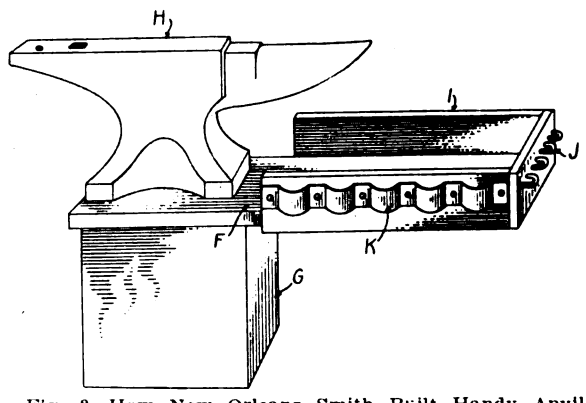


Fig. 2—How New Orleans Smith Built Handy Anvil Tool Bench.

when tires were being cut to length, the smith usually arranged matters so that the long end was always out of doors.

In arranging the "rungs" in the tire-steel "ladder," the smith also did another thing which saved him quite a lot of work. He not only spaced the rungs of the "ladder" 12 inches apart, but he also spaced them accurately, and then punched the ends of the rungs all the same distance from the bend in each end. This, when the rungs had been riveted into place, proved a pretty good measuring rig for the hacksaw, which was located with its cutting point exactly three feet from the first "rung" in the grating. These rungs were all turned with their flat sides next to the saw, so that if a piece of steel four feet long was to be cut off, its outdoor end was pushed against the second rung in the grating and the desired length was at once obtained. By raising the indoor end of the bar a few inches, it would strike fair against the edge of the rung, making it unnecessary to spend much time looking to see if the out-board end was fair with the four-foot mark or not.

When four feet was required from the in-board end of the bar, the end would be brought to the saw blade, a mark made with chalk at the edge of the second rung in the grating, the bar pulled along until the chalk mark was fair with the saw, the bar clamped and the saw set to work.

Locating the Emory Wheel.

This smith seemed bound to reverse the ordinary methods of tool location in the shop, for not only had he located the hacksaw in a corner as above described, but he also placed the emery grinding wheel right out in the middle of the shop floor where everybody had to dodge that machine as they passed along. There was fine light where the grinder was located and the smith told the writer that his men did not spend one-half the time at the grinder that they did when the machine was in its former location in a dark corner under the stairs.

"Now," said the smith, "my men can see what they are about when doing a grinding job. They can cut right to the mark, and don't have to keep grinding a little by guess and then stopping to look at the work for fear that too much metal has been removed from some portion of the work. No, sir! After giving it a good try-out, I never will have the grinder anywhere else than right in the middle of the shop. The men will use it a whole lot more when the machine is right there, in front of them, and where they can see, than when they have to dive into a dark corner and hunt for the grinder with a lantern when they have a little work to do.

"Why, my men use the grinder now for smoothing up the ends of horse shoes. This was work that they used to do with rasps while the metal was hot, and I find the file bill quite a bit lower than it used to be before the grinder came out into daylight. Now the shoes can be quenched and the smith holds them in his hands while he does the grinding act, provided that he does not hand the shoes over to a boy who polishes them off as well as the smith could. Yes, the grinder in mid-floor is a great idea."

Funny Steel-Working.

One day while passing a large manufacturing plant in Gardner, Mass., a sort of open air smithy was seen beside the road and an Italian blacksmith (?) was seen busily at work sharpening cold chisels for some men who were chipping castings just inside the plant.

The chisels were to be used in an "air-gun" as the pneumatic tool has been nicknamed in the shop. Chipping cast iron and sand takes the edge off a good many tools, but I am not in favor of the methods employed by the Italian smith in question, but will give them in order that other smiths may avoid using such methods.

The helper placed five chisel points in the fire at the same time, blowed until stopped by the smith. As the smith removed the first chisel, it was seen to be almost white hot, and the smith (?) quenched the overheated metal a bit before he hammered it.

The smith hammered the edges to narrow the tool, then he upset the chisel until the end showed about ¼-inch thick. Then he sharpened it the usual way, drawing down to a thin edge, filing a bit and then hardening.

A "gun-man" came in for chisels. He took several from the slack bucket and the writer noted that there was about three inches of water in said bucket and that the chisels, when quenched, were placed on end in the water, resting on the bottom and leaning against the side of the slack-bucket. As the "gun-man" was selecting three chisels from the bunch, rejecting several during the operation, the smith asked, "How did that burned chisel work?" The writer did not overhear the reply, but if overheated chisels were

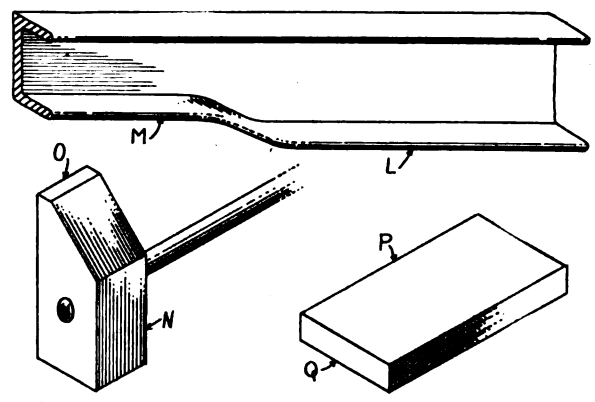


Fig. 3—Fuller Flatter and Form Utilized by New Jersey Smith in Shaping Motor Truck Frames.

heated much hotter than those which were treated while the writer was present—well, the writer would not like to have to pay the annual steel bill of the manufacturing company, that's all.

High speed steel can and should be worked at a temperature which would ruin carbon steel. That Italian smith must have been in the habit of handling high speed steel and was applying the same rules and methods to carbon steel. And so doing, always leads to disastrous results.

Keep the forging temperature of carbon steel right down to the traditional "cherry red" and if you can't seem to think just how red that might be, then never heat steel

Digitized by Google

hot enough to make it brighter than the red stripes in a United States flag. That degree of red, you can always remember. Heat the steel until it is no hotter than that red calls for and you never will spoil a steel tool by "burning" it.

A Handy Anvil Tool Holder.

It is a far cry from Massachusetts to Louisiana, but in a New Orleans shop the writer saw the handy tool holding arrangement shown at Fig. 2. A two-inch plank had been interposed between block and anvil, and presumably securely spiked to the former. The plank was about 24 inches long and 12 inches wide.

As shown by the sketch, the plank F had been placed so as to overhang block G about two inches on the right hand side, the anvil H being placed fair in line with the side of the anvil block. But to the left of the anvil the plank projected its whole length and formed a shelf upon which a good many tools could be placed for use or kept there permanently.

Three cleats 4 inches wide and 7/8 inch thick, were nailed to the edge of the plank, flush therewith below and projecting upward, forming sides to prevent tools from jarring off the plank during work upon the anvil. On the outside of the side boards clips and eyes had been arranged for holding tools which were in constant use at the anvil.

The sides I and K were fitted with loops much like those on a belt for the reception of cartridges. But instead of being made of fabric these loops were made of thin sheet steel, bent up and fastened to the boards with large-head roofing nails.

The loops on board J were nothing more or less than staples driven into the board and into the end of the plank. These staples lapped each other thus giving a greater number of openings for the reception of tools.

In a shop in Newark, N. J., some motor truck frames were being forged from four-inch steel channels, in a little shop where there was hardly room enough for the forge, the smith and the striker. In fact, more than half the length of the frame side-sill projected out of doors while one end was being heated in the forge.

Forging Truck Frame Channels.

Fig. 3 shows the kind of forging required, the channel L being narrowed a little more than an inch at M and at the same time keeping the side of the forged-in part parallel to the body of the channel and square, smooth and true because of having to be bolted to the engine support. In fact, the object of narrowing the channel at M was to obtain room for the attachment of the engine, therefore it was necessary that the forging be well and nicely carried out.

Only two special tools were used in the work. A combination fuller and flatter, something as shown at N, was used. This tool was evidently home-made and consisted merely of a square piece of steel with one side bevelled off as shown at O. While this tool was in use it was 'tother end up, the hammer blows being delivered on the end N, while the end O was placed against the work.

The other tool was nothing more than a piece of flat bar, soft steel, cut about nine inches long—an inch longer than the forged place at M. The lower corners, shown at Q, were rounded to fit inside of the channel to be forged, both lower corners having been removed.

This tool, or rather jig, was used as follows: A heat was taken on one end of a channel and only one flange and the adjacent web were heated, care being taken to keep the other flange as cool as possible. Then the channel was taken to the anvil and with a sledge the flange was battered down at M, then the channel was turned down flatwise and the tool N used to shape up the corner of the channel at M. Then more sledgework on the edge at M, and when about down to size piece P was driven inside the forged end, the channel turned upon P, with flanges down, and the back of the channel was hammered into shape. For this purpose it was necessary that the thickness of piece P be slightly greater than depth of the flanges on channel L.

By means of alternate work with fuller-flatter N and the form P, the end of the channel was soon brought to the required width, and perfectly straight and parallel with the body of the channel. During a part of the operation upon form P, this was held in place by means of a pair of tongs which grasped both form P and the web of channel L, which was placed upright as shown, but in an inverted position, the other, or unforged flange, resting on the anvil.

With the channel in this position, the flange at M was brought by hammer blows down to a finished and good alignment position as regards the outside of said forged flange. All required inside work upon said flange having of course to be done with tool N, and it is for the purpose of allowing end N to project over the flange of the channel while being hit with a hammer that the sharp bevel is given to one side of this tool.

While watching the forging of several channel ends as above described, it was noticed that after the forging had been completed, after the last blow had been struck, the smith returned the channel to the fire and took a good red heat all over the entire end which had been forged. This time he heated both forged and the unforged flanges. They were heated as evenly as possible, all over, then the channel was removed from the fire, carried out of doors and placed carefully upon a pile of finished channels. The smith said that the bit of annealing thus done might sometime save a break by relieving all the strains which the hammering and sledging might have driven into the portions of metal adjacent to the forged places.

Driving an Emery Grinder.

A shop down in New Orleans, La., has motor power and a lot of small wood-working tools, among which is a single surfacer of rather ancient make, but which is evidently on the job and able daily to "deliver the goods." This old planer is one of the kind which uses a separate belt from the overhead counter to drive the feed works of the planer. One belt comes down from the counter to a pulley on the planer cutterhead, and another belt comes down to the feed pulley.

In casting about for an easy place for attaching a grinder, the smith saw that the counter in question ran about fast enough to drive easily to the grinder and to that end a pulley was placed on the planer counter and the grinder belted direct therefrom. The result is that the grinder runs all the time, whenever the planer is in operation. Whenever it is required to use the grinder, which is pretty often in that shop, the belt to the planer cutter head is slipped off its pulleys, the feed belt allowed to run, and the grinding is done with the planer feed works running. But very little power is absorbed by the feed works and the smith just lets it run.

It is but a few seconds work to snap on the planer belt when that machine is needed, and the smith says the arrangement works pretty well and he can't see how he would be benefited very much should he go to the expense of putting in a separate counter for the grinder. "As it is now," he continued, "the planer is not used very often, while everybody wants the grinder, so the planer belt is off its pulleys nearly all the time and that counter will belong to the grinder instead of to the planer, first thing we know!"

Saving the Cost of Steel.

With the price of horseshoes going up, and now between seven and eight cents per pound, smiths are casting about for relief. Saw one smith, recently, forging shoes from old scrap round rods, and another smith had a lot of old shoes which he was welding together, two shoes into one, for heavier shoes.

Never be too proud to ask advice—it is absorption that makes the difference between a living and a dead leaf.

HORSE FAMINE AFTER WAR.

Breeders Called Upon to Prepare for the Future of Country.

"Save the Horse and Breed" was the slogan of several of the great specializing horse breeding associations at meetings held in Chicago recently. The event brought together the most notable of America's live stock men, and gave opportunity for discussion of the problem of the war in relation to the horse.

At the Belgian Society's banquet, speaker after speaker dealt with this topic. It was touched upon at the meetings of the Percheron Society and the Shire Horse Society. These successful and hard-headed specialists viewed the steady drain of horse supplies in Britain, France, Italy and Germany and the exportations from Scandinavia due to the war, together with the vast losses of animals on the Western front and formed the opinion that Europe will experience great scarcity of horses after the war. They further believed that any surplus in America before the war was rapidly dwindling, and that as America was now the chief source of supply for all the Allies, the prospect ahead was one of scarcity. From many shrewd breeders came the advice to save all the youngsters and mares; to breed every good mare during 1918, for after the war America will be called upon to export horses in vast numbers for the restocking of Europe. The end of the war would give to the horse breeders of America an opportunity such as might never occur again.

Amongst the speakers at the meetings was Richard C. Craven, Field Director of the American Red Star Animal Relief. He pointed out that while agriculture was rendering a service of the greatest patriotism in conserving the horse in the United States and in breeding for future needs, it was even more important right now to save every possible horse on the battle fronts. This war called for continuous supply of nearly 5,000,000 horses and mules. An infantry regiment required one horse for every four men, and every horse that was killed must be replaced by one from America. Veterinary surgery and care for animals had never in the history of world warfare reached such a high state of efficiency as in the present war. Although the number of horses killed in France was as high as 5,000 a day, the number of sick and wounded animals cured and returned to service was one of the wonders of the campaign.

This magnificent result had been brought about by the co-operation of the volunteer organizations working with the Army Veterinary Departments along lines similar to those of the Red Cross. The Royal Society for the Prevention of Cruelty to Animals, working with the British forces in France, had built hospitals for 12,000 horses, hospitals which would compare with those erected for the wounded soldiers. The British people voluntarily subscribed $700,000 to pay for this work and its efficiency was such that close on eighty per cent. of the animals treated in hospitals were cured and sent back to the front. The value of this work in money was $30,000,000; in fighting efficiency it represented something far greater than money.

The American Red Star Animal Relief would act in a similar capacity to the American forces, maintaining supplies and stores behind the lines, providing ambulances and hospitals as required, and generally rendering service by meeting the exigencies of the campaign. To the American forces this service would be more valuable than even to the British, because the American army would be 4,000 miles from Washington while the British army was only 200 miles from London.

The Percheron, Belgian and Shire Horse Societies recorded their approval of the work of the American Red Star and the Shire Horse Society, unanimously voted to send to Dr. W. O. Stillman, Director-General of the Red Star, Albany, N. Y., a check for $500 to aid the work of the organization.

Digitized by Google

How Poor Roads Create Bad Business in Country and City

The draft required to move a loaded wagon on different types of road has, of course, been made the subject of repeated investigation, but so far as is known no determinations have been made with reference to the various types of road which are to be found in California under soil and weather conditions which here exist. It is common knowledge that cheap makeshift patchwork road building and maintenance are expensive, and in California, perhaps more than in any other place, the public conscience has awakened to the economic value of the good road. But, insofar as relates to the waste of power and the waste of money incident thereto, which result from hauling heavily loaded wagons or trucks day after day and year after year, over bad roads, no report is extant which attempts to picture, in popularized form, the economics inherent in the high-type, modern, hard highway as opposed to mud or dust or ruts.

In planning the tests herewith reported, the good roads bureau of the California State Automobile Association was fortunate in securing the interest and co-operation of Professor J. B. Davidson, of the Agricultural Engineering Division of the University of California; his assistant, L. J. Fletcher, with Austin B. Fletcher, Engineer of the California Highway Commission, and a national figure among road builders; C. H. Sweetser, District Engineer of the U. S. Office of Public Roads and Rural Engineering, and W. H. Lynch, Senior Highway Engineer, of the same office.

TYPES OF ROAD TESTED.

EARTH ROAD, dust ¾ to 2 inches deep.
EARTH ROAD, stiff mud, firm underneath.
GRAVEL, compact, in good condition.
GRAVEL, loose, not packed.
WATER-BOUND MACADAM, good condition.
OIL MACADAM, new, good condition.
CONCRETE, unsurfaced, smooth.
CONCRETE, ⅜-inch top, asphaltic oil and screenings.
CONCRETE, 1½-inch Topeka top.
TOPEKA TOP, 1½-inch, on plank. Approach to causeway.

Same Equipment Used.

The purpose of the tests was to determine the tractive resistance of a standard farm wagon, when loaded, on various road surfaces. As far as possible all factors influencing the tractive resistance of a loaded wagon, except the road surface itself, were either eliminated or maintained constantly throughout the tests. Thus one wagon with the same load was used and was drawn by a team in all the tests reported here, except those on an oil macadam road, where a motor truck was used. The tests were made on June 13, July 9 and 10. The weather was bright and sunny in each case and the highest temperature for each day was about 105 degrees. The warm weather was the occasion for an increased tractive resistance on the oil roads over that for average temperatures.

An appliance known as the Iowa dynamometer was used. This dynamometer was designed by Professor Davidson while on the staff of the Iowa State College.

In order to insure absolute accuracy in these tests, the particular instrument employed was subjected to careful inspection in the Engineering Laboratory of the University of California at Berkeley before being utilized.

The tests were made in part at the University Farm of the University of California, near Davis, Yolo county, and upon the State highway in the vicinity and over various county roads and stretches of the State highway in Sacramento county near Sacramento.

Various Roads Tested.

The various roads chosen for experiments fairly represent the roads of California under summer weather conditions, the readings made on the muddy earth road being made possible by an overflow from an irrigation ditch on the University farm at Davis and merely intimating, rather than conclusively picturing, the pull per ton necessary to move a loaded wagon over, or rather through, mud.

The tests were held uniformly with a load of 6,000 pounds gross, which was made up of a standard farm wagon loaded with California rice in sacks. The motive power used in the tests at Davis was supplied by a fine team of draft horses weighing about 1,600 pounds each, wagon and horses being the property of the University of California. In the tests made in the vicinity of Sacramento a standard two-ton truck, the property of the California Highway Commission, was used, through the courtesy of Austin B. Fletcher, Highway Engineer. So far as possible, all conditions were kept uniform except road surface, the same wagon, the same load, the same driver and the same horses being employed and practically the same speed being maintained in the horse-drawn tests, while the same man drove the trucks when it was utilized as motive power.

Factors in Tests.

The rate of travel was decided in each case and averaged 2.4 miles per hour for the team. On grades tests were made both up and down grade and the results averaged.

A standard farm wagon with steel axles of equal length with wheels 38 and 46 inches in diameter and four-inch tires was used.

The load was drawn with a motor truck in the tests on oil macadam.

The dynamometer was of the integrating and recording type known as the Iowa. The force representing the tractive resistance of the loaded wagon acting through the instrument compresses a spring carefully calibrated to indicate the force acting. The average resistance over a uniform distance, measured automatically, is indicated directly by the instrument at the end of the run. A record of the resistance is also made on a strip of paper drawn under a recording pencil; this record so provided is used to check the average results furnished by the instrument. The tests were started after the load was in motion and moving at a uniform rate.

Upsets Earth Road Theory.

In reviewing the tests made, it is to be regretted that it was impossible to get a comprehensive series of readings over muddy roads, such as the average farming community is blessed with in winter, the "muddy road" tested being a mere hint of the hub deep mud which wet weather brings.

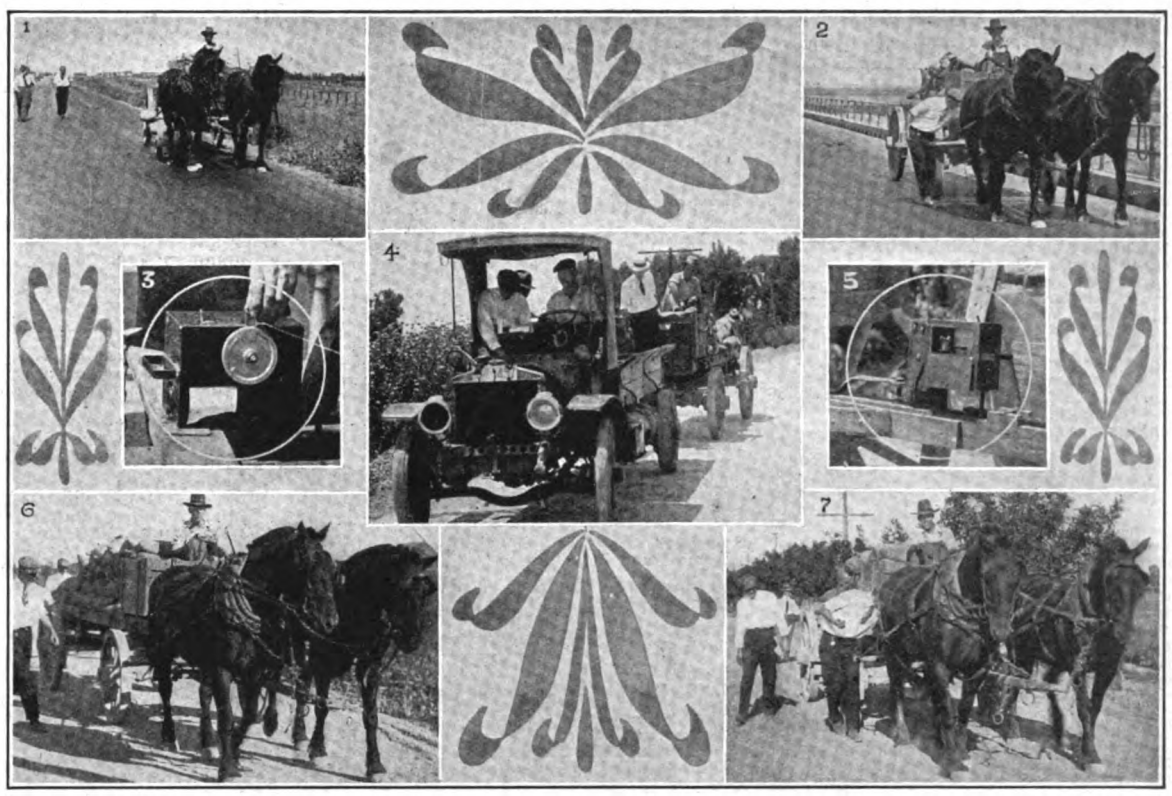
In testing the pull necessary to move the load over the earth road the results arrived at upset the theory once expressed by the Governor of one of our States, who declared that "the good earth road" was easier to pull over than any other type of road. This con-

PULL IN POUNDS PER TON	
Over a level, unsurfaced concrete road	27.6
Concrete base, ⅜-inch skin top asphaltic oil and screenings	49.2 / 51.6
Water-bound macadam, level, good condition	64.3
Concrete base, 1½-inch Topeka top, level, good condition	68.5
Gravel road, good condition, level	78.2 / 81.3
Earth road, fine dust, level	92 / 99.3
Earth road, stiff mud on top, firm underneath, level	218
Loose gravel, not packed down, new road, level	263

tention did not prove up, for the tests made by Professor Davidson showed that the pull required was 3 1/3 times as great as over unsurfaced concrete and nearly twice as great as over concrete with the ⅜-inch skin top.

How Energy Is Wasted.

Comparison between the lowest pull recorded, that necessary to keep the three-ton load moving, after it was started, over the level, unsurfaced concrete road, which amounted to 83 pounds or 27.6 pounds per ton, and the pull through stiff mud, which was 654 pounds for the load, or 218 pounds per ton, furnishes ample food for thought. Over the concrete road the horses pulled together 83 pounds, each horse pulling only 41½ pounds, while over the mud the team pull was 654 pounds and the pull on each horse was 327 pounds. The difference in pull between the concrete road and the mud road was 571 pounds, a difference of 285½ pounds pull for each horse, which is wasted energy wasted as absolutely as if it never had existed; and this energy, wasted day in and day out, in the winter in every part of almost every State in the United States, is what is meant when Bradstreet's Agency, with its fingers on the business pulse of the Nation, says: "Bank clearings (in New York, Chicago or San Francisco) were affected by the usual seasonal condition."



Ascertaining the Tractive Resistance on Various Road Surfaces: 1—Concrete, Asphaltic and Screenings; 2—Concrete Base and Topeka Top; 3—Showing Arrangement of Dynamometer in Horse Drawn Tests in Which Pull Is Transmitted from Doubletree Through Dynamometer to Clevis; 4—Unsurfaced Concrete; 5—Showing Arrangement of Dynamometer for Motor Drawn Test; 6—Water-Bound Macadam; 7—Gravel Road, Packed.

Digitized by Google

Coal, $289.00 Per Ton.

According to a compilation made by the "Black Diamond," a publication in the interest of the coal trade, the late shutdown enforced by the Fuel Department cost the country in loss of wages and manufactured products considerably over $4,000,000,000 and the saving is estimated to have been 3,456,000 tons of coal; in other words, the coal saved cost $289 per ton. Was the saving in coal worth the tremendous sacrifice made to get it?

Wouldn't it have been far better if some official of the Government had had foresight enough last summer and fall to provide for just such an emergency as occurred?

Will the authorities see a lesson in what has happened and make such arrangements as will preclude the possibility of any such breakdown again in transportation as occurred this winter?

A Tire-Bolting Hint.

When taking off buggy tires, says an exchange, the bolts are often found to be loose and turn round. Sometimes they are rusted into the tire and cannot be punched out. To overcome these difficulties, get the smith to make a very thin cold chisel and sharpen it on one side like a wood chisel. Get it down on the bolt between the tire and the rim, the sharp side of the chisel against the tire, and cut the bolt off. When the tire is off, punch the bolts out of the rim. If you are in the habit of always putting in new bolts when cutting tires, this is a much quicker plan than unscrewing the nuts and punching out—that is if you do not intend to use the old bolts again.

If you come across a bolt that turns round in an awkward place and cannot get at it with a bolt cutter or chisel (a nail or a screw is sometimes quite as bad), there is only one way out and that is to cut it. The best thing to cut it with is a hand saw; but, instead of using the teeth of the saw cut with the back first, putting some teeth in by nicking it with a sharp cold chisel. Do this on six to nine inches of the back of the saw from the point. If it gets dull after cutting a few bolts, sharpen it up by re-cutting. Only a trial of this plan will convince you that it is a good idea and will get you out of many a tight corner.

When the Horse Proved Up.

The cavalry horse has always occupied a conspicuous place in warfare, and there are several occasions when he has been decorated for bravery, says Tid Bits. A short time ago, for instance, a Russian officer's horse was awarded a medal for gallantry in action. It appears that the animal's master was badly wounded and fell from the saddle. The horse evidently realized the officer's plight, for it picked him up by his belt with its teeth and carried him to safety.

This recalls the case of a Russian artillery horse which received a medal at Plevna. A number of wagons were sent with ammunition to the front line. As they were making the journey, shells began to fall, and all the horses, with one exception, refused to move. The driver of one wagon noticed that one horse did not seem a bit cowed, so he cut the traces of the other horses; thereupon the willing animal dashed forward and succeeded in pulling the ammunition wagon through the fire. The driver was promoted and his animal decorated with a medal specially struck for it.

The late Earl Roberts was carried on the memorable march from Kabul to Kandahar on the back of a gray Arab steed named Venllel. Queen Victoria bestowed upon this animal the Kabul medal with four clasps and the bronze star. When Venllel died it was buried with pomp and ceremony in the rose garden near the Royal Hospital at Dublin.

Speed is the craze of modern life and the ideal of business, and, as a consequence, we rush the clock and die early.

Index to Advertisers

Aetna Nut Co., horseshoe calks....Front cover
A. & G. Mfg. Co., brazing compound..... 68
Akron-Selle Co., gears..... 86
American Calk Co., calks.....Front cover
Anti-Borax Compound Co., welding compounds .....2d cover
Armstrong Mfg. Co., bolt dies..... 64
Armstrong-Blum Mfg. Co., punches and shears .....Front cover
Barcus Mfg. Co., horse stocks..... 61
Barnett, G. & H., Co., files and rasps, Front cover
Batavia Rubber Co., rubber tire applying machines 64
Bertschy-Bermo Co., welding plants..... 84
Bicknell Mfg. & Supply Co., dies....4th cover
Bradley, C. C., & Son, shaft coupler..... 64
Buffalo Forge Co., blacksmiths' tools..... 67
Burden Iron Works, horseshoes.....3d cover
Bush Motor Co., automobiles..... 86
Butterfield & Co., taps, dies and screw plates 68
Campbell Iron Co., supplies..... 84
Canedy-Otto Mfg. Co., blacksmiths' tools 87
Champion Blower & Forge Co., blowers.... 63
Capewell Horse Nail Co., horse nails, Front cover
Champion Tool Co., blacksmiths' tools..... 88
Chandlee & Chandlee, patents..... 84
Childs, S. D. & Co., steel stamps..Front cover
Columbus Forge & Iron Co., anvils..3d cover
Columbian Hardware Co., vises..... 66
Corona Mfg. Co., veterinary remedies, Front cover
Cortland Specialty Co., welding compound, 4th cover
Cortland Welding Compound Co., welding compounds 63
Cray Bros., blacksmiths' tools..... 85
Crescent Machine Co., woodworking machinery 64
Diamond Calk Horseshoe Co., horseshoes, 2d cover
Durner, A. E., disc sharpeners..... 62
Edwards, C. D., shears..... 64
Electric Blower Co., blowers..... 61
Electric Wheel Co., wheels..... 86
Empire Mfg. Co., wheels.....4th cover
Eureka Auto Co., automobiles..... 84
Felton, Sibley & Co., paints..... 61
Firestone Tire & Rubber Co..... 62
Fisher & Norris, anvils and vises..... 68
Franklin Steel Works, toe calks..... 68
Gardner, R., Electric & Mfg. Works, blowers .....4th cover
General Welding Co., welding outfits..... 85
Giant Grip Horse Shoe Co., horse shoe calks 86
Gillette Clipping Machine Co., clipping machines 66
Gogel Mfg. Co., tire heaters..... 84
Gwilliam Co., ball bearings.....4th cover
Hall, John D., horseshoes..... 84
Hart Mfg. Co., stocks and dies.....4th cover
Harvey Spring & Forging Co., auto springs 61
Hawkeye Mfg. Co., hammers..... 64
Hay-Budden Mfg. Co., anvils.....4th cover
Heller Bros., horse rasps, tools, etc..... 68
House Cold Tire Setter Co., tire setters, hollow and spoke augers.....4th cover
Imperial Brass Mfg. Co., welding outfits.... 62
Jenner, H. W. T., patents..... 83
Kerrihard Co, hammers.....Front cover
Kimball Tire Case Co., tire protectors..... 85
Lemoine, N. Co., hoof packing....Front cover
Linde Air Products Co., oxygen..... 68
L. S. P. Calking Machine Co., calking machines .....4th cover
Macgowan & Finigan Cordage Co., hammers 86
Mayer Bros. Co., hammers.....3rd cover
Ness, Geo. M., Jr., steel Stamps..Front cover
Nicholson File Co., files and rasps..... 87
Oneida National Chuck Co., chucks..4th cover
Ottawa Mfg. Co., kerosene engines..... 84
Parker, C. L., attorney .....83, 4th cover
Parks Ball Bearing Machine Co, woodworking machinery 67
Peck, Stow & Wilcox Co., pincers..... 88
Phoenix Horseshoe Co., horseshoes and toe calks 65
Porter, H. K., bolt clipper.....4th cover
Prentiss Vise Co., vises.....4th cover
Radical Rubber Co., hoof pads....Front cover
Rosewater Electric Co., blowers..... 67
Root-Heath Mfg. Co., grinders.....2d cover
Sheldon Axle & Spring Co., axles..... 66
Standard Horse Nail Co., horseshoe nails, 4th cover
Skow Mfg. Co., disc sharpeners..... 67
Standard Horseshoe Co., horseshoes, 3d cover
Star Mfg. Co., agricultural implements, Front cover
Stokes Bros. Mfg. Co., rasps.....Front cover
Superior Oxy-Acetylene Machine Co., welding outfits .....4th cover
Turner Brass Works, welding outfits..... 64
Thompson Tuyere Iron Co., tuyere iron, 4th cover
Union Horse Nail Co., horseshoe nails....
United States Horseshoe Co., horseshoes.. 63
West Tire Setter Co., tire setters, hammers 85
Wheel, B. Top & Hardware Co., supplies.. 84
Whisler Mfg. Co., nut splitters, jointer heads .....Front cover
Witte Engine Works, engines..... 87
Young, W. F., veterinary remedies..... 68

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co.....Front cover

Anvils
Columbus Forge & Iron Co.....3d cover
Fisher & Norris..... 68
Hay-Budden Mfg. Co.....4th cover

Attorneys
Parker, C. L.....83, 4th cover

Automobiles
Bush Motor Co..... 86
Eureka Auto Co..... 84

Automobile Springs
Harvey Spring & Forging Co..... 61

Axles
Sheldon Axle & Spring Co..... 66

Ball Bearings
Gwilliam Co. .....4th cover

Blacksmiths' Tools
Buffalo Forge Co..... 67
Butterfield & Co..... 68
Canedy-Otto Mfg. Co..... 87
Champion Blower & Forge Co..... 63
Champion Tool Co..... 88
Cray Bros..... 85
Heller Bros. Co..... 68
Nicholson File Co..... 87
Peck, Stow & Wilcox Co..... 88

Blowers
Buffalo Forge Co..... 67
Champion Blower & Forge Co..... 63
Champion Tool Co..... 88
Electric Blower Co..... 61
Gardner, R., Electric Mfg. Wks..4th cover
Rosewater Electric Co..... 67

Bolt Dies
Armstrong Mfg. Co..... 64

Bolt and Rivet Clippers
Porter, H. K.....4th cover

Brazing Compound
A. & J. Mfg. Co..... 68

Calking Machines
L. S. P. Calking Machine Co.....4th cover

Calks, Horseshoe
Aetna Nut Co.....Front cover
American Calk Co.....Front cover
Diamond Calk Horseshoe Co.....2d Cover

Calks, Toe
Franklin Steel Works..... 68

Chisels
Champion Tool Co..... 88
Peck, Stow & Wilcox Co..... 88

Chucks
Buffalo Forge Co..... 67
Oneida National Chuck Co.....4th cover

Clipping Machines
Gillette Clipping Machine Co..... 66

Dies
Bicknell Mfg. & Supply Co.....4th cover

Disc Sharpeners
Durner, A. E..... 62
Mayer Bros. Co.....3d cover
Skow Mfg. Co..... 67

Drills
Buffalo Forge Co..... 67
Champion Blower & Forge Co..... 63

Engines
Ottawa Mfg. Co..... 84
Witte Engine Works..... 87

Farriers' Tools
Barnett, G. & H., Co.....Front cover
Champion Tool Co..... 88
Heller Bros. Co..... 68
Peck, Stow & Wilcox Co..... 88

Files and Rasps
Barnett, G. & H., Co.....Front cover
Nicholson File Co..... 87
Stokes Bros. Mfg. Co.....Front cover

Forges
Buffalo Forge Co..... 67
Champion Blower & Forge Co..... 63

Gasoline Engines
Witte Engine Works..... 87

Gears
Akron-Selle Co. 86

Grinders
Root-Heath Mfg. Co.....2d cover

Hammers
Champion Tool Co..... 88
Hawkeye Mfg. Co..... 64
Kerrihard Co.....Front cover
Macgowan & Finigan Cordage Co..... 86
Peck, Stow & Wilcox Co..... 88
Mayer Bros. Co. .....3d cover
West Tire Setter Co..... 85

Hollow Augers
House Cold Tire Setter Co.....4th cover

Hoof Packing
Lemoine, N., Co.....Front cover

Hoof Pads
Radical Rubber Co.....Front cover

Hoof Parers
Champion Tool Co..... 88

Hoof Nippers
Champion Tool Co..... 88

Hoof Shears
Champion Tool Co..... 88

Horseshoes
Burden Iron Works.....3d cover
Diamond Calk Horseshoe Co.....2d cover
Hall, John D..... 84
Phoenix Horseshoe Co..... 65
Standard Horseshoe Co.....3d cover
United States Horseshoe Co..... 63

Horseshoe Calks
Diamond Calk Horseshoe Co.....2d cover
Giant Grip Horse Shoe Co..... 86

Horseshoe Nails
Capewell Horse Nail Co.....Front cover
Standard Horse Nail Co.....4th cover
Union Horse Nail Co.....

Horse Stocks
Barcus Mfg. Co..... 61

Kerosene Engines
Ottawa Mfg. Co..... 84

Nut Splitters
Whisler Mfg. Co.....Front cover

Oxygen
Linde Air Products Co..... 68

Paints and Varnishes
Felton, Sibley & Co..... 61

Patents
Chandlee & Chandlee..... 84
Jenner, H. W. T..... 83
Parker, C. L. .....83, 4th cover

Pincers
Peck, Stow & Wilcox Co..... 88

Punches
Champion Blower & Forge Co..... 63

Punches and Shears
Armstrong-Blum Mfg. Co.....Front cover
Peck, Stow & Wilcox Co..... 88

Rubber Tire Applying Machines
Batavia Rubber Co..... 64

Screw Plates
Butterfield & Co..... 68
Champion Blower & Forge Co..... 63

Shaft Couplings
Bradley, C. C., & Son..... 64

Shears
Edwards, C. D..... 64

Spoke Augers
House Cold Tire Setter Co.....4th cover

Steel Stamps
Childs, S. D., & Co.....Front cover
Ness, George M., Jr.....Front cover

Stocks and Dies
Butterfield & Co..... 68
Champion Blower & Forge Co..... 63
Hart Mfg. Co.....4th cover

Supplies
Campbell Iron Co..... 84
Wheel, B. Top & Hardware Co..... 84

Swages
Champion Blower & Forge Co..... 63

Tires
Firestone Tire & Rubber Co..... 62

Tire Bending Machines
Buffalo Forge Co..... 67
Champion Blower & Forge Co..... 63

Tire Heaters
Gogel Mfg. Co..... 84

Tire Protectors
Kimball Tire Case Co..... 85

Tire Setters
Buffalo Forge Co..... 67
House Cold Tire Setter Co.....4th cover
West Tire Setter Co..... 85

Tire Shrinkers
Buffalo Forge Co..... 67
Champion Blower & Forge Co..... 63

Tire Upsetters
Buffalo Forge Co..... 67
Champion Blower & Forge Co..... 63

Tongs
Champion Tool Co..... 88

Tool Grinders
Phoenix Horseshoe Co..... 65

Trucks
Akron-Selle Co. 86

Tuyere Irons
Buffalo Forge Co..... 67
Champion Blower & Forge Co..... 63
Thompson Tuyere Iron Co.....4th cover

Veterinary Remedies
Corona Mfg. Co.....Front cover
Young, W. F..... 68

Vises
Butterfield & Co..... 68
Columbian Hardware Co..... 66
Fisher & Norris..... 68
Prentiss Vise Co.....4th cover

Wagons
Akron-Selle Co. 86

Welding Compounds
Anti-Borax Compound Co.....2d cover
Cortland Welding Compound Co..... 63

Welding Outfits
General Welding Co..... 85
Imperial Brass Mfg. Co..... 62
Superior Oxy-Acetylene Machine Co., 4th cover
Turner Brass Works..... 64

Welding Plants
Bertschy-Bermo Co. 84

Welding Supplies
Linde Air Products Co..... 68

Wheel Dishers
House Cold Tire Setter Co.....4th cover

Wheels
Electric Wheel Co..... 86
Empire Mfg. Co.....4th cover

Woodworking Machinery
Buffalo Forge Co..... 67
Crescent Machine Co..... 64
Parks Ball Bearing Machine Co 67

Wrenches
Champion Tool Co..... 88

Wrenches (Knife Handle and Pipe)
Peck, Stow & Wilcox Co..... 88

Digitized by Google

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

inserted under this head at 3 cents a word, including the address, for each insertion, cash in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York.

PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT.

Patents

PATENTS FOR INVENTIONS.
W. T. JENNER, patent attorney and mechanical expert, 608 F Street, Washington, D. C. Established 1883. I make a free examination and report if a patent can be had at the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trade-marks registered.

PATENTS.
C. L. PARKER, attorney-at-law, and solicitor of patents. American and foreign patents secured promptly. Handbook for inventors sent free upon request. McGILL BUILDING, Washington, D. C.

For Sale

FOR SALE.
Gasoline tank and pump, 3" retreading moulds and cash register. VANDERPOOL CO., Springfield, O.

FOR SALE.
Make money easy. While business is good. Vulcanize tires. Our book tells you how. $1.00. VANDERPOOL CO., Springfield, Ohio.

FOR SALE
Blacksmith shop in a town of 1,200. A bargain if taken at once. Splendid location for welding plant. Reason for selling, poor eyesight. Write to JAMES M. McGHIE, Exeter, Nebraska.

FOR SALE—IMMEDIATE DELIVERY—NEW MACHINES.
5-in. Bench Jointers. $20.00; 9-in. Complete Jointer, No. 125, $35.00; 13-in. Complete Jointer, $55.00. Can you afford to build your own Jointer Table when you can get a good, complete Jointer at the above prices? If so, we can furnish you with Square or Circular style cutter heads, made especially for wood frame tables 5-in. to 17-inch cut and in price from $10.00 up. Catalogue for the asking. W. L. SHERWOOD, Kirksville, Mo.

FOR SALE
300 sets carriage and wagon hubs XX Elm and Oak, sizes 3½ x 6½ to 10 x 14. Big bargain to anyone who can use them. Address HARRY KLENERT, 325 East 124th Street, New York City.

FOR SALE.
Vulcanizing Auto Tires is a growing business. Our plants are easy to learn how to operate and prices save you about 30%. B. AUTO TIRE EQUIPMENT COMPANY, Cincinnati, Ohio.

FOR RENT OR SALE.
Blacksmith shop for rent or sale, with or without tools; man enlisted; plenty of work; good prices; 9 miles to nearest shop. J. E. LINDSTROM, Lehigh, Ia.

FOR SALE.
One 16-in. pony planer, $65; 1 24-in. planer and matcher, $150; 1 8-in. 4-side moulder, $175; 20-in. automatic knife grinder, $50; 1 broom handle lathe, $35; lathes, planers, millers and other tools. BICKNELL MFG. & SUPPLY CO., Janesville, Wis.

FOR SALE.
A blacksmith and wagon shop in Eastern Nebraska. We get 75 cents for new common and $1.00 straight for new Neversiip shoes. Other prices accordingly. A gilt-edge proposition. $900 to $1,000 will handle. Owner going on farm. For further particulars address: C. L. K., care of The Blacksmith and Wheelwright, P. O. Box 654, New York City.

FOR SALE.
Blacksmith Shop—Fully electric equipped; two fires; good tools and stock. Work for two men. Write T. E. McCUTCHEON, Oregon, Ills.

For Sale

FOR SALE OR TO RENT.
Fine old established blacksmith and wheelwright shop; two-story building, 30 feet by 70; location excellent; well equipped for business; large country trade. Owner has recently died. Address for price and further particulars, A. B. S., Box 822, Chatham, N. Y.

FOR SALE.
Blacksmith and wagon shop in town of 400 population in Filmore county. Only wood shop in town. No tools. Good business, worth investigation. Address MRS. K. WESTLINE, 810 W. 7th, Rochester, Minn.

FOR SALE.
Exceptional opportunity offered in sale of established business. Blacksmith and machine shop, fully equipped and in operation. Reasons for selling. Write immediately, ERICK NELSON, Strandquist, Minn.

WHITE OAK WAGON POLES
3"x6" at Butt, 3"x3" at Point, 12 ft. Lengths
F. F. BOWN MFG. HOUSE, P. O. Box 500, PITTSBURGH, PA.

FOR SALE.
Drill Press, Trenton Anvil, Engine Lathe, Little Giant Trip Hammer, F F, Ford shock absorbers, blacksmith vises, 3-ton Avery truck, 180-lb. grinding stone, 100 spark plugs, Marine engines, propellers, stationary gasoline engines. Enclose reply stamps. J. A. LOFFELMACHER, Fairfax, Minn.

Miscellaneous

QUICK COLLECTIONS.
Send your accounts to-day to a live wire firm and get your money NOW! Established 25 years; collections made everywhere. WILLIAM H. DODD, 87 Nassau St., New York. Phone 6231 Cortland.

AUTOMOBILE REPAIRS.
Blacksmiths who own automobiles or repair automobiles in their shops should subscribe for the AUTOMOBILE DEALER AND REPAIRER: 100-page illustrated monthly devoted exclusively to the care and repair of the car. It is the only magazine in the world devoted to the practical side of motoring. Many garages and repair shops subscribe for no other automobile magazine. The "Trouble Department" contains five pages of numbered questions each month from car owners and repairmen which are answered by experts on gasoline engine repairs. $1 per year; 15 cents per copy. Postals not answered. CHARLES D. SHERMAN, 52 Windsor Avenue, Hartford, Conn.

Gears

GEARS & SHAFTS

Transmission gears and shafts, differential gears and axle shafts in stock for over 125 makes (500 models) of pleasure cars and trucks. Obsolete, Orphan and Current models.

Dealers and repairmen, send for our 125-page price list and make a good profit on your repair work.

AUTO GEAR CO., Inc.
844 Eighth Avenue, New York, N. Y. — 1461 S. Michigan Ave., Chicago
275 Marietta St., Atlanta, Ga.
NO SECOND-HAND PARTS OR JUNK

Tires

Double Tread Tires

Notice Our Prices Before Going Elsewhere

PRICE LIST

Size	Plain	Size	Plain
30x3	$5.00	35x4	$9.00
30x3½	5.50	36x4	9.50
32x3¼	6.50	36x4½	10.00
32x4	7.00	36x5	10.00
33x4	7.50	37x4½	10.00
34x4	8.00	37x5	10.50
34x4½	8.50		

For Non-Skid, 50 cents more on all sizes.

We Carry a Full Line of New and Used Tires & Tubes

GINSBERG & BERKOWITZ, Inc.
236 WEST 48th STREET, NEW YORK

DOUBLE TREAD TIRES
GUARANTEED
SPECIAL OFFER TO AGENTS. Write for Catalogue
Get our special price on new tires
M. LIBEN & CO.
205-AK West 48th St. New York City

Wanted

WANTED.
Second hand House Cold Tire Setter, with punch and shear, or with shear. Must be cheap. J. L. SCOTT, 4048 Laclede avenue, St. Louis, Mo.

WANTED.
Good all-around blacksmith. Young married man preferred. Top wages for right man. Address M. W. ABTS, Morrill, Nebr.

WANTED.
Situation by first-class horseshoer at the fire. Address Box 480, Macon, Ga.

WANTED.
Salesman: Calling on quarries, mines, mills, factories and railroads to handle our Damascus Tempering Solution. Used by the largest railroads and steel industries. EMPIRE CHEMICAL CO., Huntington, W. Va.

WANTED.
We need a blacksmith in our town of 150 population. Good opening for a competent mechanic. No blacksmiths' shops here now. Have a building that can be had cheap; also tools. Write for details. GASCOYNE COMMERCIAL CLUB, Gascoyne, North Dakota.

WANTED.
A good all around blacksmith. Address GEO. W. THOMPSON, Coopersville, Mich.

Personal

PERSONAL.
BROTHER—Accidentally discovered pleasant root, chewed like gum, quickly, easily, overcomes both tobacco habit and indigestion. Gladly send particulars. G. S STOKES, Mohawk, Florida.

L. S. P. Calking Machine Company.

This is said to be a marvelous time and labor saving machine. The 1918 model is practically the same as the 1917 model. The company has eliminated the steel plugger attachment and strengthened some of the parts. This, readers should bear in mind, is not a machine which makes toe calks nor is it a foot vise. It is for turning heel calks, both blunt and sharp, sticking and welding toe calks, clipping and trimming ends of shoes. A cut of this device will be found in the advertisement of the company on another page. Full information and prices will be given by addressing the L. S. P. Calking Machine Co., P. O. Box 225, Wyalusing, Pa.

"E-Z" Welding Compound.

This compound is said to work equally well on all kinds of steel and welds at a very low heat, leaving no scale. The Crescent welding compound is recommended especially for plow work or where parts are fastened together before welding. It insures a smooth finish and perfect weld on toe calks. Sample of either of these compounds will be sent on request to any reader who will write for it to the manufacturers, the Anti-Borax Compound Co., Fort Wayne, Ind.

The Horses's Friend.

Blacksmiths everywhere can make it profitable to take an agency for the sale of the Corona Wool Fat Compound, manufactured by the Corona Mfg. Co., Box 2, Kenton, Ohio This preparation is a very efficacious treatment for hard and contracted hoof, quarter cracks, corns, grease heel, scratches, wounds and sores of almost any nature on man or beast. It affords a good profit. This company will send free sample together with dealer proposition to any subscriber situated favorably for taking an agency.

Kerrihard Power Hammer.

Our readers who may be intending to purchase a power hammer of any kind will do well to write for a descriptive circular and full information concerning the Kerrihard Hammer made by the Kerrihard Co., Kerrihard Station, Red Oak, Ia.

Shears.

No shop is complete without such shears as are made by C. D. Edwards, Albert Lea, Minn. For upwards of 20 years these shears have demonstrated their worth wherever they have been used. They can be ordered in any hardware or supply house throughout the country or a descriptive circular will be sent by addressing the manufacturer as above.

Finished Horse Shoes.

John D. Hall, Orrville, O., announces finished horse shoes and says it will save labor and expense to order these from him.

Mending Broken Castings.

The A. & J. Manufacturing Co., 559 West Lake street, Chicago, Ill., announce a compound for brazing cast iron, which can be used in any blacksmiths' forge. This preparation is called "Braziron." If your supply house doesn't keep it, write direct to the manufacturers as above.

The Batavia Rubber Tire Applying Machine.

As soon as spring opens there will be a great demand everywhere for new rubber tires for horse-drawn vehicles, and these can be applied with great success by the rubber tire applying machine manufactured by the Batavia Rubber Co., Batavia, N. Y. The operation of this machine, it is said, is simplicity itself, and it is made of the very best material. Write at once for descriptive pamphlet and prices.

"Marvel" Blower.

This device presents advantages which our readers in need of a blower should investigate. An illustration will be found in the advertisement of the Electric Blower Co., 352 Atlantic avenue, Boston, Mass.

The manufacturers say that with the enlarged oil wells and case hardened shaft you get long wearing qualities. Through your dealer you can have one of these "Marvel" blowers on 30 days' trial. A descriptive circular giving full particulars will be mailed on request.

Armstrong Stocks and Dies.

These are made by the Armstrong Mfg. Co., of Bridgeport, Conn., New York office, 248 Canal street. Those needing a tool of this kind should send to the company at the above address for their No. 14 catalogue.

Selle Gears.

The worth of these gears has been demonstrated by the fact that they have been on the market for a quarter of a century or more and have given universal satisfaction on the largest wagons made. A 230-page catalogue will be sent free to any readers interested who will write for it to the Akron-Selle Co., Akron, O.

Burden Horseshoes, Troy, N. Y.

To those who are acquainted with the Burden horseshoes there is, of course, no necessity of mentioning their peculiar merits. To all others we would say write to the Burden Iron Co., Troy, N. Y., for particulars concerning these shoes, or order some from your dealer and see how they work.

Bradley Ball-Bearing Carriage Coupler.

These couplers are all steel, noiseless, quick shifting, ball-bearing, all very essential qualities. This shaft coupler is said to be the only one on the market which is furnished with a one-piece leather packing. Write to the manufacturers, C. C. Bradley & Son, Syracuse, N. Y., for descriptive circular. These couplers are for sale by jobbers everywhere.

Butterfield's Combined Automobile Screw Plates.

This tool may profitably find a place in every automobile repair shop or blacksmith shop for that matter where automobile repairing is done. These screw plates are adjustable for tight or loose fits by a simple screw arrangement. Complete information will be furnished by writing to Butterfield & Co., Inc., Derby Line, Vt.

The Crescent Universal Wood Worker.

This machine can be used to advantage by every wheelwright shop in the country and will be found to be a great labor saver. It has been installed in thousands of shops and is universally commended wherever it has been used. A catalog may be obtained giving full particulars by writing to the Crescent Machine Co., 203 Main street, Leetonia, Ohio.

Tires

BUY EARLY AND SAVE MONEY
Double Tread Tires and Tubes
GUARANTEED

Come to the Tire Clearing House—here are prices—clear cut and plain as daylight. We buy wholesale the best "try out" Tires—and you get the benefit—you want truthful tires, and truth is never crushed to earth if given a square deal—real truth is puncture proof—

SO ARE OUR TIRES.

Size	Plain	Non-Skid	Tubes
28x3	$4.40	$4.95	$2.00
30x3	5.50	6.05	2.00
30x3½	6.60	7.15	2.50
32x3½	7.15	7.70	2.75
34x3½	8.25	8.80	3.00
34x4	7.70	8.25	2.75
32x4	8.80	9.35	3.00
33x4	8.80	9.90	3.50
34x4	8.80	9.90	3.50
35x4	9.90	11.00	3.60

Get your order in quick for goods listed here—by all means get in touch with us for further information about our special process—it means money in your pocket. Get in right—write today—yes—today.

Look up rating in Dunn's or Bradstreet's.

Size	Plain	Non-Skid	Tubes
36x4	$9.90	$11.00	$3.60
32x4½	9.90	11.00	3.75
34x4½	11.00	12.10	4.00
35x4½	11.00	12.10	4.10
36x4½	11.00	12.10	4.25
37x4½	12.10	13.20	4.35
34x5	11.00	12.10	4.50
35x5	13.20	14.30	5.00
36x5	13.20	14.30	5.00
37x5	13.75	14.85	5.00

For (non-skid) sizes up to 32x4, 50c extra; all other sizes $1.00 extra.
For rebuilding your old tires we charge you 60% of the above prices.

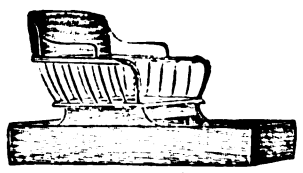
B. LIBEN & COMPANY
261-A West 54th Street — NEW YORK CITY — 112-A East 110th Street
THE HOME OF DOUBLE TREAD TIRES

Digitized by Google



No. 244. BODY AND SEATS

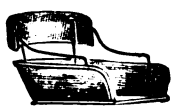
Price, no seats ..... $8.25 and up
Price with seats..... 11.95 "



STICK SEAT BODY
$8.44 and up

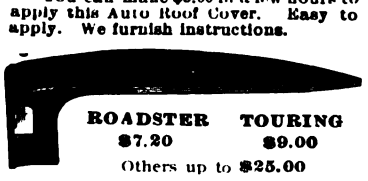


PIANO BODY
With seat..... $6.07 and up
Without seat..... 4.87 "



ROUND CORNER SEAT
Untrimmed..$3.00 and up
Trimmed..... 8.00 "

You can make $5.00 in a few hours to apply this Auto Roof Cover. Easy to apply. We furnish instructions.



ROADSTER TOURING
$7.20 $9.00
Others up to $25.00

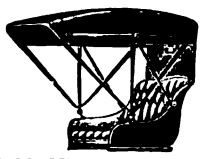
CURTAIN LIGHTS
Sticktite



No sewing. Cost $7.20 doz. and up. Parcel Post Paid. You can make 100% profit.



BUGGY GEARS
Each $12.50
With Wheels and Shafts...$26.90 and up



AUTO SEATS—Top Seats
Seat ..... $3.56 and up
Cushion and back... 7.63 "
Top ..... 12.84 "

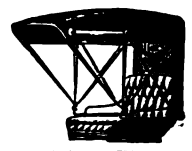


POLES
Buggy or Surrey size ..... Per bundle, $7.50

FORD FRONT SPRINGS
$3.06



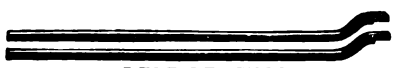
Guaranteed not to break
Can furnish springs for any make car.



TOP SETS
Seat ..... $1.55 and up
Cushion ..... 1.88 "
Back ..... 2.06 "
Top ..... 9.94 "



DOUBLE TREES WITH SINGLE TREES
Buggy and Surrey size..... Each 95c



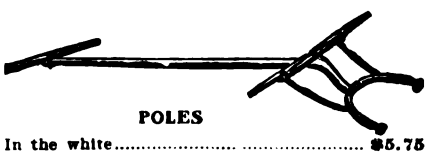
BENT REACHES
Assorted sizes..... 10 for 75c

STRAIGHT REACHES
Assorted sizes..... 20 for 75c

JUST OUT

Our New 1918 Auto Parts Catalogue

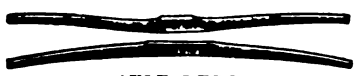
JUST FULL OF NEW THINGS & MONEY MAKERS



POLES
In the white..... $5.75
Painted 6.65



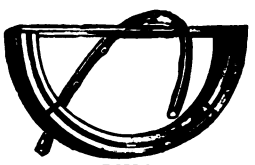
BUGGY AND WAGON AXLES
$1.95 and up
We carry all sizes.



AXLE BEDS
Assorted sizes—drop..... 14 for 60c
Assorted sizes—arch..... 8 for 60c



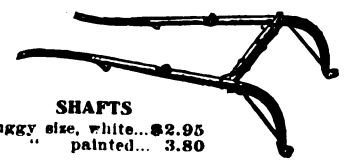
SHAFTS Per Bdl.
Buggy size ..... XX, $8.90
Surrey size..... XX, 6.50



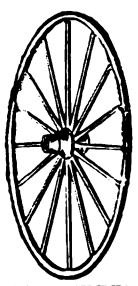
RIMS
We carry all sizes.
Plain Rims..... $1.25 and up
Beveled Rims.... 1.50 "
Bored and Rounded Rims 1.80 "
15 pieces bored and rounded rims, assorted sizes, for 75c



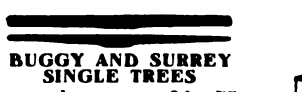
SPRING BARS
Assorted sizes ..... 14 for 75c



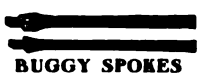
SHAFTS
Buggy size, white...$2.95
" painted... 3.80



LIGHT WHEELS
With Steel Tire on, $7.40 and up
With Rubber Tire on, $16.80 and up
We make all sizes.
Auto Wheels with Demountable Rims $14.85



BUGGY AND SURREY SINGLE TREES
Assorted ..... 6 for 75c



BUGGY SPOKES

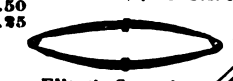
	Per 100
1 in., Sar. Pat.	$1.80
1 1/16 in., Sar. Pat.	2.10
1 1/16 in., C. B.	2.25
1 7/16 in., Sar. Pat.	3.50
15/16 in., Warner Pat.	1.35



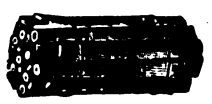
Roadster Tops $17.95
Touring, $21.55

AUTO SEAT COVERS
$7.75 and up
We recover your old Auto Frame.
Send for sample of goods we use in our Tops and Seat Covers.

PRICES SUBJECT TO CHANGE OWING TO UNSETTLED CONDITIONS OF RAW MATERIAL MARKET. BETTER ORDER NOW.



Elliptic Springs
$1.10 and up



WOOD HUB SPOKES

	Per set
2 in.	$3.05
2¼ in.	3.23
2½ in.	4.35

Send for our large CATALOGUE
On Carriage, Wagon and Auto Parts and learn how we do it.
Our freight offer will interest you.
Adjust your wants to the sizes and styles we furnish at the above prices and save money.

B. WHEEL, TOP & HDWE. CO.
127 East Eighth Street CINCINNATI, OHIO



HEAD BLOCKS
Assorted sizes,
8 for 75c

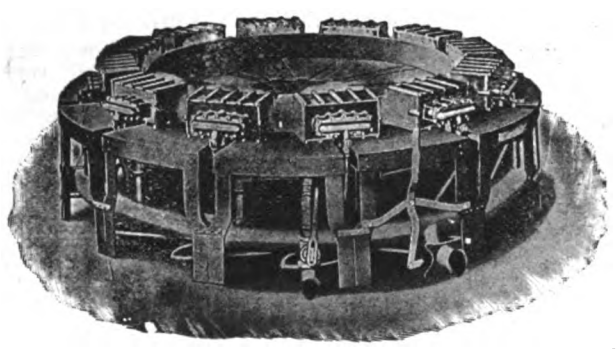


DASHES

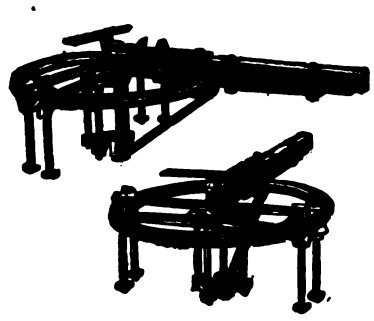
20 in. drill	$0.20
17 in. leather	1.20
26 in. leather	1.20
29 in. leather	2.60



PARAMOUNT SPOKE WEDGES
1000 Assorted Sizes
Spoke Wedges 60c







TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.

OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.

Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE GOGEL MFG. CO., TOLEDO, OHIO.

WELDING PLANTS, $25.00 to $300.00
Designed for all purposes. Small cash payment; balance, three to six months.
Every mechanic and shop should have one.
BERTSCHY-BERMO CO. OMAHA, U. S. A.

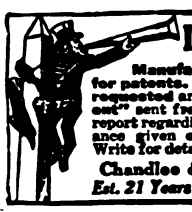
The Campbell Iron Company

Wholesale Automobile, Garage, Machinists, Blacksmith and Implement Supplies, Hardware Specialties. Duplicate Parts for Fords carried in stock.
Write for new catalog for equipment and tools for the Garage and Auto Repair Shop. 817 Cass Ave., St. Louis, Mo.

Finished Horse Shoes
When help is so scarce and costly, why not buy the best Finished Horse Shoe and cut out the labor and expense.
Address for full particulars
JOHN D. HALL,
ORRVILLE, OHIO
Manufacturer of cold hammered and cold sharpened, steel centered horse shoes.

Pay for an
AUTOMOBILE
On the Instalment Plan
$10.00 Down and $10.00 a Month
25c Brings Full Explanation with Bulletin
Eureka Auto Co., *Rebuilders*, Beavertown, Pa.

OTTAWA KEROSENE ENGINES
Latest design. Durable, Powerful, Reliable, Massive. Built to do hard, heavy work—to give lasting service. Uses Cheapest Fuel. Pulls 25 to 50% more H-P. than rated. Shipped on three months' trial. Easy terms. Sizes 1½ to 22 H-P. 10-Year Guarantee. Book free—postal gets it.
OTTAWA MFG. CO.
1781 King St., Ottawa, Kans.
FREE BOOK



Inventions Wanted!
Manufacturers constantly writing us for patents. List of inventions actually requested and book "How to Obtain a Patent" sent free. Send rough sketch for free report regarding patentability. Special assistance given our clients in selling patents. Write for details of interest to every inventor.
Chandlee & Chandlee, Patent Attorneys
Est. 21 Years 587 7th St., Washington, D.C.

Free Samples.

The Cortland Welding Compound Co Cortland, N. Y., is offering free sample of their "Weld-a-Cast" fluxes for oxy acetylene welding. "Weld-a-Cast" i highly recommended on account of it efficient working qualities. It has spe cial points of merit which appeal to al welders, as it leaves the metal soft an eliminates blow holes. This compan will send free samples to every sub scriber who is interested in welding an who will take the trouble to write fo them.

The New Little Giant.

The Little Giant Punch & Shear Co Box 56, Sparta, Ill., has recentl brought out a catalogue completely de scribing the full line of punches an shears they manufacture. They woul like to place one of these catalogues i the hands of every reader of The Black smith and Wheelwright. All you hav got to do is to write for it, on a post card, or in a letter, and it will be prompt ly forwarded. One of their machine would save many dollars and lighten th work in every blacksmith's shop in th land.

Wells Self-Opening Die.

It is said that the use of a "Well self-opening die" in certain classes o threading work must result in a savin of time and an increase in productio The time lost in "backing off" the wor is minimized and the "drag" of the wor on the chasers is eliminated. A larg amount of wear and tear on the machin belting, etc., is also eliminated. Th Greenfield Tap & Die Corp., Greenfiel Mass., has recently brought out a ver handsome pamphlet of 24 pages wit numerous illustrations and full partic lars concerning their self-opening di They would like to place a copy of th booklet in the hands of every reader The Blacksmith and Wheelwright an we suggest that our subscribers send postal card or a letter and get it.

Nicholson Files.

The files manufactured by the Nicho son File Co., Providence, R. I., a bearing the trade-mark, "Nicholso stamped on each file guarantees it is selected forged steel, annealed, grou and cut by expert workmen. The fil and rasps of this company are for sa at hardware and supply stores throug out the country.

Steel Stamps.

Our readers who may be in need steel stamps, burning brands, rubb stamps and stencils should correspo with George M. Ness, Jr., 61 Fult street, New York City.

Witte Engines.

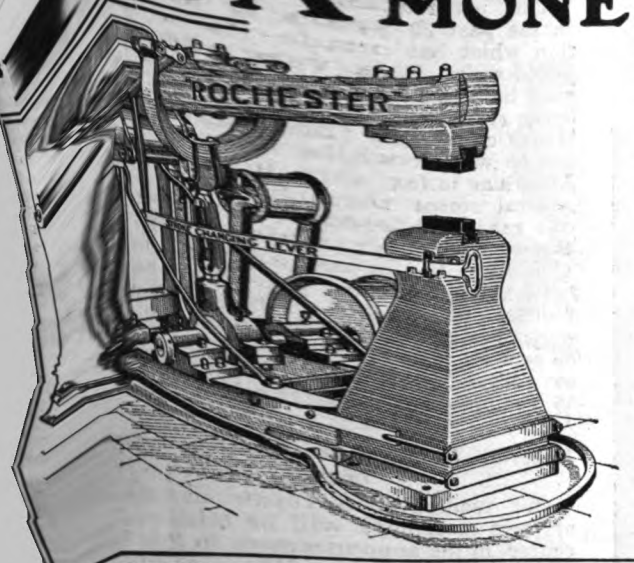
Our readers who may be in want of new kerosene engine or who have d cided for the first time to equip th shop with power will find it to their a vantage to write to the Witte Engi Works, 2449 Oakland avenue, Kans City, Mo., for their free book givi some very interesting news about t Witte engine, both stationary and po table. Some further particulars m be found in the advertising of the co pany on another page.

Subscribe to The Blacksmith & Wheelwright, $1.00 Per Year

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

T'S A MONEY MAKER



MY FRIEND"

THAT'S WHAT THE SMITH SAID—HE USES IT DAILY—

HE KNOWS

HE CAN'T SAY ANYTHING ELSE BECAUSE WE MADE THIS HAMMER TO SUIT HIM.

We have a Rochester Helve Hammer for YOU TOO.

Our Illustrated Booklet tells the entire story. A Post Card will bring it. Full Descriptions about the Six Sizes we make.

ALSO WE MAKE THE WORLD FAMOUS WEST HYDRAULIC TIRE SETTERS

THE WEST TIRE SETTER CO., ROCHESTER NEW YORK



Free 512 PAGES OF BARGAINS

POST PAID

WE WANT TO SEND YOU THIS 512 PAGE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

Tells how you can work up a profitable auto supply and repair business.

Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories
1117 W. 11th Street, **Cleveland, Ohio, U. S. A.**



MUD CHAIN

Can be put on in a jiffy with one hand while standing on the run board. If you get in a mud hole, you will laugh out loud. Hook the ends together and pull the little lever and they are on tight. One or two will take you out of a hole. but it is better to use about 5 for continuous running. Good for blow-outs.

STEEL TIRE PROTECTORS



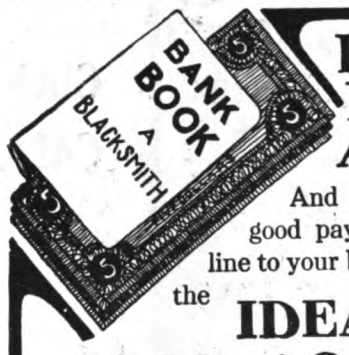
Tires can't wear out if covered with **Steel.** Try a few sections over any old blow-out. Tires are as flexible as ever. **Can't Skid.**

Special Inducements to Those in New Territory

KIMBALL TIRE CASE CO.
175 Broadway Council Bluffs, Iowa

Each Section 2 inches Wide, ⅛ inch Thick
Write for Prices and Full Particulars





IF YOU WANT A FAT BANK ACCOUNT

And an extra good paying side line to your business, the

IDEAL Welding Outfit

Will do the trick.

Cold weather causes more breaks in metals than any other cause, so if you are equipped with our "IDEAL" welding outfit to repair breaks in axles, gear cases, chassis, cylinders, and other parts, you will reap the cream of business.

Come in *now* and beat the other fellow to it.

Write *today* for full particulars

General Welding Company
363 14th St., Hoboken, N. J.



Every Blacksmith Shop Ought to Have a Clock



Having made a very favorable arrangement with one of the largest clock companies in this country, we now offer to our readers a Regulator Eight-Day Calendar Clock, 38½ in. high with a 12 in. dial, with a subscription to THE BLACKSMITH AND WHEELWRIGHT for a year for **$4.90.** We cannot fill orders for these clocks to foreign countries.

Every blacksmith shop ought to have a clock of this description, which gives you the time and the day of the month. The engraving shown herewith gives a correct impression of the appearance of the clock.

THIS OFFER IS GOOD FOR EITHER OLD OR NEW SUBSCRIBERS.

ADDRESS

M. T. RICHARDSON CO., Publishers,
71-73 Murray St., New York

THE SCREW-CUTTING LATHE

How to select, set up, adjust and operate

By JAMES F. HOBART, M. E.

THIS book is a concise and exhaustive treatise on everything pertaining to the SCREW-CUTTING LATHE, including costs, erection, operation and adaptability. It is written by one who thoroughly understands his subject in all its details, and is so copiously illustrated that everything in it will be readily understood.

It will be found invaluable to those desiring to know just how a Screw-Cutting Lathe should be run.

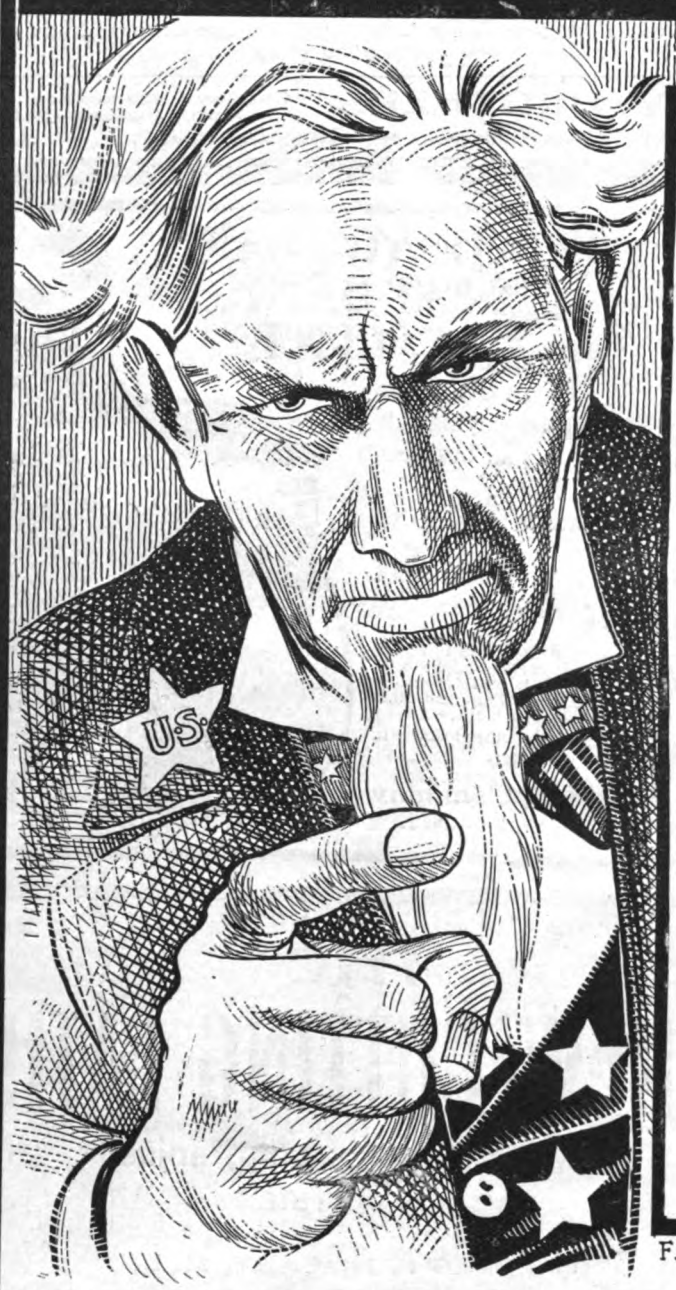
There are ***92 illustrations,*** and the book is substantially bound in cloth. ***Price, $2.00.*** A copy will be sent postage prepaid to any address on receipt of price.

M. T. RICHARDSON CO.
PUBLISHERS
71-73 Murray St., New York

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

"I'LL TAKE CARE OF THE WAR YOU BOYS WHO CAN'T GO—MUST TEND TO BIZNESS"



and there's no better way of attending to business than to stock up on

GIANT GRIP SHOES, CALKS, and TOOLS.

With MEN, business will go right along just the same as ever—molly-coddles don't count.

Giant Grip Calks you'll find to be a separation of the real from the apparent—the permanent Genuine Calk from the ordinary.

There is no effective substitute for that long and practical experience which is father of safe and conservative initiative. Many years of Shoe, Calk, and Tool making enables us to surely maintain certain advantages over others.

Don't let Progress catch you walking backward!—Write us to-day for literature.

GIANT GRIP HORSE SHOE CO.

Manufacturers of the original Drive Calk.

OSHKOSH, WISCONSIN

F.M.

Absorbine.

This preparation has won for itself in the past 20 years or more a reputation which has made its merits almost world-wide. It is very efficient in stopping lameness from a bone spavin, ring bone, splint, curb, etc., and it does not blister or remove the hair and the horse can be worked while it is being applied. Absorbine is for sale in drug stores and general stores throughout the country. Our readers interested should write for Horse Book 9M, which is sent free. Absorbine, Jr., is an antiseptic liniment for mankind for the purpose of reducing painful swellings, enlarged glands, wens, bruises, etc. A trial bottle will be sent on receipt of 10 cents in stamps by addressing W. F. Young, P. D. F., 55 Temple street, Springfield, Mass.

Imperial Welding and Cutting Equipment.

Our readers who repair automobiles or farm machinery will be interested, of course, in the announcement in this issue of the Imperial Brass Mfg. Co., 512 So. Racine ave., Chicago, Ill. Such a welding outfit as they advertise can be used to great advantage in large numbers of shops all over the country. This company would like to send an illustrated catalog, giving full particulars of their outfit, cost of operation and other valuable information to every reader who may be interested. Write for it at once at the address given above.

Porter's Bolt Clippers.

These have been a standard tool for more than a quarter of a century. They are made by H. K. Porter, 6 Ashland street, Everett, Mass., who makes "Easy" Nos. 1 and 2 and "New Easy" Nos. 0, 1, 2 and 3, and all may be had at almost any hardware or supply store in the United States or in nearly every part of the world.

Useful for Wheelwrights.

Bicknell's jointer, saw and rounding machine will be found of great advantage in all wheelwright shops. This company also make drill vises, farriers' knives and many other tools. For catalogue write to the Bicknell Mfg. & Supply Co., Janesville, Wis.

Patents.

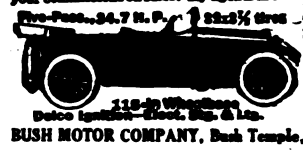
A handbook for inventors will be sent free by writing to C. L. Parker, solicitor of patents, McGill building, Washington, D. C.

Aetna Steel Toe Calks.

Dealers everywhere sell the Aetna steel calks, "Black Horse" brand. These toe and heel calks excel in shape, spur and drive and are made of the best steel.

Driver Agents Wanted

Drive and demonstrate the Bush Car. Pay for it out of your commissions on sales. My agents are making money. Shipments are prompt. Bush Cars guaranteed or money back. 1918 models ready. Write at once for my 48-page catalog and all particulars. Address J. H. Bush, Pres. Dept. 9-TW



BUSH MOTOR COMPANY, Bush Temple, Chicago, Illinois

The Perfect Power Hammer



Note the difference in construction over other makes:

Extra Long Guides, insuring a direct movement of the ram without any side motion, which causes guides and springs to break on other Hammers.

The only Hammer made with a disk attachment with special anvil for sharpening harrow and plow disks.

A recently invented **Friction Clutch** fitted with **Ball Bearings**, absolutely controls the operation of the Hammer by foot pressure from the lightest tap to the heaviest blow. This ease of operation makes the Hammer particularly well adapted for plow work, as you can get as light a stroke as you desire.

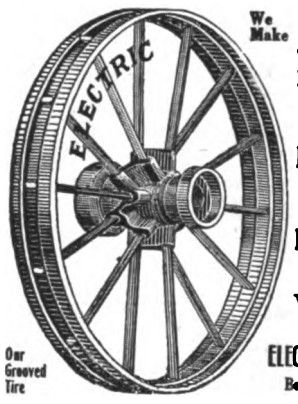
Will ship to any responsible party on approval. If not as represented, no sale.

Made in two sizes:

3 inch square, 40 lb. ram—shipping weight, 1,150 lbs.
4 " " 80 " " — " " 1,800 "

Write any jobber for prices, or

Macgowan & Finigan Cordage Co.,
204 North Third St., ST. LOUIS, MO



Our Grooved Tire

We Make **STEEL WHEELS**
To Fit Any Axle Plain or Grooved Tire
Steel or Hickory Axles
Any Size
A Full Line of Wood and Steel
Farm Trucks
With Steel or Wood Wheels
Write for Large Catalog and Prices
ELECTRIC WHEEL CO.
Box N, Quincy, Ill.

"GEARS AND WAGONS"

Selle Gears A quarter of a century of success has placed "Selle Gears" and Wagons in the hands of the largest wagon users in the world. Express and Transfer Companies, Department Stores, Fire Departments, etc., specify "Selle Gears" and will take no other after once tried.

230 Page Catalog Free.

THE AKRON-SELLE CO. Akron, Ohio

Do you want anything? Is your shop for sale, or do you want to buy a shop or hire a man? If so, a "Want" advertisement in THE BLACKSMITH AND WHEELWRIGHT will bring you good results. See terms at the head of the "Want" Department on another page.

Advertising Rates in The Blacksmith and Wheelwright made known on application

Digitized by Google



The files which do the best, "longest," are the ones for you to use on your work.

You will always find that

NICHOLSON FILES
Give Best Service

NICHOLSON U.S.A. (TRADE MARK)

BY INVITATION MEMBER OF
NEW YORK, U.S.A.

"NICHOLSON" stamped on a file, absolutely guarantees selected steel—forged, annealed, ground and cut by expert workmen who have made your needs a lifetime study.

SPECIFY "NICHOLSON"—AT ALL LEADING DEALERS

Nicholson File Co., Providence, R. I.



I Will Sell You A Better Engine—on Your Own Terms—Cash, Payments or No Money Down

I Can Make You The Best Price

IMMEDIATE SHIPMENT Now!

90 Days Trial—5-Year Guarantee

Let me ship you my Special Model Kerosene Engine using 8-cent Kerosene instead of high-priced gasoline, to earn its own cost the first three to six months. Thousands are making money with WITTE Engines---Superior in design, construction and durability. Easy starting battery or magneto. Every engine shipped ready for business, including Speed Regulator and Free Equipment.

Four Plans of Purchase—Buy for Cash, on Payments, Bank Deposit or No Money Down. Use engine 90 days. See how little it costs for fuel and how easy it is to operate on kerosene, with a WITTE. You don't have to wait for your engine---I ship at once---make you the best price. I build engines exclusively---sell them direct to my customers at factory prices. You get your engine when you want it.

WITTE HIGH GRADE ENGINES
STATIONARY AND PORTABLE

On the market continuously for 31 years without a break. Why pay more than my factory price to get quality, or buy a cheap engine to get a low price. **My Free Book,** "How to Judge Engines" is copyrighted. It tells how I have been able to reduce manufacturing costs, why vertical values are best, why I use the highest grade semi-steel instead of cast iron, why kerosene engines must be specially made for kerosene, all about vaporizing fuel, built-in adjustable speed regulator, automobile ignition and other desirable features. You can see the engine you want before you pay me a dollar. Write today for my low factory prices on kerosene engines---the lowest possible consistent with quality saving you $15 to $200.---ED. H. WITTE.

WITTE ENGINE WORKS, 2448 Oakland Ave, Kansas City, Mo.
2448 Empire Bldg. Pittsburgh, Pa.

A Real Kerosene Engine 2 to 22 H-P

Cuts Fuel Cost 65 Per Cent

Save $15 to $200

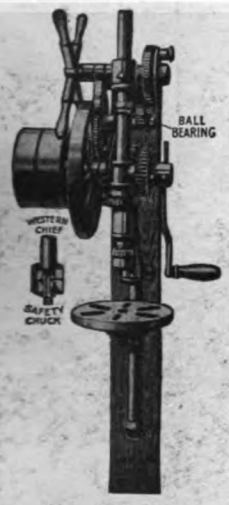
The Better Your Equipment The Bigger Your Profit

Buy CANEDY-OTTO
AND INCREASE YOUR INCOME

Once Tried, Always Used : There's a Reason—Quality

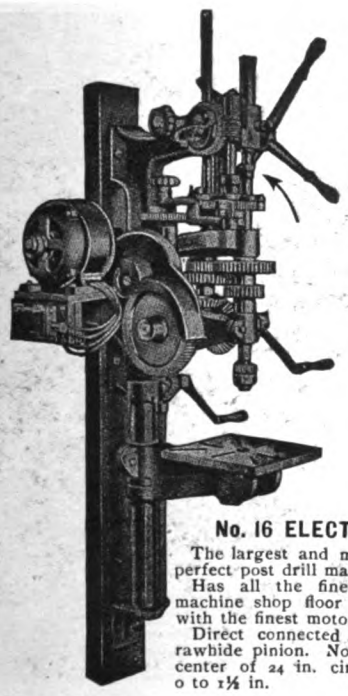
OVER 200 DIFFERENT STYLES

SEND FOR CATALOGUE No. 12



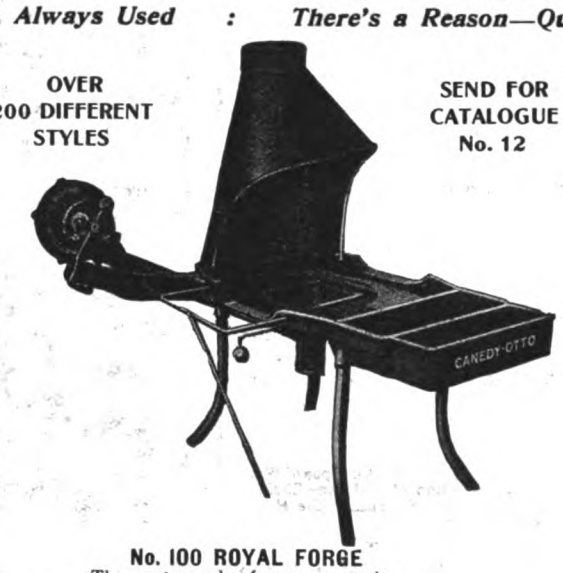
No. 19 DRILL

A low-priced combined hand and power self-feed drill.
Drills to center of 16½ in. circle.



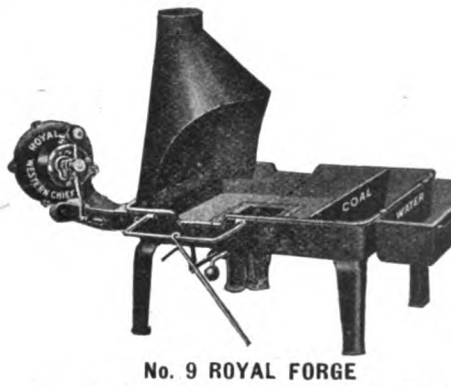
No. 16 ELECTRIC DRILL

The largest and most mechanically perfect post drill manufactured.
Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.
Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1½ in.



No. 100 ROYAL FORGE

The most popular forge ever made.
Fan, 12 in. Hearth, 31½x45½ in.



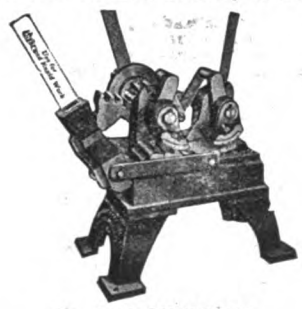
No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x50 i
Blower, 12 in.



No. 36 POWER DRILL

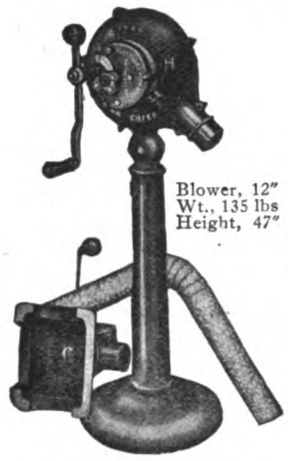
A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.
All machines are tested before leaving the factory, and guaranteod in every respect.
Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.



No. 1 1/2 SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.

CANEDY-OTTO MFG. COMPANY
"Safety First—Insist on Canedy-Otto Tools"
Forges, Blowers, Drills, Punches, Shears, Shrinkers
CHICAGO HEIGHTS, ILLINOIS



Blower, 12"
Wt., 135 lbs
Height, 47"

ROYAL BLOW

(Ask the man u owns one)

Gives more pow blast than any blower made. C turns forward or ward.
Fire pot is 8x inside.



No. 8 ELECTRI BLOWER

The best outfit money buy.

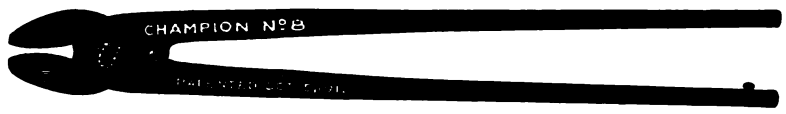
Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge

Nothing to get out of order.



Will hold securely any size of shoe.

No. 8 16 Inches Long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

Weights, 1¾ to 3 lbs.

This Hammer is the most popular Sharpening Hammer on the market.

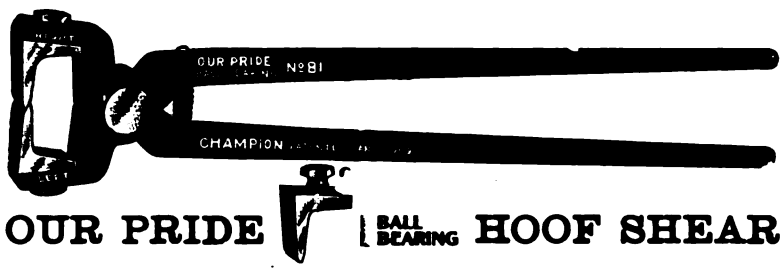


Corrugated Pein

IT GIVES RESULTS.

No. 12 ELECTRIC SHARPENING HAMMER

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.



OUR PRIDE BALL BEARING HOOF SHEAR

Blades easily replaced when worn out.

All parts interchangeable.

Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY, - Meadville, Pa., U. S. A.

THE LIVINGSTON CO., 131 E. 23rd Street, NEW YORK, Eastern Representatives

JUST PUBLISHED



AUTOMOBILE WELDING

WITH THE OXY-ACETYLENE FLAME

By M. KEITH DUNHAM

167 Pages **Price $1.00** **Fully Illustrated**

Sent Postpaid to Any Part of the World.

This is the only complete book on the "Why" and "How" of Welding.

EXPLAINS in a simple manner apparatus to be used, its care, and how to construct necessary shop equipment. Proceeds then to the actual welding of all automobile parts, in a manner understandable by everyone.

Gives principles never to be forgotten. Aluminum, cast iron, steel, copper, brass, bronze and malleable iron are fully treated, as well as a clear explanation of the proper manner to burn the carbon out of the combustion head.

AUTOMOBILE OWNERS, GARAGE AND SERVICE STATIONS, BLACKSMITHS AND MACHINE SHOPS, as well as industries using the oxy-acetylene flame, will find this book of the utmost value, since the perplexing problems arising when metal is heated to a melting point are fully explained and the proper methods to overcome them shown.

CONTENTS

CHAPTER I.—APPARATUS KNOWLEDGE.

Oxygen Supply—Care of Oxygen Cylinder—Acetylene Generator—Care of Generator—Regulators—Care of Regulators—Creeping Regulators—Gauges—Care of Gauges—Welding Torch—Care of Welding Torch—Effects of Heat—Hose and Goggles.

CHAPTER II.—SHOP EQUIPMENT AND INITIAL PROCEDURE.

Preheating Agencies—Welding Table—Location of Welding Outfit—Starting the Welding Outfit—Adjustment of Flame—Principle of Welding—General Welding Knowledge—Welding Rods and Fluxes—Choice of Tip—Expansion and Contraction.

CHAPTER III.—CAST IRON.

Simple Welding—How to Hold the Flame—Hard Cast Iron—Pin Holes and Blow Holes—Lug on Cylinder—Water Outlet—Cylinder Welding—Compression Head—Finishing and Testing—Scored Cylinders—Cylinder Parts—Fly Wheels—Pistons—Crank Cases—Babbitted Bearings—Valve Guides—Preserving Threads—Conclusion of Cast Iron.

CHAPTER IV.—ALUMINUM.

Use of—Welding Knowledge—Puddle System—Flux System—Comparison of Systems—Welding Rod—Preparation of the Weld—Inlet Manifold—Arm of Crank Case—Welding the Arm Without Taking Out the Motor—Break in the Body of Case—Welding Cold—Wrong Method of Setting Up—Lug or Boss Welding—Preheating the Case—Gas Preheating Flame—One Side or Both—Collapse of Weld—Broken Bearings—Direction of Welding—Shrinkage Cracks—Missing Parts—Finishing—Die Mould Castings—Body—Other Parts.

CHAPTER V.—STEEL

Welding Knowledge—What the Flame Does to Steel—The Welding Rod—Simple Welding—Position of Flame—Reinforcing the Weld—Frame Welding—Lengthening the Chassis—Tube Housings—Worn Parts—Gear Welding—Case Hardening—Light Metal Welding—Gasoline Tank—Welding Adjacent to Rivets—Shaft Welding—Construction of Parts.

CHAPTER VI.—MALLEABLE IRON, COPPER, BRASS, BRONZE.

How to Detect Malleable Iron—Brazing Malleable Iron—Rear Housing—Reinforcing the Braze—Brazing Tube to Housing—Building Up Worn Parts—Copper—Brass and Bronze—Silver Soldering.

CHAPTER VII.—CARBON BURNING AND OTHER USES OF OXYGEN AND ACETYLENE.

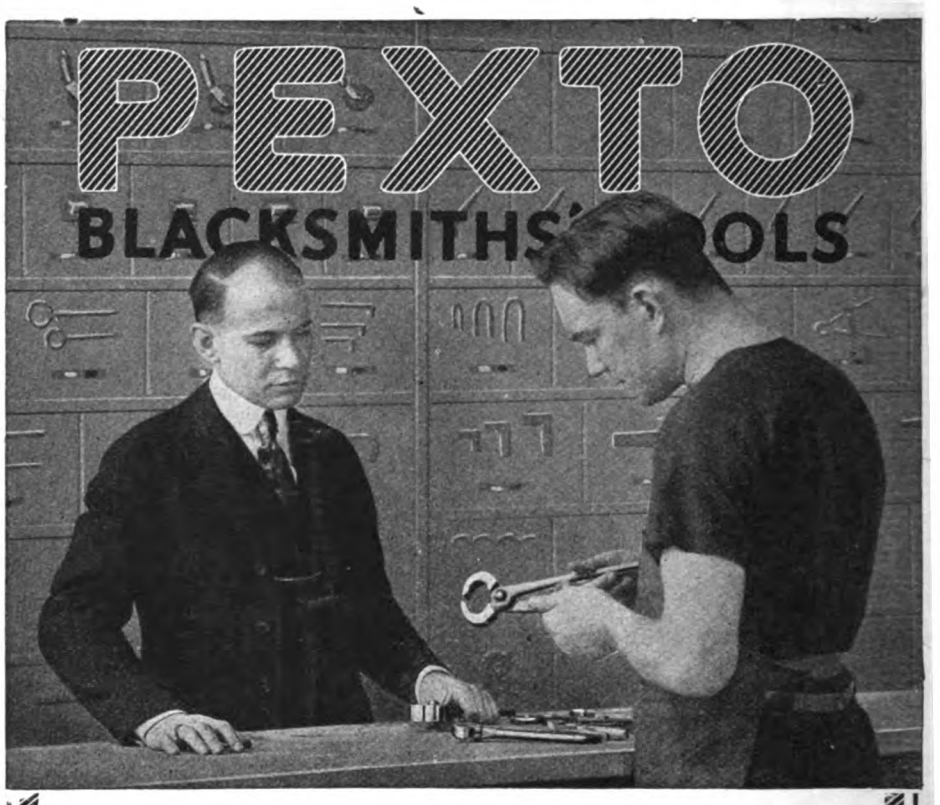
Principle of Carbon Burning—Method of Operation—Lead Burning—Soldering—Case Hardening—Heating Uses.

CHAPTER VIII.—HOW TO FIGURE COST OF WELDING.

Oxygen Consumption—Dissolved Acetylene Consumption—Torch Consumption Test—Acetylene Generator Consumption—Cost Card—Conclusion.

ADDRESS ALL ORDERS TO

M. T. RICHARDSON COMPANY, 71-73 Murray St., NEW YORK



How Can You Tell?

You're buying a pair of shoeing pincers or hoof parers and the salesman spreads out an assortment of different kinds on the counter. How can you tell which is the best buy?

Appearances are not a safe guide, for poor tools often masquerade behind a handsome exterior.

Price is not a safe guide, for inferior tools often cost you more than good ones.

But there is a safe guide, and that is to know who made the tool.

When the salesman says "This is a pair of PEXTO Shoeing Pincers" or "PEXTO Hoof Parers," you know that they have been made by a responsible concern with 100 years of tool-making experience and with a reputation for the excellence of its product.

Buy tools by name and see that the name is Pexto. If your dealer can't supply you, write us.

The Peck, Stow & Wilcox Co.

PEXTO Mfrs. Mechanics' Hand Tools, Tinsmiths' and Sheet Metal Workers' Tools and Machines, Builders' and General Hardware.

Southington, Conn. **Cleveland, Ohio**

Address correspondence to
209 W. Center St., Southington, Conn.

Digitized by Google

SPRING TRADE SPECIAL

THE BLACKSMITH & WHEELWRIGHT

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U. S. Patent Office.

Vol. LXXVII. No. 4 NEW YORK, APRIL, 1918 TERMS: One Dollar a Year. Foreign, $1.50. (6s. 3d.)

BEST HOOF PADS

Strong, tough canvasback, reinforced by new process ingredient—easily takes the place of a leatherback which is more expensive. High gravity stock in the heel too—new equipment in a big new factory enables us to turn out quantities to meet the demand – no waiting—Send for sample price list and learn something.

KAPLAN—Heavy Pads
PEARL—Light Pads
Furnished in 14 sizes—see list.



RADICAL RUBBER CO.
117 Gerry Street
BROOKLYN, NEW YORK

SEND US YOUR NAME

and Address and you'll get information worth while regarding this splendid Shear and Punch.



THE **MARVEL**

A Double Lever Machine.

One man does all the machine is capable of and he faces his work all the time.

ARMSTRONG-BLUM MFG. CO.
340 N. FRANCISCO AVE., CHICAGO, ILL.

STEEL STAMPS
BURNING BRANDS
RUBBER STAMPS
STENCILS
GEO. M. NESS, JR.
61 FULTON ST. NEW YORK
Send for price list.



SUREGRIP CALKS
American Calk Co.
DETROIT, - - - MICH.

THE TEETH IN
BLACK DIAMOND RASPS
ARE MINGLED
So as to Cut Clean and Free and Leave no Furrows in the Work

Twelve Medals of Award by Jurors



At International Expositions

G. & H. BARNETT COMPANY
Black Diamond File Works, PHILADELPHIA, PA.
Owned and Operated by NICHOLSON FILE CO.
Copy of Catalog sent Free to any interested file users upon application.

The Best and Most Economical



"The Capewell" Horse Nail

saves time and money for the horseshoer. This nail upholds the reputation of the best workmen, and is an economical factor in any shop in which it is used.

The Test That Tests

The **actual driving** is what puts the nail to the test. Will it stand up under the hammer blows? Will it go where you want it to? Will it clinch without breaking?

For years Capewell nails have been put to the actual test—they **lead today.**

Order Capewell nails—the world's best at a fair price. Used by the majority. It will pay you to use them.

The Capewell Horse Nail Company
Hartford, Conn.
Leading Horse Nail Makers of the World

AETNA STEEL TOE CALKS
Made by THE AETNA NUT CO., Southington, Conn.
BLACK HORSE BRAND

BEST SHAPE
BEST SPUR
TO DRIVE
BEST STEEL



TOE AND HEEL CALKS
.....
SOLD BY ALL DEALERS

Stokes Bros.' Improved Horse Rasps
Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A.

STEEL STAMPS
LETTERS and FIGURES
For Marking Your Tools and Your Product

NAME PLATES OF ALL KINDS

S. D. CHILDS & CO.
DEPT. 2
136 S. CLARK ST. CHICAGO



JOBBERS!
Turner Kerosene Torch
(No. 426)

is a rapid seller. Meets all requirements of a good blow torch. Produces a steady, powerful blue flame. Not affected by wind or bad weather.

Catalog or our complete line for the asking.

THE TURNER BRASS WORKS, Sycamore, Ill., U. S. A.
B. S. Alder, 30 Warren St., New York, N. Y., Eastern Representatives.



THE HORSE'S FRIEND

If you do not handle Corona Wool Fat Compound ask for FREE SAMPLE and our Dealers Proposition.

For Hard and Contracted Hoof, Quarter Cracks, Corns, Grease Heel, Scratches, Wounds, and sores of almost any nature on man or beast.

Good profit on sales for you.

Box 2 The Corona Mfg. Co., Kenton, O.



HORSESHOERS

It pays to pack the horse's hoofs with Lemoine's hoof packing. It has no equal for dry, hard, contracted hoofs, quarter cracks, corns and thrush. It never fails to do the work.

N. LEMOINE COMPANY
P. O. Box 88 FRAMINGHAM, MASS.

"GEARS AND WAGONS"
Selle Gears
Forty years of success has placed "Selle Gears" and Wagons in the hands of the largest wagon users in the world. Express and Transfer Companies, Department Stores, etc., specify "Selle Gears" and will take no other after once tried. 230 Page Catalog Free.
THE AKRON-SELLE CO. Akron, Ohio

Driver Agents Wanted

Drive and demonstrate the Bush Car. Pay for it out of power commissions on sales. My agents are making money. Shipments are prompt. Bush Cars guaranteed or money back. 1918 models ready. Write at once for my 48-page catalog and all particulars. Address J. H. Bush, Pres. Dept. 4 TW



BUSH MOTOR COMPANY, Bush Temple, Chicago, Illinois

Pay for an
AUTOMOBILE
On the Instalment Plan
$10.00 Down and $10.00 a Month
25c Brings Full Explanation with Bulletin
Eureka Auto Co., *Rebuilders,* Beavertown, Pa.

The ROTO ELECTRIC BLOWER $27.50 COMPLETE

THE U. S. GOVERNMENT
Wants everybody to avoid waste. Why should the middleman come between you and the maker? Our direct plan of selling

ELIMINATES THE MIDDLEMAN.

The latest model AIR COOLED ROTO BLOWER is better than any $35 or $40 Blower on the market. It will weld the largest size axles or the lightest calks. No forge is too large for this Roto. It will make your work easier—Save 50% of your time—Let you do twice the work in less time—Costs only 2 cents per day to run and is fully guaranteed.



N. B.—The above price is subject to change without notice.

The Navy Department Uses The Roto

It surely ought to be good enough for you if it can pass government inspection. You can't go wrong by sending us the coupon for a free trial. If it doesn't satisfy you in every respect send it back at our expense. That's fair isn't it?

CUT OUT THE COUPON
SEND IT TODAY DO IT NOW!

THE ROSEWATER ELECTRIC CO.
5516 KINSMAN ROAD CLEVELAND, OHIO

Send me by.....An AIR COOLED ROTO BLOWER with one year's guarantee, complete with cord, plug and Speed Regulator. I will return it to you at the end of 30 days, if it does not give me entire satisfaction, and if I keep it, I will pay you $27.50 at the end of 30 days.

Name.....Address.....

Current.....Voltage.....Cycles.....

Your Electric Light or Power Company Will Give You This Information



O. K. 5-T Screw Plate

You Need These Tools For Auto Repair Work



G. T. D. Hand Taps

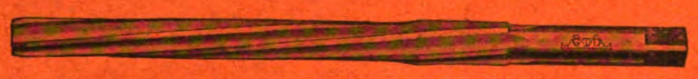


B. B. Burring Reamer

BLACKSMITHS who equip themselves with the proper tools for extensive auto repair work this season will show good judgment.

Fewer cars will be made this year, consequently more repair work will be done.

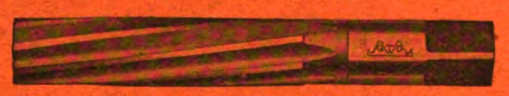
In selecting screw cutting tools, accept only the old reliable brands, Little Giant, Green River, Lightning, Smart or O. K.



2 in 1 Reamer for Ford Spindle Body and Spindle Arm Bushings



Back view O. K. Die



Piston Pin Bushing Reamer



Wells Improved Pipe Wrench



Taper Pin Reamer

THE illustrations show some of the tools we manufacture for auto repair work. G. T. D. Taps, Dies and Reamers are well known for their easy cutting qualities.

If you have not our catalog, send for copy today and ask for address of nearest dealer handling G. T. D. tools,

G.T.D PRODUCTS
TAPS — DIES
SCREW PLATES — GAGES
REAMERS — PIPE TOOLS
THREADING MACHINES — LATHES
SCREW MACHINES — GRINDERS
CUTTING OFF MACH. SAW AND CUTTER SHARPENERS

Greenfield Tap and Die Corporation
Greenfield, Massachusetts., U.S.A.
New York-28 Warren St. · Chicago-13 South Clinton St.
Canadian Factory Wells Brothers Co. of Canada Ltd. *Galt, Ontario*



NOW there is greater need than ever for thrift and efficiency in vehicle operation.

Naturally the Firestone motto, Most Miles per Dollar, has a personal meaning for every user of tires.

By furnishing your customers with Firestone you help your community enjoy better travel at lowest cost per mile.

Firestone rubber is high in grade and while massive in appearance it is light in weight. This means extra profit for the dealer on every reel.

FIRESTONE TIRE AND RUBBER CO.
AKRON, OHIO Branches and Dealers Everywhere

Firestone
Carriage Tires

Digitized by Google

"F-S" PAINTS



When a Hit is Needed, Let "F-S" Come to the Bat

When in doubt or at a crisis, use "F-S" Extra Coach Japan—it will "score" for you. It has a fine body and excellent drying qualities.

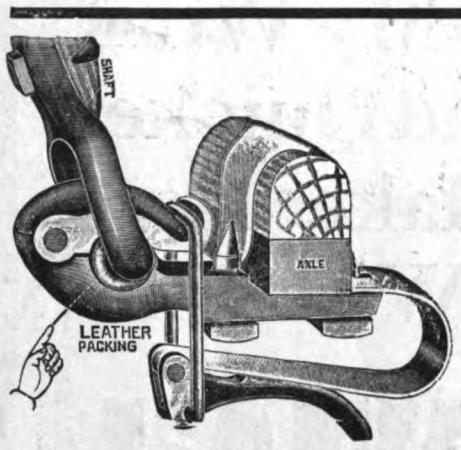
FELTON, SIBLEY & CO., Inc.

Manufacturers of Colors, Paints, Varnishes since 1863

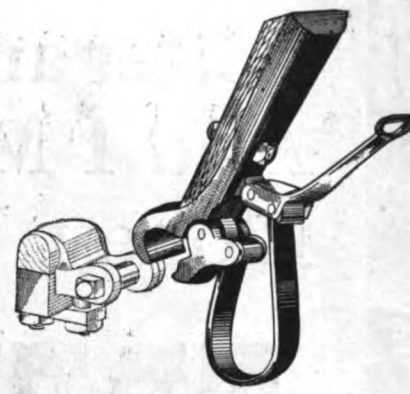
136-140 North Fourth Street, Philadelphia

(148)

BRADLEY



Ball-Bearing

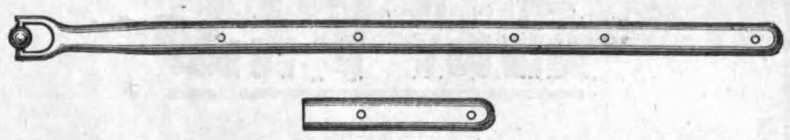


Hold-Fast

Carriage Couplers and Long Shaft Irons

BEAR IN MIND

That we furnish both "Ball Bearing" and "Holdfast" in short or stub lengths and in full length Shaft Irons to your pattern.



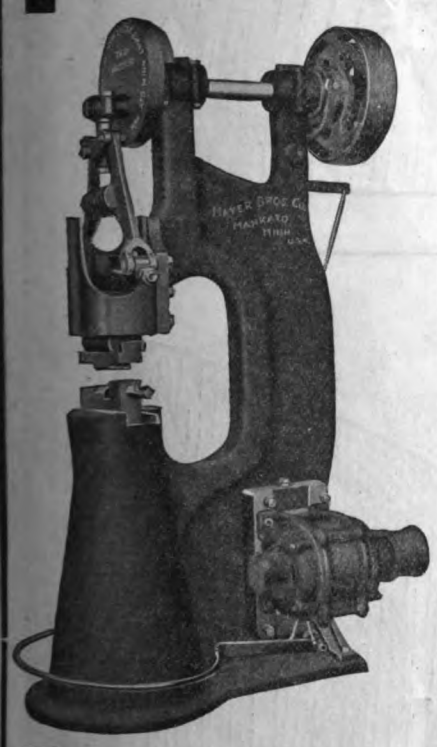
An illustration (greatly reduced) of a full length Shaft Iron and T Piece

Write for Free Booklet

C. C. BRADLEY & SON, Inc.

SYRACUSE, N. Y.

JOB WANTED



An able bodied workman seeks a position in some good blacksmith or machine shop.

He is an old acquaintance and friend of the Editor of the Blacksmith and Wheelwright, to whom he is permitted to refer.

He is not particular as to what locality he works in, provided he has plenty of good hard work to do, and his employer honest and careful.

With such a boss, he agrees to never touch intoxicants or indulge in other dissipation. He agrees to be on hand ready for work at seven o'clock in the morning, or any earlier hour the shop opens. He will work overtime without grumbling, even to twenty-four hours daily for as long a period as may be necessary.

He will agree never to strike, ask for higher wages, or even want to go fishing or take a holiday.

He will board himself and remain in perfect health indefinitely. He has no family cares to worry about. He and his brothers, older and younger, are of the well known L. G. P. HAMMER clan, world renowned for skill, integrity and ability.

He is willing to work for twenty cents a day and agrees to do more work than any six skilled men at $3.00 per day. After his wages have been paid for twenty months, he agrees to work for nothing during the remainder of his natural life, which he estimates at fifty years.

He agrees to come on trial, and after thirty days' work, if his boss is not satisfied he will return home without any charge for his services.

He guarantees that he will relieve his employer from all drudgery, so he can spend more time with his family, and not be so eternally tired that he can get no enjoyment out of life.

He will treat all customers so pleasantly and do their work so skillfully that they will always bring their work to his shop, and advise their friends to do likewise.

He is not subject to enlistment or draft, and is ready to leave at once and begin work immediately on arrival.

ADDRESS:

LITTLE GIANT

103 Rock Street

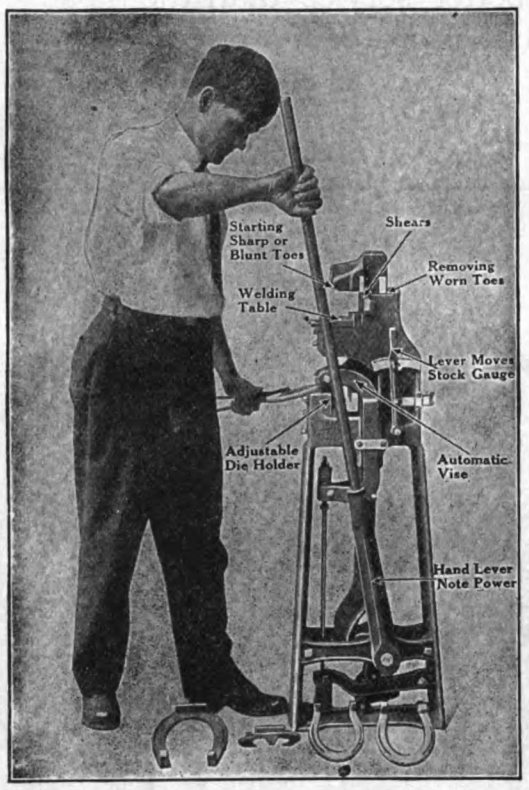
MANKATO, MINN., U. S. A.

MAYER BROTHERS COMPANY MANKATO MINN U.S.A. LITTLE GIANT

1918 MODEL

THE L. S. P. CALKING MACHINE

The Greatest Time and Labor Saving Machine On Earth



1918 MODEL—Fully covered with Patents

OUR 1918 Model is the same as our 1917 Model with the exception that we have eliminated the steel plugger attachment and strengthened some of the parts.

Do not mistake this for a machine which makes toe calks on a foot vise. This machine is for turning heel calks, both Blunt and Sharp, sticking and welding toe calks, clipping and trimming ends of shoes. IT CALKS SHOES, doing the work just the same as you do by hand with the hammer, only it is done much better and easier, and in a fraction of the time.

In turning heels, you can turn up just as much stock as you wish, upset or stoveup to make as heavy as you like and square up the calks without use of hammer. There is no losing of toes when you weld on the L. S. P.

It is a strong, handsome, well made machine and will last, as you might say, a life time, fully warranted for one year. It is in use in the best shops in the United States, users claiming more for it than we do.

Write at once for full information and prices.

L. S. P. CALKING MACHINE CO.

P. O. Box 225 **WYALUSING, PA., U. S. A.**

NATIONAL MACHINE CO., Brighton, Ontario, Canada

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

I Can Do My Work Better and Quicker And I Make More Money With The

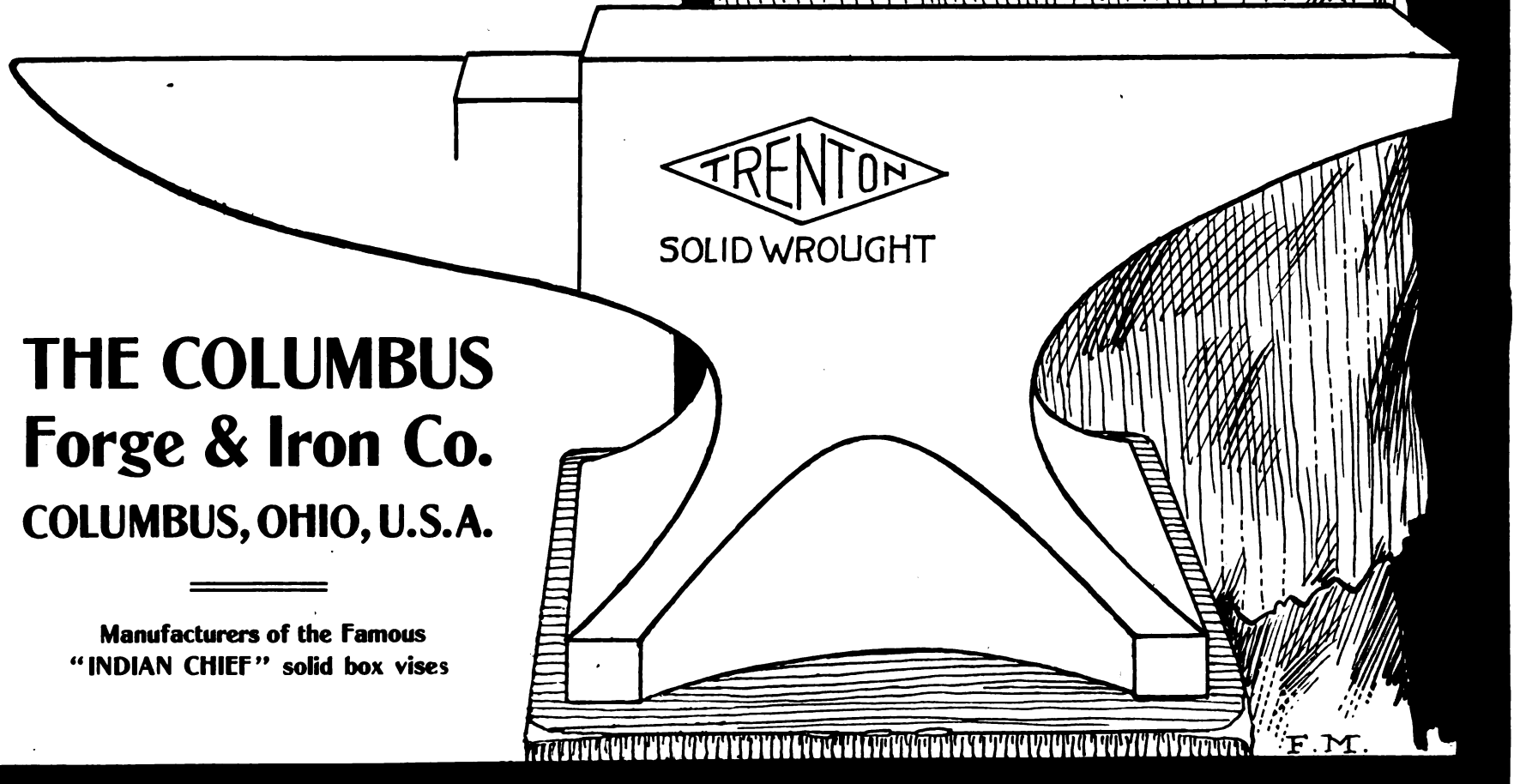
TRENTON ANVIL

Every user of a famous Trenton Anvil knows that he has the best anvil that there can be. The steel—pure, live and "Ringing Like a Bell," gives a cheerful sound to the up-to-date shop. No waste metal built into one of these, they are wrought solid.

The recessed base allows it to stand firm on the block without strapping to the floor.

Made in all sizes with all desirable clips, every one perfect in shape and guaranteed to give the best service that the best anvil can give, and better service than the most of them. What more can a perfect anvil say for itself?





THE COLUMBUS Forge & Iron Co.

COLUMBUS, OHIO, U.S.A.

Manufacturers of the Famous
"INDIAN CHIEF" solid box vises

Digitized by Google

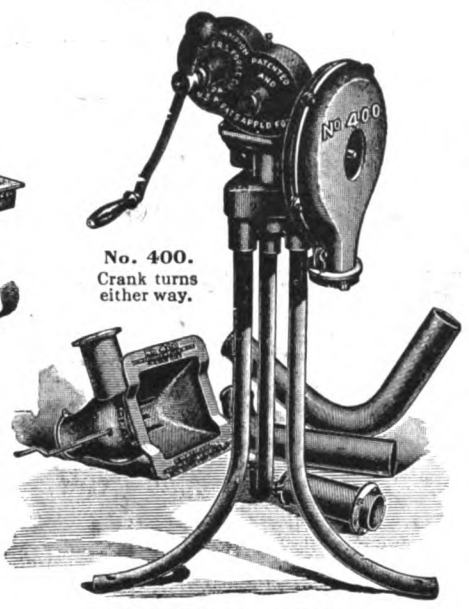
THE FAMOUS CHAMPION BLACKSMITH TOOLS



Hercules Patented Power Hammer. Weight of ram, 65 pounds.



No. 408. Steel Blacksmith's Forge.

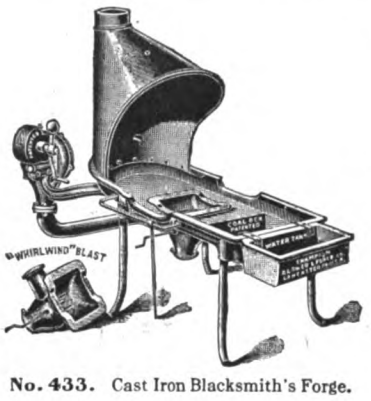


No. 400. Crank turns either way.

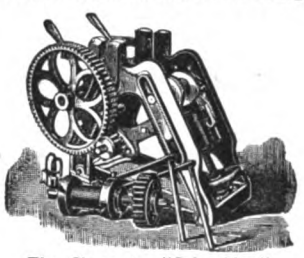
FAMOUS 400

Don't Fail to Get 1918 Catalog

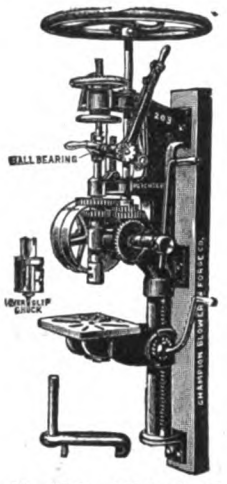
Before purchasing a Hand Blower, Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



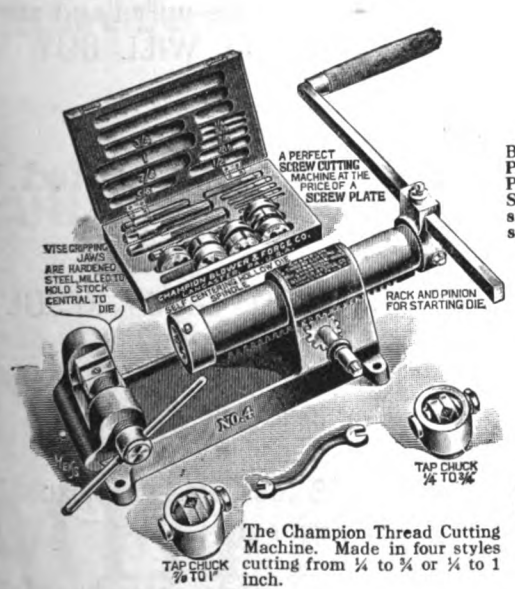
No. 433. Cast Iron Blacksmith's Forge.



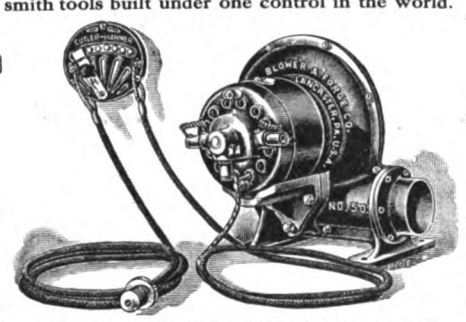
The Champion "Columbian" Tire Bender. Made in 3 sizes.



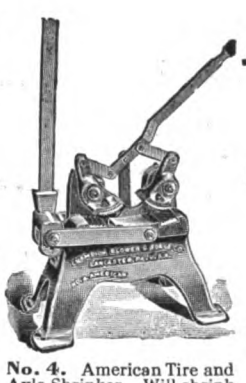
No. 203. Self-Feed and Double Compound Lever Feed Drill.



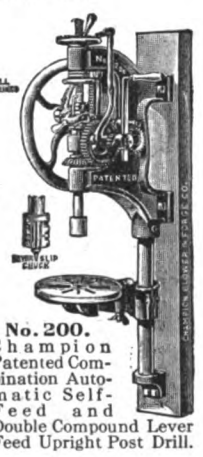
The Champion Thread Cutting Machine. Made in four styles cutting from ¼ to ¾ or ¼ to 1 inch.



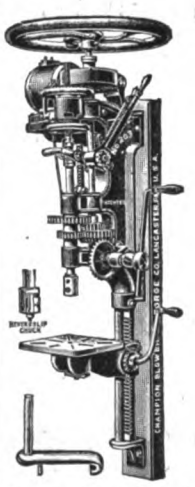
No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower.



No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



No. 200. Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

F.M.

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

PHOENIX HORSE SHOES

Constant Demand is the Best Proof of Their Superiority.

Practical to the Highest Degree. **Made of Unexcelled Material.**

BULL DOG CALKS

Hold Firmly to the Shoe. Never Jump Out When Set. Easy to Drive in Shoe.
Perfect in Every Detail.

FOR SALE BY ALL DEALERS. WRITE FOR SAMPLES.

WE ARE THE LARGEST HORSE SHOE MANUFACTURERS IN THE WORLD.



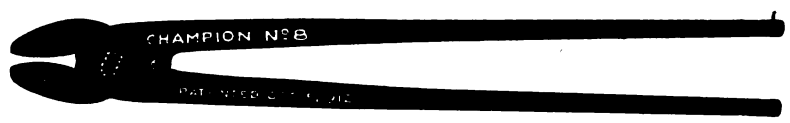
PHOENIX
Horse Shoe Company
CHICAGO, ILLINOIS
ROLLING MILLS and FACTORIES } JOLIET, ILLINOIS / POUGHKEEPSIE, N. Y.



A NEW TONG

One tong to take the place of all the tongs on the shoer's forge

Nothing to get out of order.



Will hold securely any size of shoe.

No. 8 16 Inches Long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

Weights, 1¾ to 3 lbs.

This Hammer is the most popular Sharpening Hammer on the market.

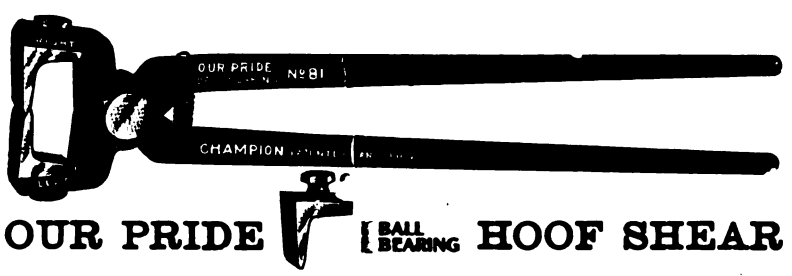


Corrugated Pein.

IT GIVES RESULTS.

No. 12 ELECTRIC SHARPENING HAMMER

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.



OUR PRIDE [BALL BEARING HOOF SHEAR

Blades easily replaced when worn out.

All parts interchangeable.

Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY, - Meadville, Pa., U. S. A.

THE LIVINGSTON CO., 131 E. 23rd Street, NEW YORK, Eastern Representatives

Digitized by Google

GENERAL BLACKSMITHING



ANCIENT AND MODERN

OLD EXTRAVAGANT METHOD

THE "BLACKER" BELT-DRIVEN STRIKER

HAS

REVOLUTIONIZED THE TRADE

THE ONLY TOOL OF ITS KIND IN THE WHOLE WORLD

PATENTED IN ALL COUNTRIES

WHAT OUR USERS SAY:

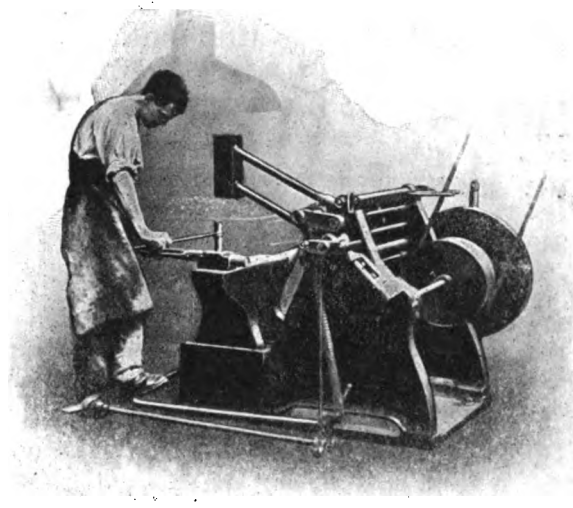
- ¶ I am in my 69th year and with the Blacker Hammer can do with ease the work which was before a heartsickening terror.
- ¶ I can manage my work alone now.
- ¶ I find it a very useful tool.
- ¶ The hammer is satisfactory in every way.
- ¶ No modern shop should be without one.
- ¶ I wish I had had it years ago.
- ¶ It does away with the Smith's helper.
- ¶ Wherever there is a Smithy fire there is room for a BLACKER HAMMER.

Lecture-Demonstrations have been given in Technical Colleges throughout the United Kingdom.

PROPOSITIONS OF ALL KINDS INVITED

Full Page of Testimonials Next Month

NEW "BLACKER" METHOD



MECHANICAL HAMMER CO., Ltd.

STAYLEY IRON WORKS STALYBRIDGE, ENGLAND

Digitized by Google

Johnston's "KRAKNO"

is elastic, non-corrosive, heat-resisting, impervious to moisture, an inhibitive coating which prevents rust and scale—and is the ideal filler and surfacer.

"KRAKNO" On Old Work

FOR ALL VEHICLES



"KRAKNO" saves you all the time and trouble of burning off and repriming and gives you a perfect job besides. You know what a surfacer and filler that will do what we claim "KRAKNO" does, will mean on all refinishing jobs.

Check up the evidence by trying "KRAKNO" in your shop. Test it thoroughly. Don't wait for a special job to come along, but try "KRAKNO" on your next regular job if you want the most beautiful, durable and economical finish.

Order One Gallon or More on Trial.

Mail us a post card for a trial gallon. We will tell you just how to use it. If "KRAKNO" makes good for you, you will have made a valuable discovery.

"KRAKNO" is made in the following shades:
Red, Slate, Yellow, White, Blue, Green, Maroon, Gray and Blue Black.

THE R. F. JOHNSTON PAINT CO.

Makers of Paints to Meet Every Need

S. E. Corner Main and Pearl Sts. CINCINNATI, OHIO

"IDEAL" LAWN MOWER GRINDER

A BIG MONEY-MAKER.

Many of our customers make $300 in one season. You can do as well.

Patented
Dec. 29, 1908
Mar. 1, 1910



"You Grind It as You Find It."

Grinds all makes of Mowers perfectly in 15 minutes without removing wheels, ratchets or reel-knife. Has perfect Skate Sharpener Attachment for sharpening skates. Operated either by hand or power. Ball-bearing; easy running. Will do the work so much BETTER, QUICKER and EASIER you cannot afford to be without it. Nearly 10,000 in use. Fully guaranteed. Sold on easy-payment terms.

WRITE TODAY for catalog and full information.

Also makers of the "PEERLESS" Horse Lawn Mower Grinder.

THE ROOT-HEATH MANUFACTURING CO.

PLYMOUTH, OHIO



The files which do the best, "longest," are the ones for you to use on your work.

You will always find that

NICHOLSON FILES
Give Best Service

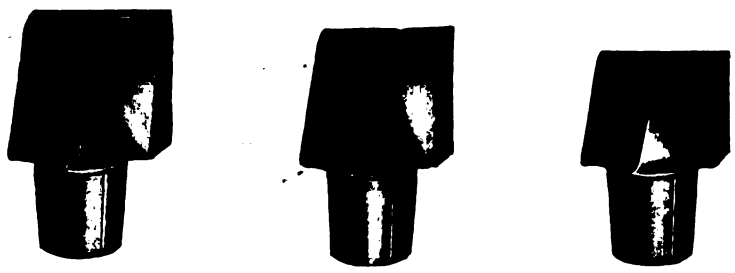
NICHOLSON U.S.A. (TRADE MARK)

BY INVITATION MEMBER OF

"NICHOLSON" stamped on a file, absolutely guarantees selected steel—forged, annealed, ground and cut by expert workmen who have made your needs a lifetime study.

SPECIFY "NICHOLSON"—AT ALL LEADING DEALERS

Nicholson File Co., Providence, R. I.



Big **Standard** **Short**

DIAMOND CALKS

Are so good that you can't buy better ones.

The are made for all purposes, and in different sizes. Sharp (3 sizes); Dull (2 sizes); Block, Round Sharp (2 sizes); Round Dull (2 sizes). They are as tough as a cold chisel, and hard as razor steel.

The shanks absolutely fit the calk holes, and they don't fall out, twist, or break off.

They just wear and wear and wear.

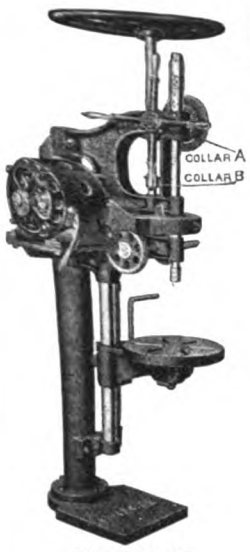
Ask for illustrated price list.

DIAMOND CALK HORSE SHOE CO.

DULUTH, MINN.

Digitized by Google

BUFFALO BLACKSMITH TOOLS

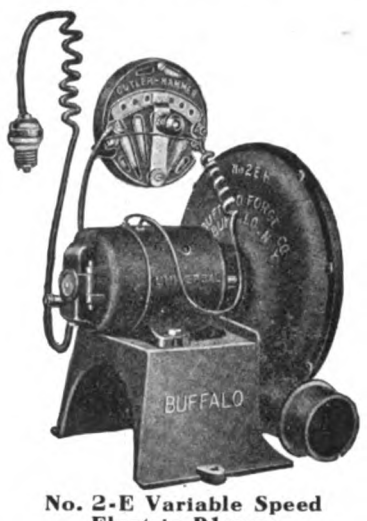


BUFFALO
Drill No. 124-CE
Capacity: 1½ in. holes, with ½ H.P. motor.

Write us about your requirements, we can satisfy them.



FUFFALO Forge No. 228-E
Size: 32x44 inches.

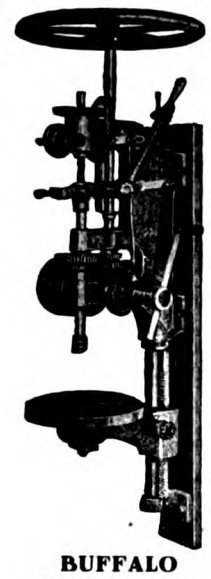


No. 2-E Variable Speed Electric Blower
The Blower with a Conscience

Arrangements can be made for trial of "Buffalo" Tools without expense for freight if returned.



BANNER Upsetter
Capacity up to 4x1 in.



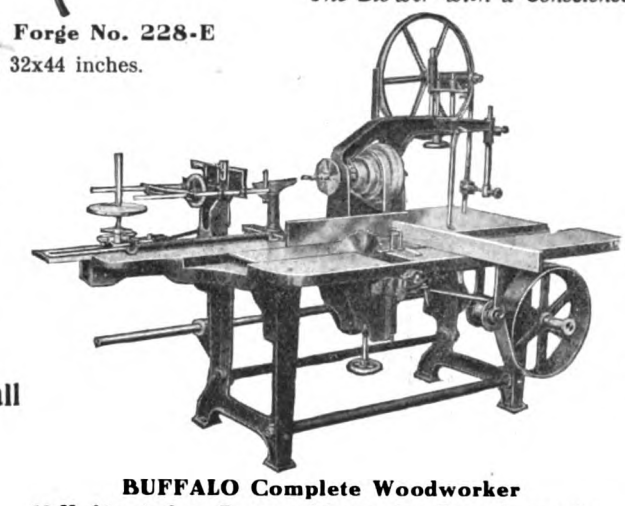
BUFFALO
Drill No. 221



No. 200 Hand Blower
Sizes: 12, 14 and 16 in.
Sold with a Ten-Year Guarantee.

Machines for Every Service

Large or Small



BUFFALO Complete Woodworker
12 Machines in One. Economy of Space. Low Power Consumption.

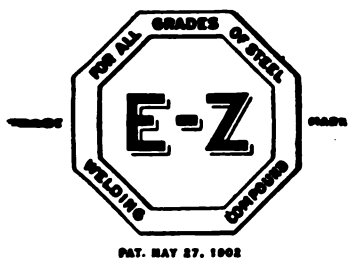
Catalog 179-6 **illustrates and describes our complete line of hand and power operated machines.**



BUFFALO
Forge No. 650
Size: 28x40 inches.

BUFFALO FORGE CO., BUFFALO, N. Y.

"E-Z" WELDING COMPOUND



is the best **BECAUSE**

It works Equally good on all Kinds of steel.

It welds at **lower heat** than any other.

It **sticks** to metal at a **very low** heat.

It leaves **no scale.**

USE IT ONCE AND YOU WILL ALWAYS WANT IT

Crescent Welding Compound

MAKES SMOOTHER WELDS THAN ANY OTHER

It is fine for plow work or where parts are fastened together before welding, or for making split welds, finishing heats, or for welding under dies, etc., etc.

CRESCENT WELDING COMPOUND TRADE MARK

It insures smooth finish and perfect welds on Toe Calks.

"Money back" from any jobber if "E-Z" or Crescent does not give perfect results.

We will send samples free of charge.

MADE ONLY BY

Anti-Borax Compound Co.

FT. WAYNE, IND.

Would You Sell Your Life For $65?

You wouldn't part with even an arm or a leg for that figure, would you?

Yet every vicious horse you shoe is likely to do more damage in the twinkling of an eye than can be repaired at several times the cost of **Barcus Stocks.**

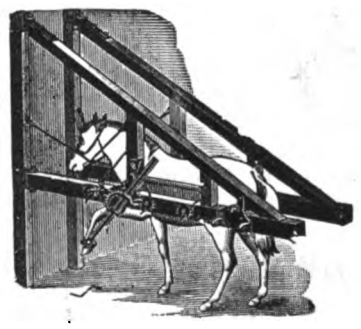
When you place a horse in a Barcus Stock, he is harmless—he cannot hurt either you or himself. Costing only $65 it is cheap insurance, indeed.

BARCUS STOCKS not only furnish the logical way to observe "Safety First," but they are also a positive aid to good shoeing. The BARCUS is a modern Stock—automatic working parts instead of the bothersome ropes, straps and blocks that made the old style stock almost more of a nuisance than a help.

If you don't know about **Barcus Stocks** you owe it to yourself and your family to write **at once** for the complete details.

The Barcus Mfg. Co.,

Wabash, Ind.



Please send me full particulars regarding your Horse Stocks without any obligation on my part.

Name.....

Town.....*State*.....

Digitized by Google

LINDE OXYGEN

From Coast to Coast 65 Producing Plants and Distributing Stations provide an unlimited supply of Linde Oxygen for users everywhere.

LINDE SERVICE means no investment except for oxygen actually received—no expensive overhead or upkeep charges.

Linde Oxygen may be obtained from any of the following Linde Plants and Distributing Stations where a large supply of charged 100 to 200 cu. ft. cylinders is kept on hand constantly to insure immediate shipments.

Mail or telephone your order to THE LINDE AIR PRODUCTS CO., at the nearest point. **Shipments will be made on day order is received.**

PRODUCING PLANTS AND WAREHOUSES

Alabama
*Birmingham
10th Ave. & 28th St.
California
*Emeryville, Oakland
*Los Angeles
1405 Mission Road
Colorado
Denver
1017 17th Street
Connecticut
Hartford
1095 Main Street
District of Columbia
Washington
9th & Maryland Ave., S. W.
Georgia
*Atlanta
Plyant St. & Southern R. R.
Savannah
Ogeechee Canal, So. of Bay St.
Illinois
*Chicago
3633 Wall Street
East St. Louis
6th & Walnut Ave.
Peoria
721-730 So. Washington St.
Indiana
*East Chicago
S. E Cor. Kennedy&145th St.
Fort Wayne
414 E Columbia Street
*Indianapolis
2819 Roosevelt Ave.
Iowa
Davenport
118 Harrison Street
Des Moines
117 W. 5th Street
Kansas
Wichita
Rock Island Ave. & 2nd St.
Kentucky
Louisville
12th East Main St.
Louisiana
New Orleans
861 Fulton Street
Maryland
*Baltimore
25th & Montebello Ave.
Massachusetts
Cambridge
25 Waverly Street
Massachusetts
Springfield
Napier Street
*Worcester
961 Southbridge St.
Michigan
*Detroit
St. Aubin Ave. & Newton St.
Grand Rapids
Pearl Street by the Bridge
Minnesota
Duluth
Seventh Ave., West
*Minneapolis
1809 Hennepin Ave.
Missouri
*North Kansas City
14th & Charlotte St.
*St. Louis
4218 Forest Park Blvd.
Nebraska
Omaha
1007 Jones Street
New Jersey
*Elizabeth
Linden Ave.
Newark
354 Plane Street
New York
Albany
Montgomery & Colonie Sts.
*Brooklyn
475 Driggs Ave.
*Buffalo
155-183 Chandler St.
New York City
217 W. 29th St.
New York City (Bronx)
3168 Park Ave.
*Utica
Walnut & Schuyler Sts.
Ohio
*Cleveland
802 East 72nd Street
*Cincinnati
Stanton & Mellish Aves.
Columbus
310 Dublin Ave.
Dayton
521 E. First Street.
Lima
338 East High Street
Ohio
Toledo
441 South Erie Street
*Youngstown
601-621 Jones Street
Oklahoma
Oklahoma City
27 E. Grand Ave.
Tulsa
1 North Boulder St.
Oregon
Portland
15th & Hoyt Streets
Pennsylvania
Erie
1502 Sassafras Street
*Norristown
*No. Philadelphia
18th & Cambria Streets
Pittsburgh
16th & Pike Streets
*Trafford
Tennessee
Chattanooga
212-238 King Street
Memphis
203 Washington St.
Texas
*Dallas
Harwood & Coombs St.
Houston
Cedar & Baker Sts.
San Antonio
512 Dolorosa St.
Utah
Salt Lake City
112 West Second St., South
Virginia
Richmond
1709 E. Carey Street
Washington
Seattle
530 First Ave., South
Spokane
121-123 S. Madison St.
Wisconsin
Manitowoc
810 Quay Street
*Milwaukee
36th St. & National Ave.

(Star) * Designates Plants.

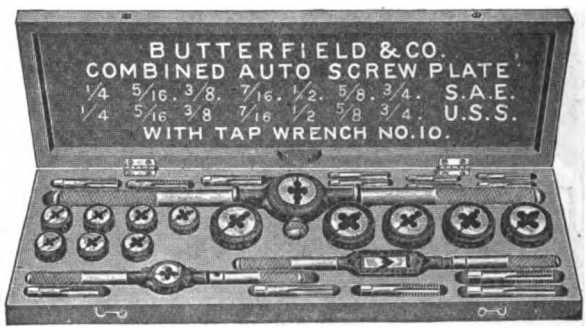
Other Plants and Distributing Stations are planned for other industrial centers throughout the country and will be established as fast as and wherever the local demand for oxygen warrants.

THE LINDE AIR PRODUCTS COMPANY

Largest Producers of Pure Oxygen in America

Forty-Second St. Building **NEW YORK**

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.
New York Store: 126 Chambers Street

The Horse Rasp of Quality



Ask your Dealer for the

IMPROVED HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, **"Slim," "Light," "Slim Light"** and **"Fine Cut."** Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial. New catalogue mailed free on application.

HELLER BROTHERS CO. *Established in 1836* **Newark, N. J.**

"GREYHOUND"

$27.50



Variable Speed only

These motors are made from the very best materials obtainable. Have a perfect lubricating system. Economical in the consumption of current. Complete with rheostat cord and plug.

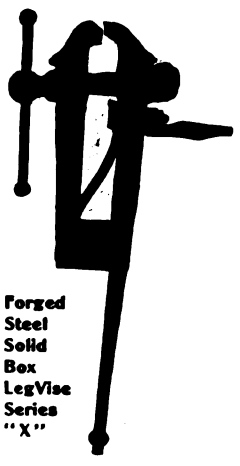
Shipped to you through Your Dealer on a 30 days' trial

R. GARDNER ELECTRIC & MFG. WORKS
1714 COLUMBUS ROAD **CLEVELAND, OHIO**



BICKNELL'S
Jointer, Saw and Rounding Machine,
Drill Vises, Farriers' Knives, and Other Tools.

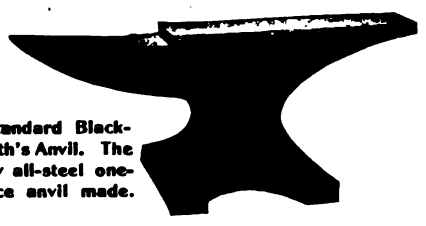
BICKNELL MFG. & SUPPLY CO.
JANESVILLE, WIS.



Forged Steel Solid Box LegVise Series "X"

COLUMBIAN

VISES AND ANVILS



Standard Blacksmith's Anvil. The only all-steel one-piece anvil made.

If your jobber does not carry Columbian Tools, write us for catalog and prices.

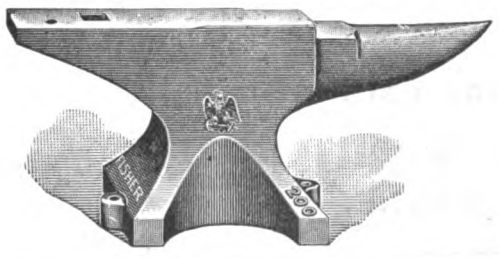
THE COLUMBIAN HARDWARE CO.,
Manufacturers **CLEVELAND, OHIO**

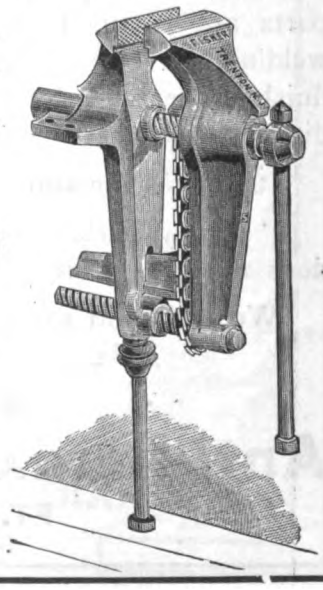
1843 EAGLE ANVILS 1918
AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE
BLACKSMITH AND WHEELWRIGHT
Vol. LXXVII. No. 4. NEW YORK, APRIL, 1918. TERMS ONE DOLLAR A YEAR

Design, Construction, Operation and Repair of Motor Vehicles

Part III.—Explaining Crank and Camshaft Design, the Firing Orders and Valve Timing of "Fours," "Sixes," "Eights" and "Twelves"

The reason why a four cylinder engine must fire in either the order, 1-2-4-3, or 1-3-4-2, is plainly evident from Fig. 7. Upon inspection, one can see that with the piston in number one cylinder at the top of its firing stroke, either piston number two or three is on its upward stroke or so-called compression.

Let us assume for a time that we have arranged the engine spark mechanism to fire in

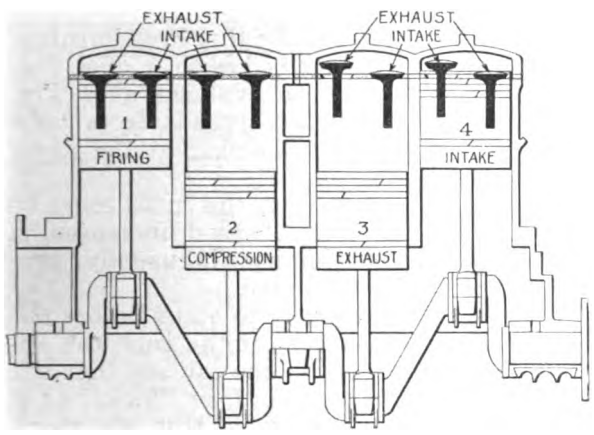


Fig. 7—Illustrating the Positions of the Pistons of the Ford Engine With Firing Order 1-2-4-3 and Showing Position of Valves with the No. 1 Cylinder Ready to Start Firing.

the order 1-2-3-4, and that in Fig. 7 cylinder number one is now firing. Piston number one is driven down by the explosion and piston number two rises in the cylinder, compressing a charge of gas which has been admitted. When this piston reaches the top of its stroke, the mixture is fired by the spark, and it is, in turn, driven downward. At the next half revolution it has reached the bottom of its stroke and it is now time for the spark to occur in cylinder number three. Here is just where the "hitch" comes, however, for the crankshaft is designed so that number three piston is also at the bottom of its stroke at this time, and since there is no mixture or compression in this cylinder there is no explosion. Should it be possible for an explosion to occur in this cylinder, it would give no power, for the piston has gone to its extreme downward limit.

Crankshaft Design.

We can see, therefore, that with a crankshaft such as shown in Fig. 7 the explosion following the one in number two cylinder must be in number four. If the firing order starts 1-3, then the explosion following that in number three cylinder must occur in cylinder number four. To simplify the whole matter, the explosions will occur in the cylinders having their pistons upmost at the same time, alternately, every revolution.

The main reason for this crankshaft design is that the power is more evenly distributed along the shaft than it would be were the engine to fire in the order 1-2-3-4. To understand this statement clearly, let us take the example of a board evenly balanced upon a block at its center. Place a weight upon one end of the board, and the board drops at that end; place an equal weight upon the other end and equilibrium is restored. Drop a weight half way between the first weight and the center and the board drops back upon the other side, and to bring it to a balance again an equal weight must be placed on the other side.

In this case, at every second weight application the board is brought back to a balance. Suppose, however, that the weights should be put in place, beginning at one end of the board. As soon as the first weight were put in place, the board would swing off center, as it did in the first case. When the second weight is put in place, the board still remains unbalanced and stays that way until the fourth and last weight is placed.

If, instead of applying weights, one were to hit sledge hammer blows, conditions might approach nearer to those encountered in an engine. The even distribution of the blows, as shown in the first example, is obviously the best, whether a board is used or a crankshaft.

Not every four cylinder engine can be made to fire in either order 1-2-4-3 or 1-4-3-2 as desired, for if the camshaft, which operates the valves is arranged for the first order, the engine cannot be changed to fire in the second.

Finding the Firing Order.

It is an easy matter to determine the proper firing order of an engine by following the procedure outlined herewith. Turn the crankshaft until the piston in number one cylinder is at the top of its explosion stroke, bearing in mind that it has two top strokes, the explosion and the exhaust. Watch the exhaust valve, and should the valve remain closed as the piston is ascending, it is an indication that the piston is reaching the top of the explosion stroke, or so-called compression stroke. Continue to turn the crankshaft, watching the exhaust valves in cylinders two and three. As the pistons in cylinders two and three travel upward, the exhaust valve in one of them will remain closed, while that in the other will open.

The cylinder in which the exhaust valve remains closed is next in the firing order, and we will assume that it is number three. We now have the firing order 1-3, and since we know that the third cylinder to fire is number four, we have the full firing order 1-3-4-2.

Six, Eight and Twelve Cylinder Engines.

As has been said in previous installments of this article, six, eight and twelve cylinder engines are but additional units, and in general the firing arrangement is the same as those of fours. By this we mean that the impulses are distributed from one end of the shaft to the other, working toward the center. As an instance of this, take the various combination of six cylinder firing orders as given in the following table:

1-5-3-6-2-4
1-4-2-6-3-5

These two firing orders represent the majority of six cylinder engines, and when one takes into consideration the shape of the crankshaft, it will be an easy matter to trace out the order from the position of the pistons in the cylinders.

As has been explained before, in a six cylinder engine the crank pins, upon which are mounted the connecting rods, are spaced every 120 degrees on a circle. In the four cylinder engine the two outside pistons will always be found at either the tops or bottoms of their strokes at the same time, but in the six cylinder machine no two of the pistons will be at the top of their strokes at the same time.

Firing Order of Six Cylinder Engines.

To find the firing order of a six cylinder engine, locate the firing stroke in number one cylinder as directed for the four cylinder machine. Slowly turn the crankshaft, keeping track of all the other pistons until one of the pistons has reached the top of its stroke. This will be in the cylinder firing next, and so, in an engine firing in the order 1-5-3-6-2-4 the pistons will come to the top in that order.

In considering eight and twelve cylinder machines, we have a somewhat different problem, for in both these the crankshafts are arranged to bring two pistons at the top of their strokes at the same time, much the same as in a four. One of the pistons, of course, will be at the top of its firing stroke, while the other will be at the end of the exhaust and by watching the exhaust valves. the proper firing order may be found.

To sum up the matter, then, the firing order of an engine depends upon two things—the shape of the crankshaft and the arrangement of the camshaft, and for all general purposes, the average repairman need not pay any attention to anything but the action of the valves to determine the firing order.

The Camshaft.

The camshaft, or the member which operates the valves, together with the valve mechanism has rather a long history. In the early days a number of engines were made so that the valve stems rested directly upon the cams. As time went on engineers found that with this arrangement there was no way to make proper valve adjustment, and so they added what is termed as a tappet. The tappet rested upon the cam and lifted the valve stem. Many years passed before.

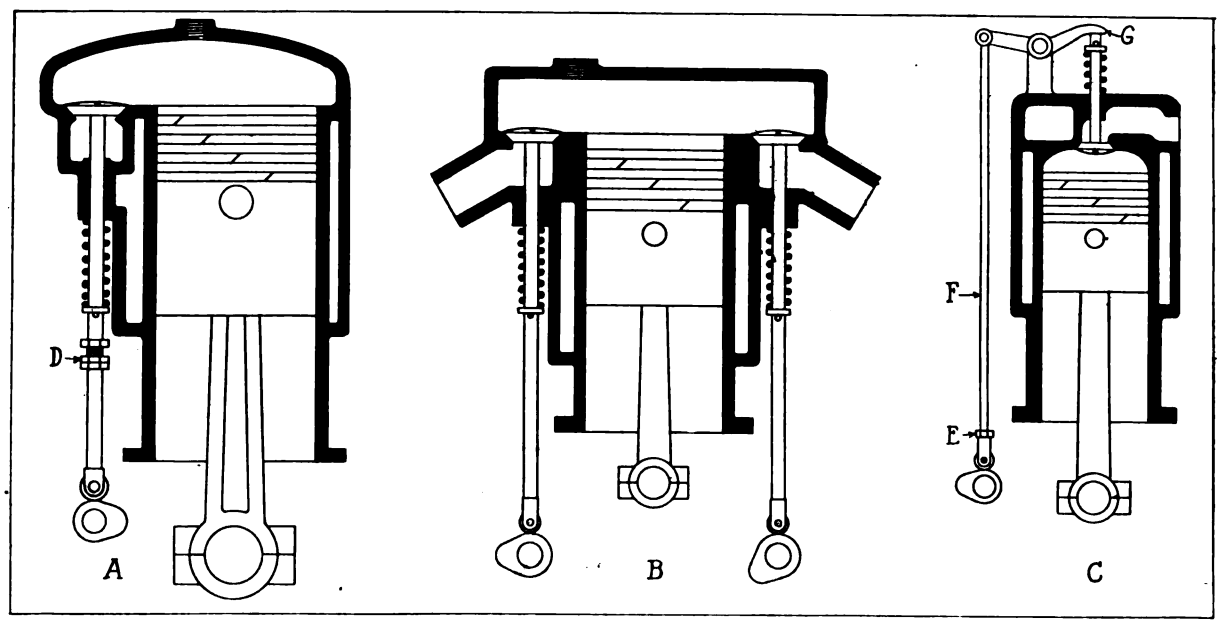


Fig. 8—Showing the Three Types of Automobile Engines; the L Head; the T Head; and the I Head; and the Mechanisms Used to Operate the Valves.

Digitized by Google

the present valve mechanism was perfected, which consists of a cam upon the camshaft, a tappet, an adjusting device, and the valve with stem.

As soon as the piston starts upon its downward path, on its so-called intake stroke, the cam through the tappet and valve stem begins to lift the valve so as to allow the passage of new gas from the carburetor, into the cylinder. When the piston has reached the bottom, or is near the bottom of its stroke, the valve must be closed, or the piston in ascending on the compression stroke will force the gas back into the manifold again.

The cam must be so designed that it will open the valve at the proper time, and open it completely, or a full charge of gas cannot pass into the cylinder. As each cylinder of an engine may be considered by itself, we will not attempt to take up the detailed operation of four, six, eight and twelve cylinder engines, except at such points as may concern one of these types.

Camshaft Construction.

The camshaft of the conventional engine has all of the cams cast or forged upon it, so that if the valve timing of one cylinder is all right, the timing of the other cylinders must be correct. This shaft is usually driven from the crankshaft, either by a chain, or by gears.

The tappets may be of a number of types, mushroom, roller, or bar, and rest directly upon the cam faces. The mushroom type, as the name suggests, resembles a mushroom or wire nail in shape. The larger part, or head, is the portion which rests against the cam face. The roller type of tappet is fitted with a small steel roll which presents a rolling contact to the cam, and is a favorite type among many manufacturers. The bar, or straight tappet is simply a bar of metal, usually steel, rounded at the end and either round or square; the rounded end resting upon the cam.

If the valve stem were to rest directly upon the tappet, the expansion of the tappet and the valve stem, caused by the heat from the running engine, would soon result in the holding open of the valve. For this reason there is always a certain space left between the tappet and the valve stem, called valve clearance.

Valve Clearance.

Should the valve clearance be too great, however, the valve would not be opened sufficiently to allow a full charge of gas, and the engine would not generate full power. To permit proper adjustment, the top of the tappet is usually provided with a screw and lock nut. By backing out the screw, the head may be brought nearer to the valve stem.

In some types of engines where the valves are exceptionally high, or are in the head, such as the "valve in head" type, there is a long rod between the tappet and the valve stem or rocker arm, which is called a push rod.

The location of the valves determines the type of engine, and there are three main classes, the L head, the T head, and the I head, shown in Fig. 8, at A, B, and C, respectively.

All of the tappets shown in this figure are of the roller type. At D is shown the tappet adjusting nut and screw; E shows the adjusting nut, which is mounted upon the push rod of the I head type; F indicates the push rod; and G shows the arrangement of the rocker arm, which is necessary to change the direction of push from the upward valve operating mechanism to the downward acting valve.

In both the L and I head types of engines a single camshaft is used, while in the T head two cam shafts are necessary, one of which operates the intake valves, the other the exhaust.

Valve Timing.

Theoretically, the intake valve should be gin to open just as the piston starts on the down stroke, while the exhaust should open at the beginning of the up stroke following the explosion. In actual practice, however, the intake valve does not open until after the piston has traveled a short distance downward and the exhaust usually opens slightly before bottom center.

The reason for this is, that to obtain maximum efficiency the valves should be fully open at the center of the piston travel. In both the L and I head types the proper valve setting can usually be arrived at in the following manner:

Bring the piston in number one cylinder to the top of its stroke, and turn the camshaft until the exhaust valve closes; make a mark upon the engine casing as well as upon the shaft and continue to turn the camshaft in the same direction until the intake valve starts to open. Make another mark upon the engine casing, opposite the mark on the camshaft and turn the camshaft backward until the mark on it is half way between the two marks indicating the closing of the exhaust and the opening of the intake valves. At this point the camshaft and crankshaft valve gears may be meshed, or the chain may be put into place.

Occasionally, in order to mesh the gears, the camshaft must be turned forward slightly so that the inlet valve will open slightly later on the down stroke of the piston. From this rule one can see that the point at which the exhaust closes on the up stroke of the piston is just as far before top center as is the distance between top center and the point at which the intake opens on the down stroke.

While these rules apply in general to all engines of the four cycle principle, one must not apply them to every engine, for in some cases, particularly engines of the high speed types, the inlet and exhaust valves frequently are arranged to overlap; that is, the exhaust valve may not be fully closed when the intake begins to open. The average repairman need not worry about these types, however, for he will seldom be called upon to do that type of repair work.

We have dealt in general with the position of the pistons at the time of firing, the different strokes, and the valve timing, and we now come to the actual timing of the spark as related to the position of the piston.

Theoretically, the spark which fires the compressed mixture of gasoline and air should occur just as the piston starts on its downward or power stroke. In actual practice, however, the spark must occur somewhat sooner, and frequently quite a distance before the top of the compression stroke has been reached.

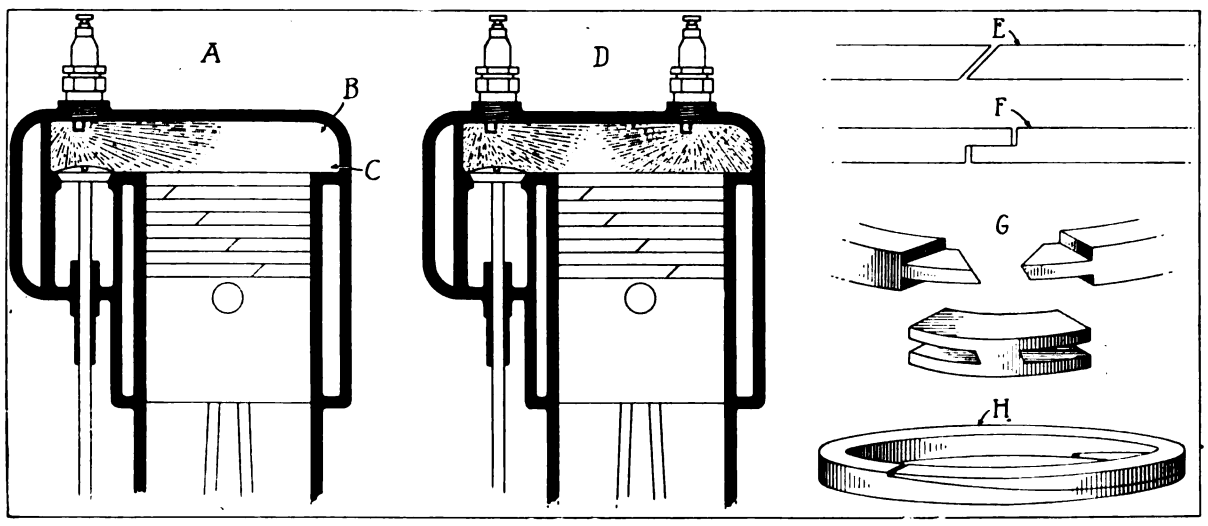


Fig. 9—Illustrating the Travel of the Fire in the Explosion Chambers of Single and Dual Ignition Type Engines. Also Showing Four Types of Piston Rings.

Let us see just why theory and actual practice differ. We will assume that we have a machine, fitted with pistons and rings, absolutely gas tight in the cylinders and that the valves do not permit the escape of any gas during the compression stroke. As the piston reaches the extreme top of its stroke and starts downward, a spark is made to occur, exploding the charge and driving the piston downward. This would be ideal if the mixture exploded, but it does not, it simply burns. Starting with the spark plug the flame spreads somewhat as represented in the Fig. 9 at A, and a slight interval of time elapses before it reaches the pockets B and C.

One can see that to get maximum efficiency all of the gas must be burned, but the faster the piston travels the less time the flame has to reach every part of the chamber, and if the spark occurs at the plug when the piston has reached the top of the stroke, the piston will have traveled to the bottom and the exhaust valve have opened before all of the gas is burned. The unburned gas will be driven out through the exhaust.

To get full engine efficiency, then, the spark must occur at a point before the piston reaches the top of its stroke, and this point advances as the engine speed increases.

Dual Ignition.

As a means to overcome this slow burning, some engines are designed with a dual system of spark plugs, such as shown at D, Fig. 9. In this way the fire spreads from both sides of the explosion chamber at the same time.

Because of the fact that the spark must be advanced as the engine speed increases, a spark advance mechanism is usually provided for a gasoline engine.

Now, if the spark were to occur before the top of the piston stroke, at the time the engine was being cranked, one can see that the engine would run backward, or "kick," as it is usually called. To prevent this, the spark must occur, when starting, at the beginning of the down stroke. This gives us sufficient data with which to adjust the spark mechanism. In practically every automobile engine on the market to-day the spark mechanism should be set so as to fire the mixture at the top of the piston stroke, or just as the piston is starting downward.

To a certain extent the spark can be advanced with the engine speed; there is a limit to this, however. Up to a certain advance the maximum expansion is obtained at the top of the stroke. If the spark should be advanced beyond this point the expansion would occur before the top of the stroke, and the engine would work against itself, so to speak, resulting in a deep thud or pound.

With a dual set of plugs, such as shown at D, Fig. 9, the spark cannot be advanced so far at a given number of engine revolutions as it can with a single plug, as shown at A. In every case the theoretical should be approached as near as possible. By this we mean that, if one could design a firing arrangement that would give maximum engine efficiency with the spark occurring at top center, or just as the piston started downward, then such a design would be better than one requiring a great advance of spark position.

We now have the complete theory of the gasoline engine, as far as actual operation is concerned, and for the time being will consider the construction, leaving the subject of carburetion and ignition to be taken up in a later chapter.

Engine Compression.

During the past installments frequent mention has been made of compression, though little has been said as to the reason for, or the necessity of it. Ordinary mixtures of gasoline and air, such as are found in the engine, are not explosive under ordinary atmospheric pressures. As the pressure or compression, as it is termed, increases the gas becomes more explosive, until finally, at pressures above 200 pounds per square inch, some mixtures explode without the application of heat. The Diesel engine, for instance, need not be exploded by electrical current.

The ordinary gasoline engine of to-day has a compression which ranges from around

Digitized by Google

50 pounds per square inch to slightly over 100 pounds. To obtain this compression, the piston rings must be perfectly fitted to the cylinders, as in event of leakage the pressure will drop very rapidly.

Piston rings are usually made of soft gray iron and are springy enough so that they will expand against the cylinder walls. If they were made in solid rings they would not answer the purpose, for their expansion under heat would not be the same as that of the cylinder walls. For this reason they are so designed as to be open on one side.

Types of Piston Rings.

At E, of Fig. 9, is shown the standard butt joint ring. With this sort of construction three or more piston rings are usually needed for each piston, and very frequently as many as four are used. This of course means an additional amount of friction against the cylinder walls and is not particularly advisable.

At F, of Fig. 9, is shown what is termed the step joint ring. With this ring the chances for gas leakage are not as great as with the butt joint. At the present time there are a number of so-called leak-proof piston rings on the market sold under various names. One of the popular makes is shown at G in the same figure. This ring is made in two pieces, the standard circle and a little guard which protects the ends. In a ring of this type there is no direct gas passage across its face.

At H is shown a refined design of ring in which the diagonal cut extends to a great extent around the circle. This ring also is a great favorite among the car manufacturers.

One will note that in every case the manufacturers are striving to make the pistons absolutely tight in the cylinders. At the same time, however, though this might be done by using a great number of rings, they are striving to keep the rings limited to three or four.

Cooling System Necessary.

At the time of the explosions in the cylinders the amount of heat is sufficient to melt the metal of which the parts are composed, and this would be the result if some means were not adopted for carrying away the excess heat. Two methods are used for doing this—one by air-cooling, the other by water-jacketing. The latter is used on the majority of cars. The greatest source of heat is in the head of the engine, and for this reason designers try to surround the head and upper parts of the cylinders with the water-jackets.

The second system of cooling, by air, is adopted on the well-known Franklin car. In this engine the cylinders are fitted with fins spaced around and running up and down on the cylinders. In both systems the object is to take away enough heat so as to prevent the melting of the metal.

In the next installment we will take up the principles of carburetion, as well as explain the various methods used for cooling.

(To be continued.)

Sirloin of Horse.

A resolution requesting Congress to appropriate immediately $100,000 to re-establish the inspection of horse meat, so that it might be made saleable, was adopted by veterinary surgeons from New York, New Jersey, Massachusetts and Connecticut at a conference in New York recently.

The sale of horse meat, the conferees determined, should be of invaluable aid in preventing a food shortage and reducing the high cost of living.

Horse meat proved its value during the siege of Paris, and since then the world has kept it in mind for emergencies. The same New York was preparing for the licensing and other regulation of the sale of horse meat immediately after Free-Trade legislation began to close manufacturing plants of America a few years ago. Then came the war, which saved us from the inevitable pauperization which follows in the wake of Free-Trade, and the horse meat got a rest until now. Horseflesh is costly stuff, however, unless it is very aged or diseased, but then we may be glad to get a piece of an old plug.—Searchlight.

ANCIENT BLACKSMITHING.

Ancient Greek Wheelwright Methods and the First Horseshoe "Sandals."

There are no Greek pictures of blacksmiths shoeing horses, because no shoes in the modern sense were given horses at that period. The nearest approach to a horseshoe was a kind of sandal which was bound and not nailed on to the feet of the horse.

There seem also to be no ancient Greek pictures showing wheelwrights at work, al-

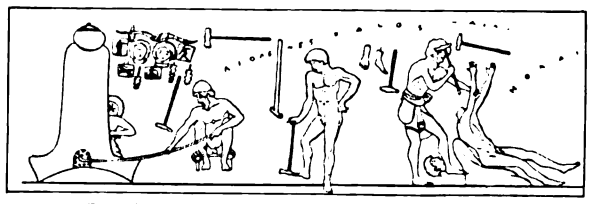


Fig. 6.—Roman Blacksmiths and Forge.

though there were many pictures of the various sorts of Greek chariots and wagons.

On the axle, which was usually of oak, was an iron plate as a bearing for each wheel. The wheels had four, six, or eight spokes, which were often tipped with iron where they entered the felloe. This was usually made with four or more arcs, and the pieces were curved by means of heat.

The tire was of either iron or bronze, but we do not know whether it was shrunk or driven on, or both.

Mostly Slaves.

Probably the majority of the smiths and metal workers in ancient Greece were slaves, as were almost all the skilled artisans as well as laborers of that period. It is a striking commentary upon the glories of Greek civilization that it was built on slavery, and on the slavery of white races closely related to themselves, or even of Greeks who had been sold for debt.

The father of Demosthenes, the orator, had 32 slave sword makers which cost him about $3,800.00 and brought him in a yearly net profit of about $600.00, or an average of perhaps five cents a day for each one.

The wages of a free blacksmith at that time were about $2.00 a week, as against a cost of seventy cents for a bushel of wheat. Thus even a free smith could buy only about three bushels of wheat for his week's work.

Under the Roman Empire.

The Romans, like the Greeks, still made far more use of bronze than they did of iron. What armor they wore was as yet of bronze, as were also their shields. Bronze was justly in great favor for artistic statuary and fixtures, furniture, utensils, and other household accessories. The blade of the sword, however, was by this time quite reguarly made of steel.

The chariot was constructed of much the same material as the Greek. The Romans



Fig. 7.—Roman Blacksmiths with Portable Forge.

also, until far into the time of the Empire, used no shoes for horses except occasionally sandals for those with soft hoofs. Sometimes such sandals, for purposes of ostentation, were made of precious metal as in the case of those for the mules of some of the empresses.

One of the Roman pictures showing three smiths working at one anvil, while a fourth is probably blowing the bellows, is illustrated at Fig. 6.

Roman Portable Forge.

In another illustration, Fig. 7, we see a portable forge which has just been brought by two Roman smiths to the location of a job. It is made on the principle of the early Egyptian forge with a raised back which could be turned to correspond with the wind.

Fig. 8 is very interesting in that it shows two smiths engaged in making cutlery. The forge and anvil are both very small, indicating that the smiths' materials came to them already partially prepared in the form of bars. Some of their products are shown hanging on nails overhead.

In all of these pictures the smiths are barefooted, which is an indication that the cuts represent slaves. In fact it is as true of the Roman as of the Greek period that



Fig. 8.—Two Roman Smiths Making Cutlery.

the skilled artisans were either slaves or freedmen who had been slaves.

For this reason wages were only just enough for a living. At the time of Diocletian the blacksmith received only fifty cents a day, while the price of a bushel of wheat was almost two dollars. Thus he could earn only about 1½ bushels of wheat for his week's work.

Repairing Heavy Springs.

An interesting description of how to repair railway wagon springs is contained in a recent issue of Work, an English publication. The springs in question support 10 tons, and each spring has six plates. The instructions for the work are as follows:

If the plates are less than ⅝ inch thick, the springs will not be strong enough for 10 tons when repaired, and this is probably the cause of their giving way. Wagon-springs, 3 feet 6 inches long, should have nine plates, 4 inches by ½ inch, to carry a load of 10 tons. In railway works these springs are hardened as follows: The plates are heated to a good red heat in a furnace, put into a cradle to prevent warping, and then plunged into water. They are then tempered by returning to the furnace and heating until a dead stick, when rubbed on the surface of the steel, will smoulder but not quite burst into flame. Some makes of steel require more or less heating than others. The springs are then bolted up in the center and placed in a scrag, in which a steam ram forces each spring straight two or three times. The sweep is measured before and after this test, and if there is any loss of compass the spring is rejected and has to be re-hardened. About ⅛ inch between the plates at the center is enough, just sufficient to ensure that they will bear hard at the ends. A screw-jack in a wooden pane is used for the scragging test.

813135 A

Digitized by Google

Ingeniously Constructed New Orleans Blacksmith Shop

How One of Our Southern Brothers Built His Smith Shop and Nearly All of His Tools from Scrap Stock

BY JAMES F. HOBART, M. E.

When the writer was a small boy, and cut up some particularly outrageous "dido" in the blacksmith shop, Grandfather would push up his spectacles and say: "Now, what in 'tarnal creation did you do that for? Just to see what ye could do, I s'pose?" I always have a good deal of sympathy for a boy who likes to do experimental stunts around the shop, such as heating bits of cast iron or bits of old files to the welding point, and then hitting them a terrible clip with the sledge,

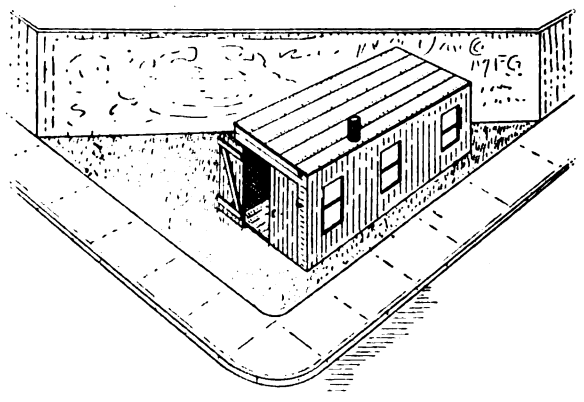


Fig. 1.—The Old Smith's First Shop in New Orleans.

while they are lying flat upon the anvil—some fireworks then!

Let the boys experiment all they want to, as long as they keep within decency, for they will learn more and work better later. Recently I saw a man who wasn't afraid to "see what he could do," and he had mighty little to do it with at that. He had reached middle age, had been crowded out by younger men and made up his mind that a shop of his own was all there was to it. Then he would not be driven from A to Z by anybody who wanted what he had, or took his work right out of his hands.

But, although a good workman, he had very little money—too little to start a shop of his own, so his friends all told him. Still, he started out to "see what he could do," and did it, too! He hunted up a vacant lot, in a good locality, where an advertising fence had been erected which cut diagonally across the corner, as shown by Fig. 1. This lot he leased very cheaply.

His First Shop.

He went to a house-wrecking concern and purchased a few boards, some scantling, half a dozen window sashes, a few rolls of felt roofing and a lot of old metal junk which chanced to be on hand. The junk metal contained among other things, a lot of vehicle springs, spring leaves and damaged springs of various kinds and sizes. He then purchased from a junk shop a set of used blacksmith tools, just the bare necessities, and had them all hauled to the vacant lot.

The services of a bright colored boy about fifteen years of age were secured, and the smith and the boy built a board fence around a section of the vacant lot. He then placed

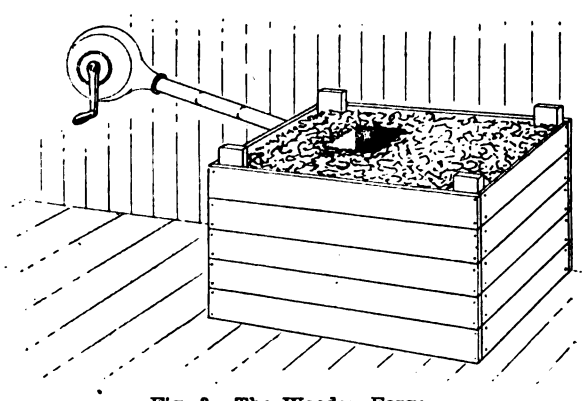


Fig. 2.—The Wooden Forge.

a roof and the roofing felt over the space enclosed by the fence, as shown by Fig. 1. There was barely room enough in the little shop to squeeze a vehicle past the forge and anvil.

The smith figured that he had all out of doors to work in and could make the shop larger when he was able to do so. The rear of the "shack" was fitted with a bench for wood working. A post drill was set up, a forge built, and in three days after the "junk" had been deposited on the vacant lot the smith was busy repairing the springs of an automobile.

A Wooden Forge.

The smith had no money to spare for a forge, and so he built a wooden one, as shown by Fig. 2. The side of the shop formed one side of the forge. A box made of boards and scantlings was filled with dirt, and a few bricks from a condemned sidewalk were arranged to do duty as a fire-pot. A bit of boiler iron from the scrap heap was drilled full of holes and used as a tuyere iron. A little hydrated lime was procured from a contractor who was building a house nearby, and the bricks were laid in lime mortar. One brick was made to do duty as a clean-out gate, pending the forging of a real gate, when the fire could be used and the smith "found time"!

Mending An Automobile Spring.

The writer happened past the shop soon after the forge had been put into commission. In fact, the writer manages to pass this little New Orleans smith shop pretty often, for he is interested in what the smith is doing and "what he will do next," also, "what he can do," as Grandfather used to

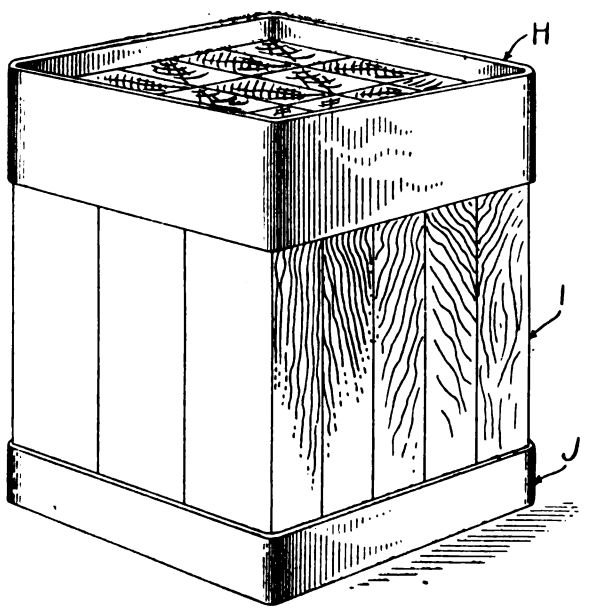


Fig. 3.—A Built-Up Anvil Block.

say. The last time the little shop was visited the smith was making a new spring for an auto, all four leaves of the old spring having been broken short off, almost all the breaks being in the same place, showing that a very sudden, as well as a heavy, shock had had been sustained by the car.

"Yes," said the old smith, "they do abuse cars frightfully sometimes, and a whole lot of drivers don't favor their cars a particle. They don't even remember that cars have springs under them, but go smashing along, over everything which they come across, and the springs must be of mighty good material or they never would stand up under one-half the misuse which they receive every day!

"But here is another thing which works against the spring service. You will notice that these springs are bolted solid to the car frame without anything whatever between to act as a cushion for relieving the shocks to which they are subjected. I shall put a piece of rubber, or a bit of leather in between the springs and the surfaces to which they are bolted, and you will find that this man will have fewer springs to be repaired, because some of the shocks will have been side-tracked and absorbed by the elastic material which I have put between them."

Repairing a Spring.

The smith took some of the old springs which he had obtained from the junk man, pulled them to pieces and cut down the leaves

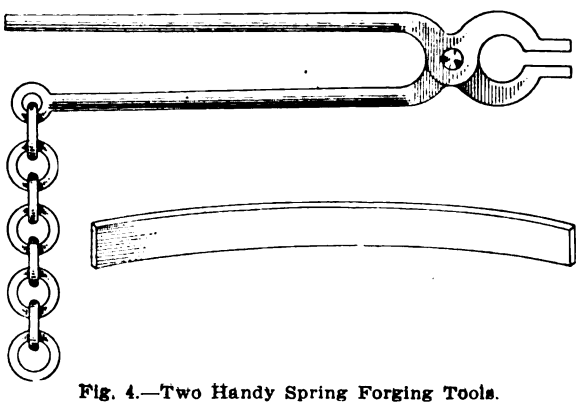


Fig. 4.—Two Handy Spring Forging Tools.

to fit the auto spring in hand. He allowed one inch for plating out the end of the spring; that is, cut the spring one inch shorter than the leaf to be replaced and the flatting out of the metal elongated the leaf just about an inch.

Before making a new leaf the smith rigged up another tool, which is shown in Fig. 4. He made up four tongs as shown, turned an eye in the ends of one leg each and welded in a bit of chain, by means of which the tongs could be clamped upon a spring leaf to hold it in the required position until it was cool.

A form was also forged from ½" x 2" tire steel—90-point carbon— and made to the required shape, as shown by Fig. 4. After a leaf had been forged, as will be described later, the smith clamped it while red hot, with the four pairs of chain tongs, against the form, shown in Fig. 4, leaving the leaf there until it was "black cold," after which the spring-leaf, form and tongs were quenched in the slack tub, the leaf removed and another leaf put in its place to form and to cool.

Horn for Spring Work.

The smith also forged out a "young bickhorn" which would fit into the hardy hole of the anvil. The "horn" was about six inches high, formed about as shown by Fig. 5, and was found invaluable for opening the eye of a spring-leaf. This device was made from a bit of tool steel, a piece of 1¼" rock drill which was found in the scrap.

A few punches were also forged from round tool steel, a large rat-tail file furnishing material for two punches, one straight, the other taper, of the required diameter to fit the hole to be turned in the end of the outside leaf.

Forging Spring Leaves.

As already described, the blank for the leaf was cut off, two inches short, an inch at either end being allowed for elongation of the leaf during the forging process. For the length of the outside layer a mark was made on a piece of the steel, about 12" from the end which was to be forged, or rolled into an "eye." After forging, a measurement was made from the center of the eye to the mark above noted, and from the difference between the two measurements it was very easy to determine exactly how much length of steel to allow for rolling up the eye at the other end of the leaf.

In sketch B, Fig. 6, the leaf blank is shown as cut from an old spring or from a bar of 90-point steel. Next, the blank was flatted to the shape shown at C, the work being done by the colored boy, with a sledge, fuller and flatter. The next step was the cutting off of the end of the leaf and the removing of the irregular end which was formed during the forging operation.

The smith did the cutting off by holding the leaf over a very sharp place on the far edge of the anvil, which acted, with the cutter, as a pair of shears, clipping off the end of the leaf very smoothly. (See D.) This finished one end of the leaf. After the other end had been forged in a similar manner the leaf would be tong-clamped to the form (Fig. 4) and set aside to cool slowly as described.

Forging an Outside Leaf.

The forging of an outside leaf was accomplished in much the same manner as far as plating out and cutting off, then the end of

Digitized by Google

the leaf was rolled up to receive the bolt which connected the top and bottom members of the spring. Sketch E, in Fig. 6, shows the first step in the process, just a bending of the leaf over the far edge of the anvil.

Next, the leaf is turned over and the bent end rounded down with the hand hammer, after which the punches were used, the eye sometimes being opened a bit to receive the taper punch. This was done by giving the eye a tap with the hammer when placed on top of horn, A, Fig. 5.

By means of the hand hammer and by hooking the leaf with a straight punch inserted in the eye, over the edge of the anvil, the eye was well rounded save at the very end of the flatted portion of the leaf. This could not be reached by either the hammer, the flatter, or by a corner of the anvil, so the old smith drove the tip end of the leaf into place by means of a common cutting off tool which was placed as shown by sketch H, and the striker, with two or three light sledge blows put the finishing touches to the eye, which needed very little filing indeed to finish it up.

A Built-Up Anvil Block.

The anvil purchased by the old smith was placed on a box while the spring was being repaired as above described. At the first opportunity he decided to make up an anvil block, but found that he had nothing except 3" x 4" and 2" x 3" stock to make the block with. But this material answered and he made up a good block, which will probably last longer than the old smith himself.

There was a piece of worn seven-inch tire in the junk which the smith had purchased, and this was bent and forged to a size exactly large enough to fit over the bottom part of the anvil easily. That is, after the old wide tire had been welded on into a "square ring," as shown at H, Fig. 3, the anvil feet or legs would slide easily into the "ring" when it laid on the floor.

Next, the shape, H, was packed full of the small scantlings, which were fitted by rough-planing so closely together that there were no large cracks between the pieces of wood. The pieces were driven into H as tightly as possible, first placing a piece of one-inch board in the bottom before driving in the pieces of scantling.

The last pieces were fitted a bit large, and were tightly driven so as to fill H as full as possible. But it was found that the lower ends of pieces, I, did not lie close together, making it impossible to put in place the light band, J, which had been forged from a piece of old 3" tire. The smith "trussed" the lower end of block, I, so that ring, J, could be driven on, and the way he did this was as follows:

A piece of stout rope was procured and made fast to one side of the shop wall scantling, about four feet above the dirt floor. The block, I, was placed on a couple of trestles and the rope given two turns around the lower end of the block just above where

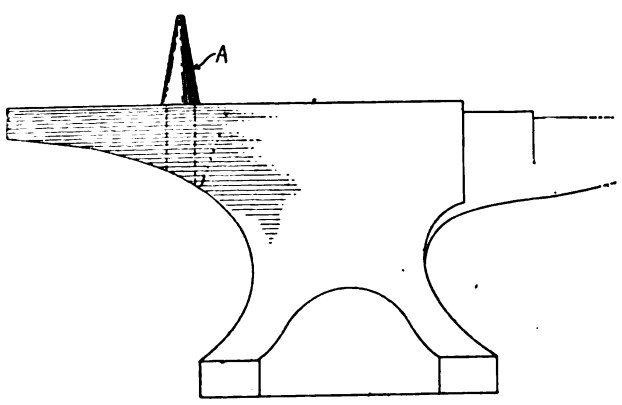


Fig. 5.—The Anvil and a Spring Eye Tool.

ring, J, was to be placed. The other end of the rope was then made fast to a wall scantling on the opposite side of the shop and a stick placed in the rope and twisted until the block was almost raised from the trestles upon which it had been placed.

A board was then placed under end H of the block, the board resting upon the trestles, which were moved to one side so that end J of the block was supported entirely by the rope. Then the smith rolled the block back and forth a few times, and the rope pulled the pieces of scantling so close together that band, J, could be caught over the ends and driven home in short order.

The piece of board was placed in the bottom of H before setting in the pieces of scantling in order that the ring, H, might project about one inch above the ends of the scantlings, thereby forming a collar to prevent the anvil from sliding off. The ledge or lip of ring H, where it projected above the wood between the feet of the anvil, formed

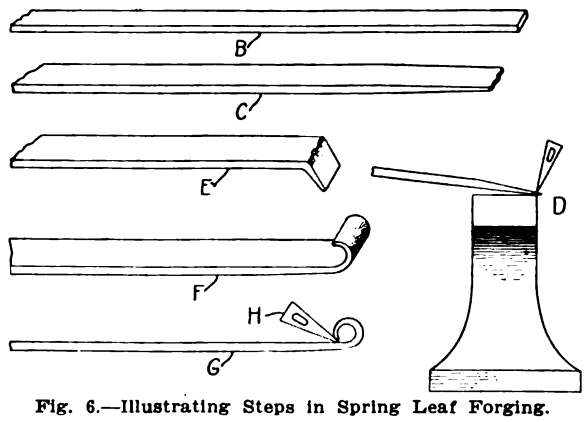


Fig. 6.—Illustrating Steps in Spring Leaf Forging.

excellent places for placing the center punch and any other small tools which it was found desirable to keep on top of the anvil block.

Making a Vehicle "Track"!

The old smith was always very glad to talk about the things which he had accomplished in the days gone by, and among other things he interested the writer very much by a story of how a certain cab had its wheels made to "track." "The owner of that 'buss,'" said the old smith, "was in a great pickle, because the rear wheels would not fall readily into the car track but would run for perhaps a hundred feet before they would drop in. This worried the owner very much, and he had many smiths and carriage makers try to make the wheels fall in, but they all failed.

"One day the owner of the cab was talking with me and said he would give $5.00 to any man who would make those wheels fall into the car tracks before the car had run ten feet after the forward wheels had fallen in. I took him up on that, and he brought the cab to my shop, and in half an hour he drove it out upon the car tracks and 'bang—bang' the front and rear wheels fell into the tracks almost together.

"What did I do to the cab? Just took down one spring and cut about an inch off one end of it so it would hang square and let the wheels follow each other without trying to guide from the rear, same as a long ladder truck is made to do. That is all I did to the vehicle, and I surely would like mighty well to make $5.00 as easily as that every day!"

A New Plow Invention.

A device which has recently been invented by Mr. J. H. Rhomberg, of Dubuque, Iowa, is said to plow, disc, and harrow the ground at the same time. With this machine, the inventor claims, he can put three acres of land into perfect shape for use, in the same time that would be required for preparing one acre in the ordinary way. The device consists of several small knife-like blades which are attached to the plowshare, and as the plow turns over the earth the small knives cut the sod into ribbons and break it into fine soil. This fine soil falls from the plow into the furrow, making a bed for the seeds. Mr. Rhomberg claims that this device requires but very little more power to pull it than does the ordinary plow.

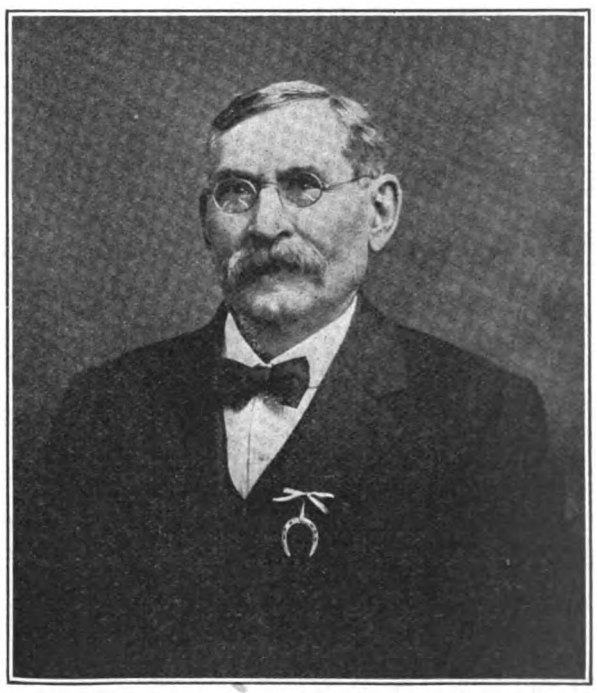
A NEW ORGANIZATION.

Incorporation of the Blacksmiths' Mutual Fire Insurance Company.

On the evening of February 12, 1918, members of the Blacksmiths, Wheelwrights and Horseshoers' Association of Nebraska enjoyed the hospitality of one of its oldest members, Dietrich Spethman, who has been engaged at his trade for over fifty years. Forty-seven years he spent in Nebraska, and for thirty-four he has been in business for himself. All the boys in the state know "Dick" for his genial handshake and his hospitality. The gathering was held at Mr. Spethman's delightful home at 509 W. Division street, Grand Island. The table was beautifully decorated, and a miniature horseshoe, made by Mr. Spethman, to be worn on the coat lapel and fastened by red, white and blue ribbons, was presented to each guest. The evening was spent in speeches, social talk, music and smokes, and was enjoyed by each and all. The guests upon leaving assured Mr. Spethman of their appreciation and that the evening was one that would never be forgotten. Those present were: Jens Miller, of North Bend; Robert McIntyre, of Kearney; G. S. Fisher, of Kenesaw; Walter Erickson, of Elba; C. C. Good, of Auburn; M. R. Fogerty, of Greeley; and C. H. Hoffman, E. H. G. Heidkamp, Ed Krall, Mr. Dalgash and Mr. Spethman, of Grand Island.

In furtherance of a plan that had long been under discussion by the association, a committee appointed by the Board assembled at the office of Attorney W. H. Thompson the next morning, and procured him to prepare Articles of Incorporation of the Blacksmiths Mutual Fire Insurance Company, consisting of members of the Blacksmiths, Wheelwrights and Horseshoers' Association of the state, with its principal place of business at Elba, Nebraska, to commence business on or about May first. Each member of the Blacksmiths, Wheelwrights and Horseshoers' Association has a right to become a member of this corporation and to insure his property in the said company, to an amount not to exceed the sum of three thousand dollars to any one individual. Mr. Thompson drew up the necessary Articles of Incorporation, also the By-Laws, and the same were signed by the members present—the officers to serve until after the first meeting of the stockholders of the corporation being: Dietrich Spethman, President; Robert McIntyre, Vice-President; Walter Erickson, of Elba, Secretary and Treasurer, and the said W. H. Thompson was employed as its attorney. The annual meeting of the corporation will be at the time and the place of the annual meeting of the Blacksmiths, Wheelwrights and Horseshoers' Association, at which time the Board of Directors are to be elected by the members, each member having one vote. After the Board is so elected, it is to, at the same time and place, elect the different officers of the corporation for the ensuing year. The Board of Directors is to consist of nine members, three to be elected at each annual meeting for a term of three years.

This means cheap, safe and equitable in-



Mr. Dietrich Spethman, Who Has Been Engaged at His Trade for Over Fifty Years.

surance for the blacksmiths and wheelwrights of the state—a thing that has generally been denied them in the past. The surprise is not that this company has been organized, but that it was not organized long, long ago.

Digitized by Google

Three Additional Interesting Entries in the Prize Photo Contest

We continue to receive photographs in every mail for our prize photo contest and are glad to find that the interest is still growing. Every reader who owns a smith or repair shop should send us a photograph, for there is no telling just who will win the prizes.

Prizes will be awarded to those who send in the most interesting picture, or set of pictures; the actual size or condition of the photograph itself makes little or no difference.

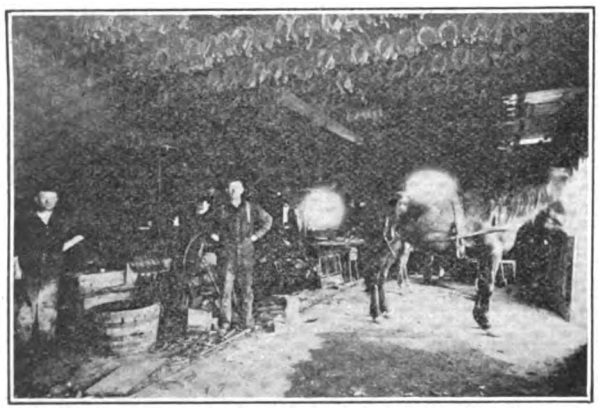
Be sure to send, with the picture, a little letter telling about your shop, your work or anything you think that your brother smiths will be interested in. You know how well you like to read letters from others—perhaps they also like to read letters, and it is "up to you" to do your part.

After the picture has been printed in the magazine, your photograph will be returned, and if you desire the cut itself, for use on your letter-heads, we will gladly give it to you and pay the postage on it.

Prize Photo No. 18.

From E. W. Matthews, Illinois.—I am enclosing, for you, a picture showing a part of my shop, and one showing myself with my three-months-old filly, which is standard and registered; sire and dams are developed stock and good race horses. Inside the door of the shop you will see a piece of an automobile, as I do this kind of work, as well as that of blacksmithing. When a blacksmith learns about the electrical system of the automobile he has but little to fear if he is a good machinist.

I remember last season an automobile mechanic, who had had some years' experience tell the owner that his coil needed new points because the engine missed on one cylinder when it was cold. I asked him why



Interior of Mr. Matthews' Shop.

all of the cylinders did not miss if the coil was at fault, but he couldn't answer that, and when I suggested a little more gas and a new spark plug they found what the trouble was and left the same points on the coil.

I shall be forty-six years old next spring, and over thirty years I have been doing horseshoeing and general work on wood and iron. I never could work quite as fast as some men I hear about, but I know how to shoe a draft horse or a race horse. I have ridden and driven horses and in all my travels never saw a man who knew very much more about them than I do, or one who could do more in a day's work. The picture shows one-half of my shop, which is equipped with tools and the latest types for doing implement work in both wood and iron. Among these you will see saws, emery wheel, power saws, a drill, a sickle sharpener, lawn mowers, automobile tools, all driven by a gasoline engine, and a forge driven by an electric motor. In this picture I am the man with the apron.

A good thing for beginners to do, is to write the carburetor people and get their instruction slips and study them carefully. I notice that many of the automobile owners are using Dyke's Automobile Encyclopedia, the same one that you sell. Another good set is put out by the American Technical Society of Chicago. Both of these I own and study a great deal, for I find many helpful things in them. I never have had any time to spend in pool rooms, picture shows or saloons, and though I am no total abstainer, I do hate a whiskey fiend, and usually spend my evenings at home studying some subject pertaining to my occupation, for in this way I am sure to get good returns.

The night of the 3d of July, last year, I took a vacation trip and went west of Cheyenne, Wyoming, about 316 miles, and on my way back saw some nice shops and some poor ones and many of them were doing automobile repair work.

I will close my long letter now, but want



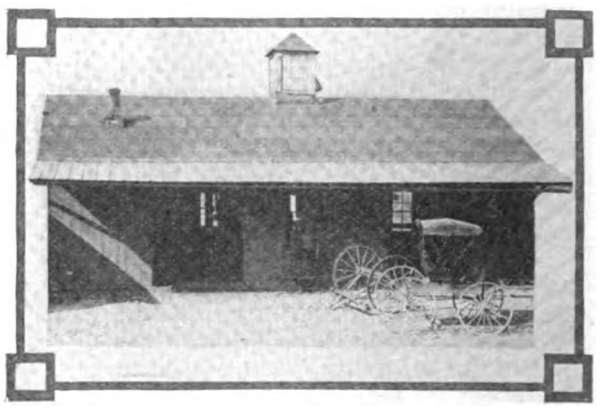
Mr. Matthews and His Three-Months-Old Filly.

to tell all the boys not to be afraid to charge as much as the other fellow, for he is not afraid to charge you whether you get value or not.

Prize Photo No. 19.

From G. N. Sidders, Ohio.—I am sending you an exterior view and a plan of my shop, which I like very well for the kind of work that I do. You can judge from the plan just how many different things I can do with this equipment. I have been in this business, here, for 17 years, although the shop shown is only three years old. The photograph makes the shop look rather dark, but it is not, for some of the windows are covered by the open doors. Since this picture was taken I have put an extra sash in each door. You can see by the plan that there are plenty of windows. Two windows in the skylight are made so as to tip and ventilate the shop if necessary. Perhaps the plan will interest some of the readers if they contemplate building.

Some time ago a customer wanted me to put four new hounds on his wagon, so I did the work and presented him my bill, which I thought was very reasonable, but he studied it for a few minutes and said, "that



The Shop of Mr. G. N. Sidders

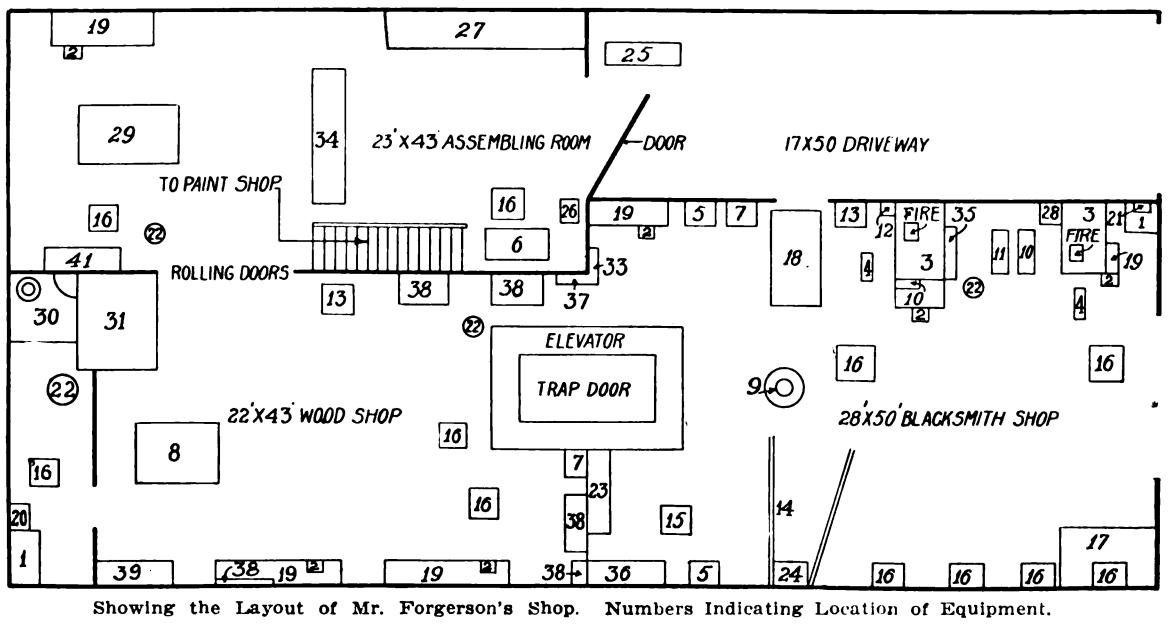
is too much for a hound, isn't it?" He didn't know, or think, that I had made four bolts to go through the axle, for the old ones were rusty beyond redemption, and every smith knows how easy (?) rusty bolts are to drive out of this place. There were a number of other irons that had to be repaired before they were fit to go back to their places. His objection set me to thinking and I put my thoughts into actions. The first time I was at a printer's I had some bill-heads made like the one shown in the illustration. I do not use these for every small job, but for medium or large sized jobs I always use them. This sort of a form shows the customer just what work he has had done, what materials have been used and how long a time the work required, also the charge per hour. Don't forget to add a little profit to the material item, and also be sure to get money enough to cover the overhead expenses, the new stationery along with the rest, but be reasonable with the profits.

In your January issue, in that splendid article by Mr. Orcutt, I think he figured a little high, especially on the bolts. The average bolt in a shaft is about 2x1¼ inches and this bolt can be purchased for a little less than one cent. He charges eight cents for two bolts. Let us charge a fair price, a price which will allow us to lay something aside for a rainy day, but will not prevent us from looking our customer in the face the next time we meet him on the street.

Prize Photo No. 20.

From J. E. Forgerson, New Jersey.—I am sending you four photographs of my shop and house, also a plan of my shop. I am not much of a draughtsman, but perhaps your artist can fix up the drawing. The picture at A is my house, while that at B is a front view of my shop with myself standing in front of the automobile. C is a three-quarter view of the shop, while D another view.

The building directly in back of the ice wagon, shown at D, is my take-down and assembly room which has a 12-foot ceiling. I do all kinds of work; anything they fetch



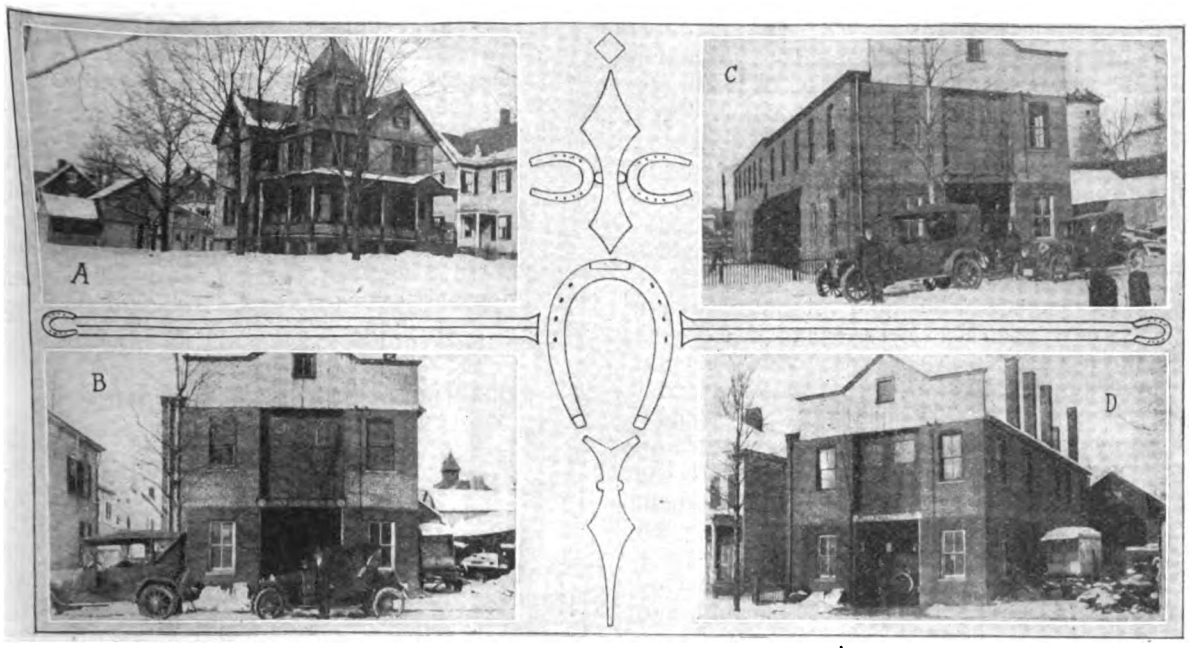
Showing the Layout of Mr. Forgerson's Shop. Numbers Indicating Location of Equipment.

in to me. And I repair anything from a wheelbarrow up to a five-ton motor truck.

The upper floor of the building is divided into three rooms and used as a paint shop.

Digitized by Google

It may interest readers to know that in 1885 there was a blacksmith shop on my lot and that the town officials had an iron post with four chains and handcuffs on it in front of the shop. They used to chain prisoners to this post.



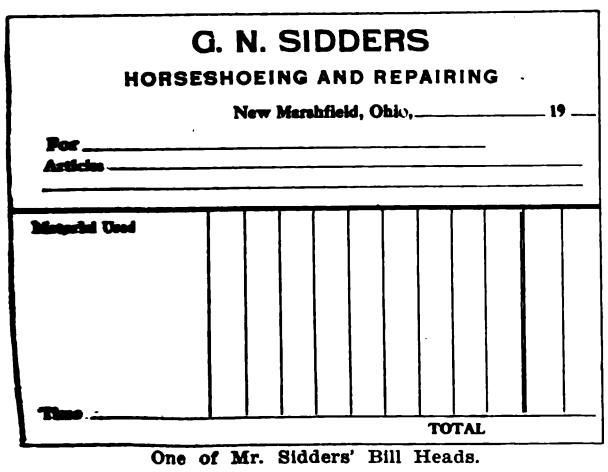
Showing Three Different Views of Shop of Mr. Forgerson and One of His Dwelling.

The shop is well equipped and laid out as the accompanying plan view shows. There is a driveway 17x50 feet leading into the take-down and assembly room referred to. The blacksmith shop is 28x50 and the wood shop is 22x43 feet. The following tools and equipment correspond to the numbers given in the drawing and will enable the reader to identify and locate each tool, machine, fire, etc. The last number indicates the number of pieces.

1—Discs, 2
2—Vises, 6
3—Forges, 2
4—Anvils, 2
5—Motors, 2
6—Gasoline Engines
7—Drill Presses, 2
8—Universal Woodworker
9—Fire Setting Plate
10—Tire Sinks, 2
11—Tire Bender
12—Hand Blower
13—Water Pumps, 2
14—Horse Stocks
15—Horse Clippers
16—Electric Lights*
17—Manure Pit
18—Coal Cellar
19—Work Benches
20—Safe
21—Clock
22—Stoves
23—Lathe
24—Tire Cooking Bath
25—Gasoline Tank
26—Gasoline Pump
27—Iron Rack
28—Electric Blower
29—Oxy-Acetylene Outfit
30—Toilet and Lavatory
31—Oil Tanks
32—Horse Shoes on Beams
33—Rubber Tire Setting Machine
34—Overhead Hoist
35—Iron Shears
36—Drawers for Bolts
37—Air Compressor
38—Bolt Closets
39—Screw Cutting Lathe
40—Wheel Horse
41—Tool Closet

* Four. The electric lights are on the side walls, the balance hang from the ceiling.

Ed. Note.—We trust that other readers will contribute sketches showing how their shops are arranged. A rough sketch will serve, as our artists will whip the drawing into shape. The fact that Mr. Forgerson has built such a substantial dwelling and a well equipped shop indicates that he has achieved success in his calling.

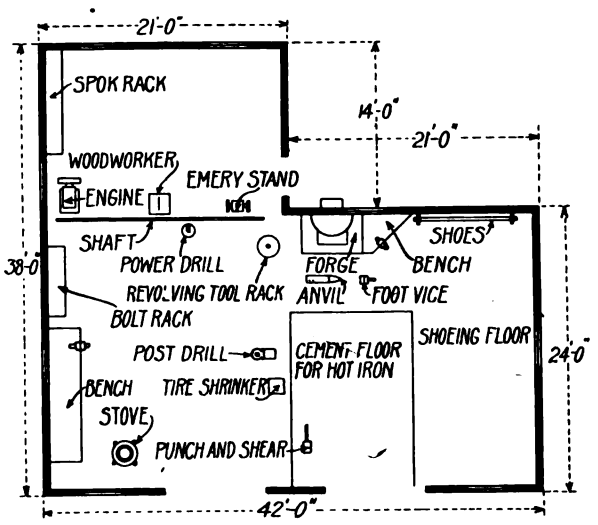

G. N. SIDDERS
HORSESHOEING AND REPAIRING
New Marshfield, Ohio, _____ 19 __
For _____
Articles _____
Material Used
Time _____
TOTAL

One of Mr. Sidders' Bill Heads.

A Substitute for Leather.

In these days of soaring leather costs the harness trade should give careful thought to a material which promises some degree of relief. We refer to a leather substitute, fabrikoid, which has solved the problems of many other trades.

Fabrikoid has qualities that are adapted to certain portions of harness which experts in the trade will soon discover. In addition to well established uses, it is now being tried out for lining carriage saddles and belly bands, where it replaces important quantities of leather. Service tests are now being made and there is every reason to believe that the material will prove entirely practical for these linings. As there is a minimum of friction at these parts, the fabrikoid should wear as well as leather and have the advantage of being impervious to perspiration and quite free from caking.



A Plan of Mr. Sidders' Shop.

The heavier qualities of fabrikoid have considerable tensile strength, but the strain on the belly band should be borne by a leather backing to which buckles are fastened. The edges of the fabrikoid should be turned under, when it will require an expert to tell it from leather. For these linings fabrikoid can be had in a glossy black finish with line grain similar to the patent leathers now in use. Other grain finishes and colors are obtainable in an ample variety to match almost any leather or carry out almost any idea.

The harness maker who examines some of the various qualities of fabrikoid will see plenty of possibilities in them. The Du Pont Fabrikoid Co., Wilmington, Del., will supply working samples and information.

Cast Iron Cement.

A good cement for repairing holes in cast iron pieces or for smoothing off castings may be made by mixing one pound of fine cast iron filings, one ounce of sulphur, and two ounces of sal-ammoniac. This mixture should be kept dry and when used mixed with twenty parts of clear iron filings and a small amount of fine sand, then made into a stiff paste by the addition of water.

REPAINTING THE CAR.

Covering the Various Finishing Methods and Materials to Use.

BY M. C. HILLICK.

During the last few years cars are being better built and are therefore going to the scrap heap in fewer numbers annually. This condition is giving the painter a greater amount of repainting from the basic surface, the owners of the cars finding that it pays to keep the equipment well painted. There are two methods to-day which are being made use of, to remove the old paint and varnish. One consists in burning off the finish with a gasoline burner, either in the form of a lamp or torch, and the other embraces the use of paint and varnish removers.

Paint and Varnish Removers.

These come to the consumer in two forms—liquid and paste. The latter is principally used for taking the paint and varnish off surfaces too large to be dipped into a vat or tank. Liquid remover is mainly used in the tank or vat, and into it small parts of the car are dipped or immersed until the old finish loosens up and comes off readily.

In shops having gas as an illuminating medium, a small hose is sometimes attached to the burner, and with this the paint is burned off. Gasoline, however, furnishes, when fire insurance policies permit, the readiest means, perhaps, for the removal of the old finish, although the paste remover is being very largely used at the present time for this work. The main thing when using the remover is to take all traces of the remover from the surface before painting over it. It is advisable to wash the surface after taking off the paint with turpentine or alcohol, or with both successively, or with vinegar. When traces of the remover are left and the painting goes on there is almost certain to be a softening up of all the coats to the extent of making it necessary to take off the coatings right down to the metal or wood.

A condition quite as uncertain occurs when in burning off the old paint the wood is charred and the coats of paint allowed to go on over these dead fibers.

Clean and Scrape the Surfaces.

These all should be scraped down to the live wood, otherwise there is nothing for the paint coats to take hold of. In building up on these stripped surfaces be they wood or steel or other metal, it is desirable to have the first coat sufficiently elastic to grip strongly to the surface below. The composition of the first coat as to pigment does not matter materially, so long as it is a good, virile substance, either lead or iron oxide, and is made to carry at least one part of raw linseed oil to every three parts of turpentine.

The next coat should likewise contain at least one part of oil to five parts of turpentine. This will furnish an elasticity to hold the pigment in place and insure safety for the coats to come after. Over these coats, after the necessary puttying with hard carriage putty has been done, apply four good coats of roughstuff. Make the roughstuff of a consistency a little heavier than ordinary paint coats, although not heavy enough to brush up into ridges. It is a fine practice to lay the first coat of 'stuff horizontally; the next coat vertically, and so on. In this way a closer, more compact fabric of material is secured.

Allow Body to Dry Fully.

Let the body of 'stuff, after completion, stand for a week or longer, if possible, before rubbing out. In rubbing, use blocks of artificial pumice stone. These are composition fabric and rub faster and safer than the old blocks of pumice lava. Always use plenty of water in rubbing roughstuff, so the gummy substances may be washed out from under the stone as the work proceeds; scratching and gouging the surface is in this manner avoided. Rub with straight out and return strokes of the stone, and avoid circular motions, the latter being apt to cut and dig the surface. Always rub around the outside of the panels first; it is almost impossible to miss the center. The main consideration in rubbing is to develop a level

Digitized by Google

surface; smoothness is a secondary factor, as this will be taken care of with the sandpaper and through the medium of the rubbing varnish coats.

Do Not Neglect Smoothness.

It is not to be understood, however, that smoothness can be neglected altogether; simply that levelness is the main thing to be secured through the rubbing process. In all burned off work, or work from which the old finish has been taken with the remover, a good substantial body of pigment is necessary to give depth and stability to the coats of color and varnish. Not only this, but substantial film of pigment is required to enable the workman to rub the surface to a level condition, otherwise to get the low places level it will be necessary to skin the high places to a dangerous degree. Moreover, the old time rule of the carriage painter obtains to-day; namely, that substantial depth of the primary foundation, including the roughstuff coats, is a very essential part of good painting.

With a fine and prime cured and rubbed roughstuff foundation the finish may properly be esteemed more than half completed. In bringing up this foundation it is a safe practice to fix up all defects which may develop during the work, or which may have been a part of the surface in its original state. In the event of some surface defect showing up in the surface as it is rubbed out of the 'stuff—and some defects through accident or other cause often do come to the surface during the rubbing or after—it is important that all such defacements be taken care of before proceeding further with the work. Where the defect is deep enough it should be puttied and when dry rubbed down with a block of rubbing stone to a perfect level with the surrounding surface.

It is safe to proceed on the understanding that all colors, practically, are of a composition which does not permit being touched up, puttied, and otherwise surfaced upon without showing plainly under the varnish and to the permanent injury of the appearance of the finish. For this good and sufficient reason all surface defects found in the work before or after the roughstuff is rubbed, should be made good and to exactly correspond to the condition of the surface in its proper state. Some little mending of such defects may, of course, be indulged in when some of the absolutely solid covering colors are being applied, but even in such cases the workman is taking a chance when he attempts to remedy a surface defect that should have been blotted out prior to the application of the color.

Repairing Surface Defects.

In the case of the semi-transparent pigments such as ultramarine blue, some of the lakes, etc., it is clearly impossible to do any mending of surface defects after the first coat of color is in place. All such attempts are bound to prove failures. It is a rule which the painter will need to adhere to without exception to round out the surface minus a flaw prior to applying the first coat of color. In these days of soaring prices the tendency is to cheapen the composition of the foundation through the substitution of cheaper materials. Any attempt of this kind, it seems to the writer, it false economy. Rather than cheapen the materials used through the purchase of inferior supplies we should much prefer to hold fast to the old standard stock, and economize by using a fewer number of coats and making the surfacing methods—the sandpapering, rubbing, and smoothing up generally—more thorough, thus getting the finish through a less number of coats of material and a more thorough refinement of the various surfacing processes.

We believe that the exhaustive methods of surfacing should be largely applied before any of the color coats are put on. In this manner it is possible to save a coat of varnish, at least, and also to save some of the body of varnish that is ordinarily rubbed off during the work of rubbing and refining these coats. While it is true to a large extent that to get depth of finish it is necessary to apply various coats of rubbing varnish, yet it is likewise true that considerable depth of varnish film is taken off during the surfacing process which under a more thorough plan of primary surfacing might be left on, thereby getting equally fine surface results and a better protection for the color and the undercoats.

Varnish Color.

Ordinarily a saving of one coat of color may be made through the use of varnish-color following the first coat of color. If a lack of depth of color intensity or solidity is apparent, this may be overcome by using some of the color in all but the last coat of rubbing varnish. What has here been said with reference to the use of the best paints and colors will apply with equal emphasis to the varnish used. The hard road and garage service to which the average car is exposed calls for a varnish superior in every respect. Such a varnish may, and, in fact, does, cost more than many others at the date of purchase, but it has an accumulative value and in the final reckoning it will be found the cheaper and more economical material. Such a varnish is safer and surer to use, with greater certainty of reliable results, gives the surface better protection, a longer period of wear, and at all times a more brilliant and enduring finish. This is what is called varnish value, and it is precisely what the consumer desires to obtain when he buys his varnish supply, but it is what he doesn't get when he buys the just-as-good-but-costs-you-less article.

We are all just at this time trying to run our shops as economically as possible, and "a dollar saved is indeed a dollar earned," but hard common sense is back of the practice of buying good, reliable stock, with bone and substance and prime quality running all the way through it. Supplement this practice with skillful workmanship and a determination to give value received and this business of painting motor cars and trucks is bound to be an exceedingly prosperous and satisfying enterprise either as a side line or a main issue. In the buying of varnish perhaps it will be found a safe rule to have the material come in containers suited to the actual needs of the business. When the consumption is comparatively small it will be well to receive both the rubbing and finishing varnish in quart containers. This will insure having the material in its original condition with the promise of safer and better results. When the container is once opened a certain unit of the thinning content is due to pass off into the air, and this results in a gradual loss of fluid matter, and a flowing and working property as well.

Strain the Varnish.

Always before using strain the varnish; this insures the work against bits of sediment and flakes of foreign matter which somehow come stringing along through the finest varnish at unexpected times. Open up the container twenty minutes or half an hour previous to using the varnish. This plan allows for certain gases to evaporate and enables the varnish to quiet down before application. Through the practice of straining, the left over varnish may be utilized for finishing purposes, or for rubbing, as the kind may suggest. In this way both rubbing and finishing varnish may be used up closely, and the old time can of "slop" varnish dispensed with altogether.

During the winter months it is a safe plan to keep the varnish supply, both rubbing and finishing, on a shelf part way between floor and ceiling, where the temperature is more certain to be maintained at a uniform degree. The habit indulged in by some painters of shaking the varnish can occasionally is uncalled for and is a menace to good results. Varnish should be maintained in as quiet a condition as possible. Whatever sediment or foreign substances may be resting at the bottom of the container had best be left there; stirring them up and through the contents merely adds to the uncertainty of the work of varnishing, which under apparently the most favorable conditions is uncertain enough now. The saving on all supplies is an important part of good painting now to a greater extent than ever before.

A little carelessness in the manner of handling colors allows for a rapidly accumulating loss. When the pigments are not furnished in what are known as press cans, the method should be to cut off the top of the container, and after lifting out the desired quantity of color, press the contents down smoothly and then cover with either water or turpentine, the last named medium being the best. A little attention now and then given these opened containers, with "turps" being added as needed, will serve to keep the color at all times ready for use without any resulting loss. The same rule should apply in the matter of caring for other pigments, all of which become rancid and gummy, and subject to a certain per cent. of loss when left open and exposed to the air and floating dust of the shop.

Veterinary Service in the Army.

One of the most interesting of the addresses delivered at the recent annual meeting of the American Humane Association at Providence, R. I., was that by Major Griffin of the U. S. Veterinary Corps, says Our Dumb Animals. He outlined with great clearness the organization that is now being perfected whereby this department of the service will be rendered thoroughly efficient. It seems that since the Mexican disturbance the need of this reorganization of the veterinary corps has been keenly felt, with the above result. The Major was particular to say that the Government at present was in no need of outside assistance, and was not asking for any. Should we reach France, and our supplies and equipment to meet the demands fail us there, he said, we shall greatly appreciate additional aid.

The Adjutant General of the Army informs us that veterinary ambulances are contracted for, that veterinary hospitals are under construction at all divisional camps and ports of embarkation, that bandages, drugs, and surgical instruments in large quantities are being accumulated at medical supply depots and are being issued as needed. As to veterinarians, 1667 have been recommended for commission, 579 are on duty, eight to ten are on duty at each divisional camp, and from five to six at each port of embarkation, while there are from six to twelve at each permanent remount depot. Already 62 have been sent to France.

The new and thoroughgoing reorganization of this arm of the service, with its provisions for the needs that may occur, will be good news to those who are deeply interested in the welfare of our army horses. We have found it hard to believe that, outside of the emergencies liable to arise during the early stages of the war, the Government would not be able to handle the situation.

Capewell Day Nursery.

An unusual and interesting experiment is being carried on by the Capewell Horse Nail Co., situated at Hartford, in the shape of a day nursery for the children of mothers employed throughout the factory in various departments.

Because of the shortage of workmen, such a step has been necessary, for in this way only can many women, who have the care of small children, be released for work. Mrs. Mildred Huff, a graduate of the Hospital of Hartford Training School for Nurses, is in charge of the welfare work at the plant.

Charge of the Light Brigade.

A couple of Texas negroes were discussing the selective draft measure just before their numbers were called:

"I sho hopes dey puts me in de infantry," said one.

"What fo'? Why, you fool, de calvary is de on'y place to be. Dey don't git near so much fightin'."

"Maybe so," admitted the other, "maybe so. But did you evah stop to figgah dey has to retreat sometimes?"

"Sho! What about it?"

"Well, when it comes to retreatin' I wouldn't wan' to be bothered with luggin' a horse after me."—U. S. Booster.

Digitized by Google

A Complete and Handy Camping Outfit for the Automobile Owner

For the Spring and Summer Hunting and Fishing Season Nothing Could Be More Compact Than This Outfit

Now that spring is near at hand the motorist is planning for long tours into the country. It is safe to assume that 50 per cent. of the automobile owners plan to use their cars during their vacations on camping trips, for fishing, or for hunting.

Since this is the situation, the average blacksmith or woodworker should find a big field at this time in the building of camping bodies for the car.

What is one of the most elaborate, but at the same time most compact camping outfit designed as an adjunct to the automobile is a body made upon the plan shown in the accompanying illustration. The outfit includes comfortable sleeping accommodations for two persons, complete kitchen equipment, luggage carriers, etc.

This body can be constructed in the shop of any average blacksmith or carpenter and requires but very little joining work. The sides are cut from one piece stock, while the rest of the wood may be discarded short lengths from other jobs.

The completed design, a side view of which is shown at A, harmonizes with the body design of the car. At the front end, the body measures two feet, seven inches in height, while at the rear it drops below the chassis frame and measures, over all, three feet seven inches. The total width is two feet seven inches, and the length four feet four inches. The body may be bolted to the flooring of the car or the chassis frame. The illustration shows it attached to a Ford roadster.

Each side is fitted with two large drawers, B, B, in which may be packed the kitchen and cooking utensils; dishes, knives, forks, and table implements; bedding, sleeping garments, bathing suits, etc., and the fourth drawer may be divided to carry in one side, camping tools such as a saw, hammer, axe, etc., and in the other side a medicine kit and shaving outfit.

Around the roof of the body is a railing, C, about six inches in height, so the roof may be utilized for carrying trunks, suit cases, camp chairs and tent. Over the baggage packed on the roof may be tied the tent fly or a rubber blanket.

The rear of the body is fitted with a hinged door, which opens downward and which is provided with two hinged legs, D. When the door is lowered, as indicated by the dotted lines, E, the legs are extended and the device used as a table.

With the door opened, two compartments are exposed, an upper and a lower. The former, F, may be arranged to contain a two-burner kerosene oil stove and an oil can; while the latter, G, is designed for a small but convenient sized ice chest. A hole should be provided in the bottom of this compartment to allow the escape of the water.

Mounted on the front and rear fenders on one side of the car are two brackets. These are for carrying a tent pole, two ordinary pole cot beds, and long handled net for fishing. Straps at the top of the brackets hold the poles and beds securely in place while traveling. At H, H, are shown the details of the brackets, which are made from 1¼ by ½-inch strap iron.

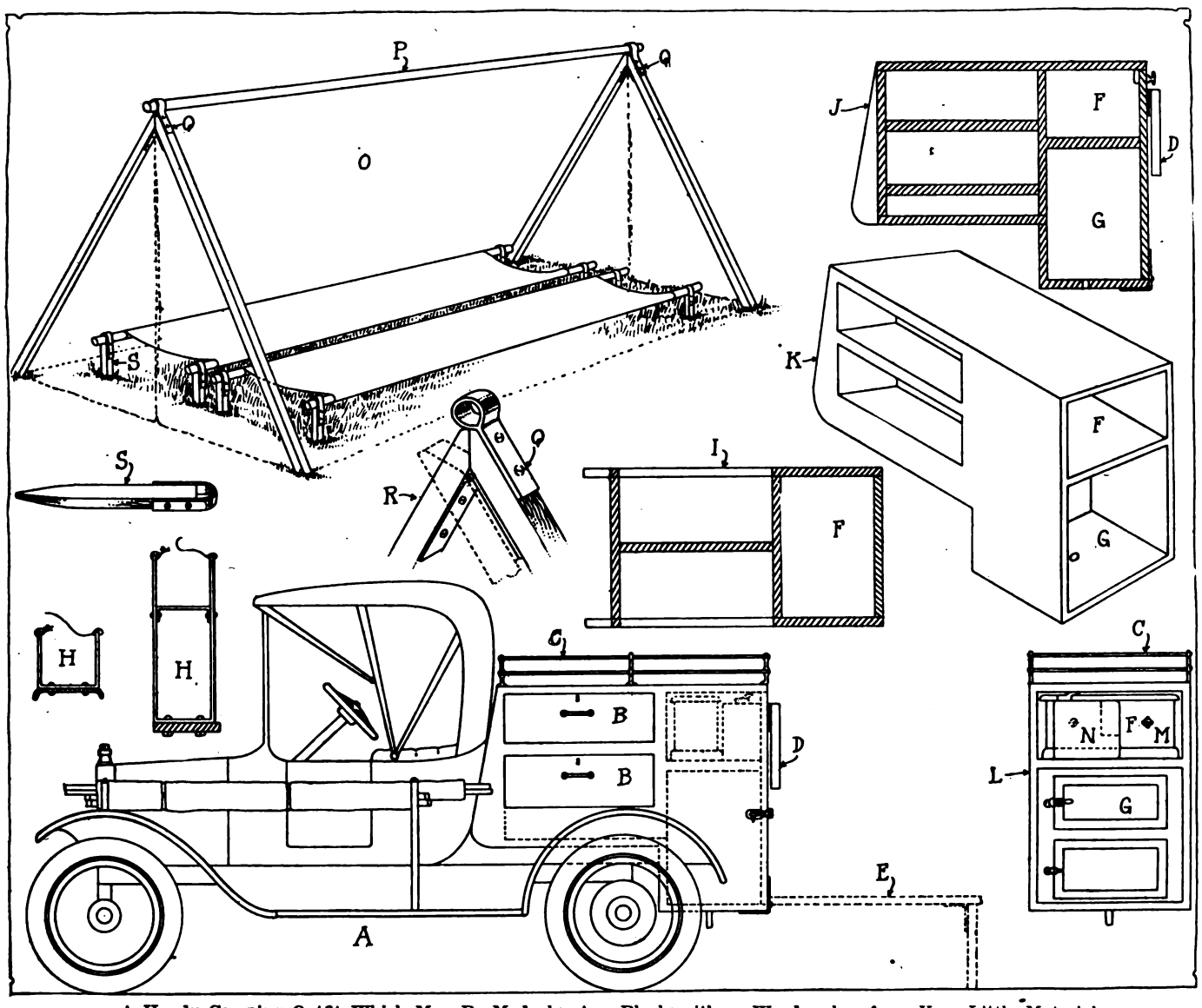
The body may be made of 1½-inch panel boards throughout. View I shows a sectional plan, while a side view appears as at J. View K shows the body with the drawers and door removed. View L shows the rear with the door removed, exposing the ice chest in compartment G, the stove at M, and the oil can at N. The tent and bed arrangement is shown at O.

The top tent pole, P, is two inches square and eight feet long and is held in position by the two loop brackets, Q, Q, which in turn are fastened to the tent legs as shown. The four tent legs are six feet, three inches, by 1½ by one inches and hinged at the center so they can be folded together when not in use, as shown in sketch R, indicated by the dotted lines.

In setting up the tent, the pole, P, is held securely in the brackets, Q, by a small wedge shaped piece of wood, then the canvas is stretched over the entire frame and pegged in the ordinary manner, making a strong, simple, but complete tent.

An ingenious method has been devised for holding the beds. The pegs, S, are two feet long and 1½ inches square and pointed at one end. At the top is a short piece of strap iron bent to form a loop for the end of the bed pole. When the stakes are driven into ordinary ground they are sufficient to hold the heaviest person and prevent the annoying swinging together of the bed poles, so common with the "stretcher" type of bed.

In designing this outfit the greatest care has been observed in making the whole construction simple. At the same time, however, there has been no sacrifice of utility, and the outfit should be of great value. It should be ideal for the owner who might not care to put out much money on camping equipment.



A Handy Camping Outfit Which May Be Made by Any Blacksmith or Woodworker from Very Little Material.

Magnitude of Automobile Industry.

Few blacksmiths care very much about figures or statistics but undoubtedly the following figures, compiled by Alfred Reeves, general manager of the National Automobile Chamber of Commerce, New York, will prove of interest to every blacksmith who has been contemplating entrance into the automobile field. These figures simply go to show that the automobile industry is growing extremely fast, and that it will probably grow faster from now on, because of the railroad and passenger traffic conditions in the country at the present time.

At the present time there are 372 commercial vehicle manufacturers and 238 passenger vehicle manufacturers distributed throughout the country, showing an investment of about $736,000,000 and employing over 280,000 workmen. Last year there were only 2,000,000 motor vehicles produced, representing over $1,000,000,000. It has been estimated that there are about 4,800,000 vehicles registered in the United States and 435,000 trucks.

To take care of this great number of machines, there are approximately 25,000 garages and 13,500 automobile repair shops, representing an investment of about $184,000,000.

It is interesting to note that there are about 12,000 shops making a business of tire vulcanizing, a figure which is nearly equal to the number of repair shops in the country.

Welding on the War Front.

Reports from the war front show that considerable work is being done in all branches with oxy-acetylene. There is very little loss of material on the front. When a truck or a tank is badly damaged by shell fire, it is often repaired at very short notice by the use of the torch. Automobile members such as frames, engine housings and axle parts are reclaimed in large numbers. Where a machine is too badly damaged for repair work, it is frequently hauled to the repair base and entirely dissembled. Such parts as can be used for repairs to other cars of the same make are carefully repaired and utilized when occasion demands. The tanks of actylene and oxygen come in handy for other work also, the actylene being used for lighting at many canteens and homes.

Digitized by Google

The Blacksmith & Wheelwright

The Pioneer Journal of Its Class in the World.
Member of the Audit Bureau of Circulations.
PUBLISHED MONTHLY BY
M. T. RICHARDSON COMPANY,
71-73 MURRAY STREET, NEW YORK.
POST OFFICE BOX, 654. TELEPHONE—7377-7378 BARCLAY
CHICAGO OFFICE, 608 SOUTH DEARBORN STREET.

M. T. RICHARDSON, President and Treasurer
F. R. WHITTEN, Secretary

F. R. WHITTEN, Advertising Manager.
H. F. LUDINGTON, Western Representative

AGENT FOR GREAT BRITAIN:
ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance..$1.00
One Copy, six months, in advance.....60 cents
Single Number .....10 cents
Canadian subscriptions .....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English money.
Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

COMMUNICATIONS.

Communications on subjects appropriate for our columns solicited from all quarters. We want practical information. If you KNOW something that will benefit our readers, we shall be glad to have you write it out and send it to us for publication. All communications of this nature should be addressed to the Editor of THE BLACKSMITH AND WHEELWRIGHT, P. O. Box 654, New York.

CHANGE OF ADDRESS.

Subscribers who desire the address of their paper changed will please send the old as well as the new address.
Newsdealers can obtain THE BLACKSMITH AND WHEELWRIGHT from the news companies with whom they deal regularly.

ADVERTISING RATES SUPPLIED ON APPLICATION.

Entered as second class mail matter at the Post Office in New York City.

SPECIAL NOTICE.—When subscribers fail to receive THE BLACKSMITH AND WHEELWRIGHT regularly, we shall take it as a favor if they will notify us to that effect.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

The Blacksmith and Wheelwright in New Zealand.

Mr. R. Hill, Matlock House, Devonport, Auckland, New Zealand, is our accredited representative in New Zealand for obtaining new subscriptions.

☞ When you change your place of residence always write to us and give your new address.

APRIL, 1918.

TABLE OF CONTENTS.

	PAGE
Classified Buyers' Guide	112
Index to Advertisers	112
Want Advertisements	113
Design, Construction, Operation and Repair of Motor Vehicles	97
Ancient Blacksmithing	99
Repairing Heavy Springs	99
Ingeniously Constructed New Orleans Blacksmith Shop	100
A New Plow Invention	101
A New Organization	101
Three Additional Interesting Entries in the Prize Photo Contest	102
A Substitute for Leather	103
Repainting the Car	103
Veterinary Service in the Army	104
Capewell Day Nursery	104
A Complete and Handy Camping Outfit for the Automobile Owner	105
Magnitude of Automobile Industry	105
Editorials	106
Who Can Answer?	107
Workshop Diagram	107
A Letter and Request from the West	107
What Is the Best Draft?	107
To Remove Paint	107
A Drilling Question	107
Tempering Air Set	107
Who Sells "Solderall"?	107
Bending Angle Iron	107
New Department	107
Locating "Missing" Cylinder	107
An Answer to Mr. A. E. Roe	107
Trading Opinions	107
An Interesting Letter	108
Making and Hardening an Alligator Pipe Wrench	108
Removing Piston Rings	108
Soldering Aluminum	108
Sleeve Protectors	108
Shoeing a Forger	108
Agrees with Mr. Hattenhaur	108
Contraction and Corns	109
Gasoline Pipe Repairs	109
Hardening Soft Center Shares	109
Mr. Johnston Is Amused	109
Old Fashioned Hoe	109
Motor Car an Essential	110
Issues Set of Rules	110

AN INTERESTING PAPER.

We received recently a letter from one of our middle-western subscribers, who said that there was no paper published which he liked to read as much as he did The Blacksmith and Wheelwright. He gave as his reason that he was particularly interested in the letters from other readers. He said that he enjoyed hearing from his brothers in the East, and beyond him in the West, and that he had considerable satisfaction in finding that many of the other readers faced simi'ar problems to his own.

Brothers: This is just the spirit we like to get in our paper. We want every one of you to feel that you are a part of the magazine, just as much as ourselves. No doubt every one of you feel the same way when you read a letter from Maine, from Florida, from California, or from Washington. Somehow or other, it makes one feel as though he had friends in every part of the country when he reads letters such as are printed in The Blacksmith and Wheelwright.

It is this good spirit of fellowship that we want to keep up, and we want all of you to do your part by writing us letters and still more letters. Just think, it only takes three cents to send your letter to all of our subscribers all over the country.

OUR NEW DEPARTMENT.

Beginning in this issue we introduce a new department for the blacksmith who is doing automobile work. This department will be called "Truck and Tractor Trouble Department" and will contain questions and answers from our subscribers dealing with automobiles, trucks, and tractors. As a general rule these questions will be answered by our Mechanical Editor, but in order to receive the benefit of everybody's ideas, we want all of our readers to take part, by sending replies to such questions as they may see, giving their ideas as to the causes of the various troubles. Do not hesitate to ask questions that you want answered, for you must always remember that no one can ever learn unless they ask questions. Certain troubles are bound to arise which may puzzle even experienced automobile men, and to find the correct solution of the problems one must often consult persons who have had experience in that particular field.

CONCERNING THE TRACTOR.

In the years to come the tractor will replace a large number of horses, but the horse will always be used in agricultural work, particularly where the fields do not permit of economical use of the tractor. Because the use of tractors will eventually be universal, and because they will require repairs, the blacksmith is the logical person to do this work, for he is on the ground, is acquainted with and enjoys the confidence of the farmer.

The tractor is similar to an automobile in one respect and that is it is propelled by an internal combustion engine. Let the smith master the engine and the rest will be fairly easy. The tractor industry is in its infancy and must and will go through the same evolution as did the automobile. Now is the time for the smith to lay the foundation for the tractor business. Learn all you can about the internal combustion engine. Grow up with the tractor business. It belongs to you.

USE SENSE IN BUYING.

Doubtless the majority of our readers have, at some time or other, witnessed a "run" on a bank. You know how some of these are caused, especially in the small country towns. Mrs. Smith thinks that the bank president appears worried and tells Mr. Jones that she guesses business is worrying the banker. Then Mr. Jones tells Mr. Thompson that the bank is not as strong as it should be, and Mr. Thompson, who has two or three hundred dollars, immediately tells his friends, who may be interested, and they all go down to the bank to draw out what money they have; and so like wildfire the rumor spreads that the bank is unable to pay back its depositors, and when the bank opens in the morning, a line of perhaps fifty or one hundred people are there in waiting. Of course the bank is unable to pay all of its depositors, in cash, because much of its money is in stocks and bonds, which cannot be turned into dollars at a moment's notice without a great loss, and so the bank fails.

In a general way this sort of a condition is just what resulted this past winter when so many people made a "run" on the "bank" of coal and iron, and other metals. As soon as the people in the United States found out that there might not be coal enough to supply everybody and still have some to spare, they immediately put in orders for as much coal as they were able to store in their bins, whether they had sufficient or not. Consequently, the supply was unequal to the demand, and someone was obliged to go without.

Each individual is responsible, in a way, for these conditions, and it is up to you, Brothers, to prevent such conditions in the future. If you live in a small town do not rush to the nearest coal dealer as soon as you hear that the supply of coal is exhausted. Do not tell your neighbors that there is not coal enough for everybody. If you don't think that there is coal enough, keep it to yourself. Buy in sufficient quantities to satisfy your own demands for the near future, but don't feel that you are obliged to buy up enough coal or other stock to last you for five or six more years to come. Try to distribute your needs as much as possible, for in this way only can the great demands of the present time be taken care of.

Don't go to the other extreme and delay buying until your present stock is entirely exhausted. It is always a good plan to put in orders considerably ahead of time and let the dealer or jobber take care of your wants when it is most convenient for him.

AN IMPORTANT BILL.

Many of our readers will be interested in the new agricultural appropriation bill carrying a total of twenty-eight million dollars, which was passed on March 21st by the Senate. The amendment increasing the guarantee price of wheat to $2.50 a bushel was adopted by a vote of 49 to 18. This means that the blacksmiths will be indirectly affected, because any bill which affects the farmer is sure to make a difference to the blacksmith, for in a way the farmer employs the blacksmith more than anyone else.

THE SCRAP PILE.

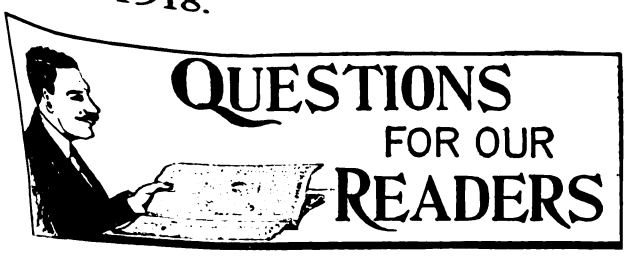
Perhaps never before in the history of the country has the price of old iron and steel been as high as it is at the present time. For this reason, now is a good time to sell all of the old iron scrap which is lying about the blacksmith's shop and which will probably never be used again.

Every blacksmith who uses any kind of high speed or tool steel in his shop should investigate welding apparatus, for with this sort of an equipment he will be able to salvage many small pieces of steel which he could not use in any other way. Steel pieces, which have been worn too small for lathe or tool holders, can be welded upon larger pieces of soft iron and ground into cutting shapes, just as well as larger pieces. If the blacksmith does not feel qualified in putting out money to buy a welding equipment, he should visit some nearby welding shop and get some good advice regarding the saving of old steel.

AUTOMOBILE BODIES.

In days gone by the country farmer, when he desired a new top on his buggy, usually visited the blacksmith, who was able to put on new top fittings and, perhaps, even supply a whole new top. This year bids fair to be one in which the old automobile will be used more than the new one. There will not be as many automobiles turned out at the factories as there were last year, and many owners will be forced to fit up their old cars for, possibly, two or three more years of service. This should prove a big field for an ingenious blacksmith, for he should be able to re-top machines as well as buggies. In addition to this he should find time in his spare moments to do much repair work upon the car bodies themselves.

Digitized by Google



In this department our readers are invited to ask questions about anything concerning which they need information. There is no charge connected with it. It is as free as air. Questions require answers, and these often are as valuable to other readers as to the ones asking the questions. We urge all to make free use of this privilege. Fire all the questions at us you please. The more the better.

Making Use of Department.

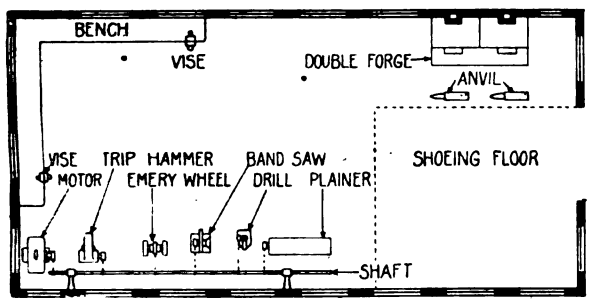
As has been stated previously, this department is for the benefit of our readers and we want every one of them to feel that he is at liberty to ask for information on any subject. For the benefit of new subscribers, it is explained, that this department was inaugurated to assist our readers, give them information, not readily and easily obtained elsewhere. The questions are published and answer is made in the department entitled Workshop Experience. That these departments are appreciated by the readers of The Blacksmith and Wheelwright is proven by the increasing number of questions received and the large number of answers published each month. Any reader is welcome to ask as many questions as he desires. Send in your questions at once.

Who Can Answer?

From Hector Tenney, Ont., Canada.—I would like to hear from some of your expert readers as to how to shoe a horse which interferes, striking his left foot with his right one just above the hoof on the hair, where I suppose the coronary bone is located. I have tried different ways and have been unable to stop him.

Workshop Diagram.

From N. H. Browning, Montana.—I am building a workshop 25 by 50 feet and would like to get some idea as to how the machinery might be placed. I want two fires, double forge, triphammer, emery wheel, band saw, drill, and planer, all on one shaft, to be run by a motor.



Suggested Machinery Lay-Out for Mr. N. H. Browning.

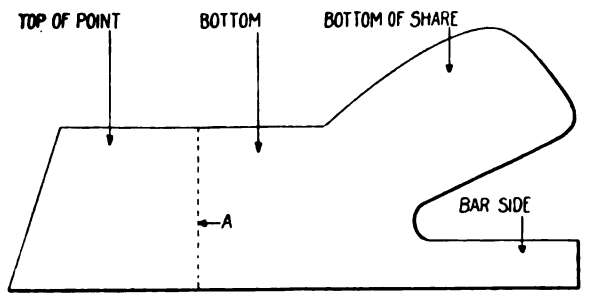
A proposed shop arrangement is arranged herewith—perhaps one of our readers will have a better idea; if so let us hear from him.

A Letter and Request from the West.

From R. Ledingham, Montana.—Though I have only been a reader for one year, I would like a little help from some of the other readers. I am a blacksmith on a big stock ranch here in Montana; have been here for about three years and like it very much. In 1916 we built a new shop, and have everything in fine shape now but have not a tire heating furnace. I would appreciate it very much if some brother blacksmith would give a good suggestion in this line. I have seen a few of such devices, but there was always room for improvement. At the time I arranged my tools, I decided that I could have the furnace in the shop, but since then I have found it will have to be put up outside.

What Is the Best Draft?

From J. M. Coburn, Texas.—Though I get a great many good ideas from The Blacksmith and Wheelwright, I have never seen anything about plow work. Down here where I am we have a lot of plow points to lay, for the hard and stiff land calls for good long duck bills. I wish some of my older brother blacksmiths would write something about how they shape and prepare a lay for points. I note that some readers write about being compelled to raise prices. This is just what we must all do, for material is higher, everything we eat costs more, and if we blacksmiths are to be able to stand up to our anvils, we must have plenty to eat.



Illustrating Mr. Coburn's Letter on Preparing Plowshare Points.

Will some of our blacksmiths tell what is considered the best draft for welding on light work, the bottom or the side?

I am sending with this article a sketch which shows how I shape and prepare a lay for duck bill points. I use ¼ by 1¾-inch stock, about seven inches long. This I bend at the mark A, then draw all the edges out thin. All of the hammering is done on the bottom of the point. The part on the bottom of the share adds strength to the weak part.

To Remove Paint.

From A. J. De Remer, N. J.—Will you kindly tell me the best way to remove paint from an automobile body?

Note: We know of no better way to remove paint either from carriages or automobiles than to use a preparation called "Krakno," manufactured by the R. F. Johnston Paint Company, Pearl and Main streets, Cincinnati, Ohio, who will no doubt be glad to send a descriptive circular of this preparation to anyone who chooses to write for it.—Ed.

A Drilling Question.

From W. Purser, Ireland.—I will be glad if some of your readers will give me a receipt for drilling holes in case-hardened iron and hard steel. This would be a great help to me for at times I have hard metal to drill.

Tempering Air Set.

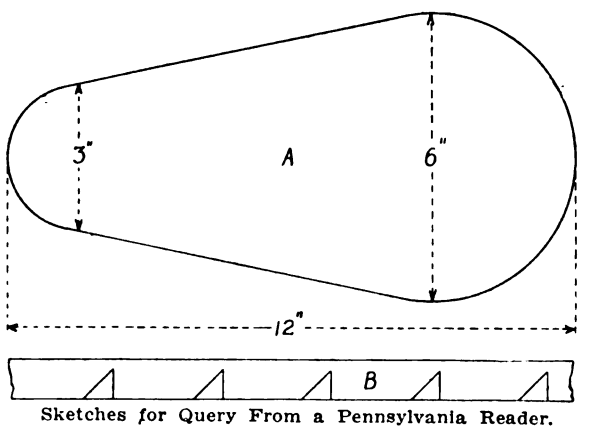
From Subscriber, Washington.—I have been searching The Blacksmith and Wheelwright to learn how to properly temper an air set, which is used in driving long drift bolts in the construction of wooden vessels. Would some reader explain how this work is done?

Who Sells "Solderall."

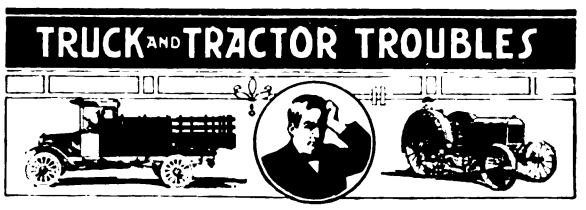
From A. Larsen, North Dakota.—Mr. Perry Robinson gave some information in the February number about soldering and although I have tried in many places, I cannot find the "Solderall" which he mentions. I wish he would let me know where I can get this product.

Bending Angle Iron.

From a Pennsylvania Reader.—I wonder if some of my brothers will tell me how to find how much stock is required for making a band to fit an ellipse like the one shown in the sketch. The band is to be made of ⅜" square stock. I would also like to know how to bend a piece of angle iron into a ring without cutting nicks in it as shown at B, to keep it from kinking.



Sketches for Query From a Pennsylvania Reader.



New Department.

Now that so many of our blacksmith brothers are graduating into the automobile field, we have decided to institute a truck and tractor Trouble Department, which will hereafter form a part of this magazine. In this department we will publish questions and answers to automobile, truck and tractor questions. Any reader who may at any time be puzzled by a particularly difficult problem is invited to write us, and we will answer immediately, either by mail or in this Trouble Department. In order that you may get the best results be sure to give us all details possible: the make and year of the machine, all the symptoms which indicate the trouble. Don't simply tell us that you are having trouble with the machine or that it knocks, or that some of the cylinders miss fire. Tell us just what the trouble is, where the knock seems to come from, or which cylinder does not fire. Also tell us just what you have done to remedy the trouble, then we need not give you directions for doing something that you already have tried. Remember that this is a friendly column, and perhaps your problem will interest some other brother who has been puzzled by the same thing.

Locating "Missing" Cylinder.

From Daniel Van Valkenburg, Massachusetts.—I want to answer Mr. J. D. Meyers' question about locating a missing cylinder, in a Ford car by "shorting" the vibrators in the coil box. Mr. Meyers must first realize that when he holds down all of the vibrators in the box, he cannot get a spark in any of the cylinders. Therefore he should take the cover off the coil box and start the engine. After the engine is running all right he should put his fingers on buzzers numbers 1, 4 and 3, and if the engine keeps running on number 2 cylinder, he knows that number 2 is all right. Then he should let the engine run a minute and hold down buzzers 1, 2 and 4, and see if number 3 cylinder fires. Then he should try number 4 by holding down buzzers 1, 2 and 3; then hold down 4, 3, and 2, to locate any trouble in number 1. In this way he can find just which cylinder is not firing.

An Answer for Mr. A. E. Roe.

From M. B., New York.—If ordinary care was exercised while the cars were stored in your garage, you would not be responsible for their destruction in case of fire, unless, of course, there was some agreement on your part that you would be responsible. If you were careless about allowing men with pipes, cigarettes, etc., in your garage, in violation of the laws of your locality, and fire resulted therefrom, I think you could be held responsible.

By all means post several conspicuous signs in your garage, "Not responsible for automobiles or personal property in case of fire." It might be well to print this notice on all your letter-heads and bills.

Trading Opinions.

Much of our knowledge today is obtained by "swapping experiences." The successful man is the one who listens to the tale of another's mistakes, and learns his lessons from another man's troubles. As long as he is not willing to hear other people's opinions, he will be behind the times. The man who makes a mistake but never tries to find the proper way, is sure to make the same mistake again.

Digitized by Google

WORKSHOP EXPERIENCE



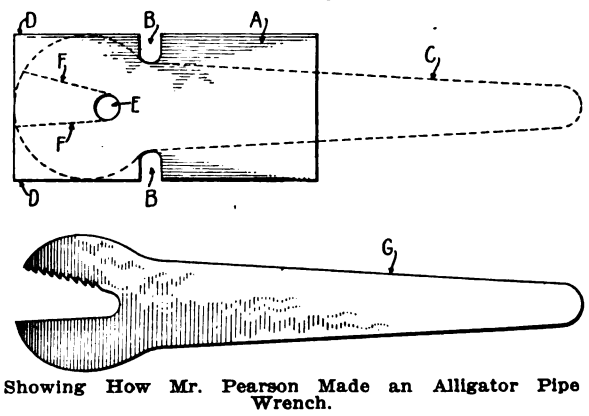
In this department our readers are invited to contribute articles explaining how they solve the various problems arising from day to day in the shop. You may have developed a method whereby a piece of work is finished quicker, easier and better than formerly, but when you have done so why not give your fellow-craftsman the benefit of your experience? No matter how simple the job may appear to you it may be one that is bothering the other fellow, so make a rough sketch of it, write a few words of explanation and send it to the editor of this department. He will have the sketch remade by an artist and fix up the article. We want every reader to join in making this department one of the features of our publication. Any suggestion for lightening one's labors in the shop will be welcomed and appreciated by your fellow-craftsman.

An Interesting Letter.

From J. R. Goslen, Kansas.—In your February number I note a question from Brother H. T. Smith of Tennessee, who wants to know how to repair a bellows. I want to tell Brother Smith that I have been running a shop for thirty years, and in that time I have bought out eight different shops. It has been my custom for the last twenty-five years at least to sell the old bellows to some farmer and put in a good forge, for one will never regret the expense, if he once buys such a machine. Always buy good machinery and if you have electrical current put in a welding plant, for it is one of the best things that you can do. It pays in several ways. I have the only shop in this part of the country and there are three garages. I do all of the welding and blacksmithing for all of them.

Making and Hardening an Alligator Pipe Wrench.

From J. Pearson, Minnesota.—Many of our craftsmen will be interested in this little hint about making a pipe wrench. Obtain a flat piece of steel, "A," of a size according to the wrench desired, heat it and after cutting in as shown at B, B, draw out the handle to C.



Showing How Mr. Pearson Made an Alligator Pipe Wrench.

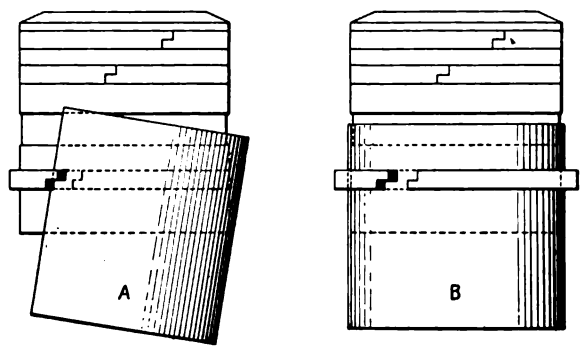
Cut off the two corners at D and shape as shown by the dotted lines. Bore a small hole at E and cut out the part F as shown by the dotted lines. Smooth the wrench up as much as possible with the hammer, or flatten and heat a little afterwards for annealing either in lime or fine dry ashes. The jaw teeth can be put in easily with a three-cornered file if a machine is not handy. The wrench should next be ground and polished, as shown at G. To harden, heat the jaw that is fitted with the teeth and dip it into the hardening bath. Do not hold it still in the bath, but move it up and down. Polish both sides and draw the temper to a dark blue.

Soldering Cast Iron.

From J. A. Morrison, New York.—In answer to J. K. B., of Rhode Island, let me give my method of soldering cast iron. First clean off all dirt and grease from the parts to be soldered and cut a V-shaped groove as shown at A, the whole length of the pieces to be soldered. Melt some zinc and run it into a bar, as shown at B, and with a fine rasp, file some of the zinc into the groove in the piece, the whole length. With a stick or glass rod drop raw muriatic acid on the zinc and let it stand for a minute until it begins to dissolve the zinc. If the piece to be soldered is entirely clean, it may now be soldered without any other flux.

Removing Piston Rings.

From W. S. Owen, South Dakota.—My latest handy kink is for taking off and putting on piston rings, without any danger of breaking them. Obtain an old tomato can and heat it until the solder is all burned off. Then pull



Mr. Owen's Handy Method of Using a Piece of Tin for Replacing Piston Rings.

it to pieces, smooth the edges to their normal thickness and wrap it around the piston, starting one corner of the tin under the end of the piston ring as at A and slipping it under until it is entirely under the ring as at B.

With the tin entirely under the ring, the ring may be slipped off the piston together with the tin. I recently saw a cut showing how one might use four or five old hack saw blades or strips of tin for this purpose, but I think that the sheet of tin will give far more satisfactory and better results. My idea is so simple that a novice can easily see and understand how to remove rings in this way.

Soldering Aluminum.

From Daniel Van Valkenburg, Massachusetts.—The reader who calls himself "puzzled" wants to know why it is, that one cannot solder aluminum. I find that I can solder it by the following rule. First clean the parts thoroughly and use aluminum solder with rosin as a flux. Preheat the parts with a plow torch and have the soldering iron tinned with aluminum solder. Be sure to keep the part, that is being soldered, thoroughly heated while you are trying to mend it with the soldering iron, but be careful not to heat it above the melting point. A very dark red is about the color. Aluminum solder, that will need no flux, but will require preheating, may be made as follows: Mix one-half ounce of lead; two ounces of rosin; seven ounces of zinc; sixteen ounces of tin. Melt them all together and stir while they are in the liquid form. After they are fully mixed, pour the liquid into molds and it is ready for soldering.

I would like to know just what luck "Puzzled" has with this and wish he would write.

Sleeve Protectors.

From W. P. Wild, North Dakota.—I have a little hint that I would like to give for the benefit of my other blacksmith brothers. I find that if one takes an old inner tube from an automobile tire and cuts bands from it, about ⅜ of an inch wide, slips them over the sleeves, two on each arm, that they will keep the sleeve out of the grease and oil.

Shoeing a Forger.

From J. A. Heller, Pennsylvania.—I am sending you a couple of drawings showing

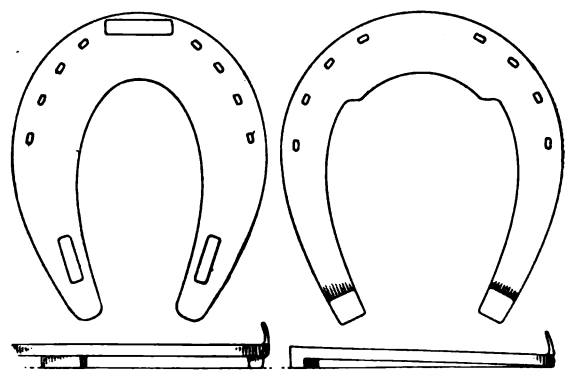


Fig. 1—Shoes Made by J. A. Heller to Cure Forging.

how I overcome forging. It is not so hard to cure this trouble if one goes about it in the right way. The sketches show the two front shoes at Fig. 1 and the hind shoe at Fig. 2. I have used these shoes and have never had them fail me in many years of shoeing. I have stopped horses with them that brother shoers have given up as incurable. It should be remembered, always, that there is as much in dressing the horse's foot as there is in the kind of shoe used.

The shoe shown at the left in the drawing at Fig. 1 is used for bad cases. I make this good and heavy all around—a little heavier at the toe—and use a clip fitted close, with a small toe calk ¼ inch high and two heel calks under shoe ½ inch high. This gives the horse a sure footing, and never lets the foot shift. I dress the foot level and then lower the toe from the heel ¼ inch.

The hind shoe is a light one, with two side clips, so as to not let the shoe shift on the foot; no toe calk; two heel calks ½ inch high. The hind foot is dressed ¼ inch lower at heel than at toe, and allowed to remain as long as possible. The shoe should extend ¾ inch over toe and 1¾ inches over heel. The effect of this is to decrease the action in the hind feet and increase it in the front feet, and that is where the trouble is overcome.

In cases that are not so bad the shoe

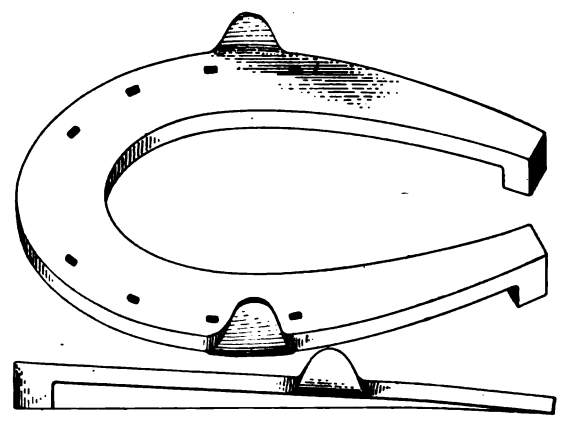


Fig. 2—The Hind Shoe Made by J. A. Heller for a Forger.

shown at the right in Fig. 1 will answer. It doesn't require a toe calk, but the heel calks should be ½ inch high.

I recommend this plan to anyone who has forgers to shoe, and then should like to have them report their experience. It has never failed me, and I have used it on many cases.

Agrees With Mr. Hattenhaur.

From Arthur O'Neil, Pennsylvania.—Mr. G. A. Hattenhaur, of Colorado, in the January number, speaks of shoeing horses having corns. He criticises the "Sprung Heel." Mr. Hattenhaur surely has the right dope on springing the heel of the shoe away from the foot and its bad effects on the foot. There are more cases of "laminitis" and corns caused by springing the shoe from the heel than by founder.

There are several forms in which these growths known as corns show themselves, though their effect and location are about the same. The cause of corns can usually be attributed to bad shoeing, and I think there is but one remedy and that is proper shoeing. Mr. Hattenhaur speaks of the "bar" shoe and his success with this shoe. I have no doubt of his having had good success with the bar shoe for corns, but where one shoer has success with it so many others fail. For my part I think it one of the best shoes ever made; a shoe that is generally condemned by most horsemen because it is misused.

I have seen a great many good men at the fire that could make a swell bar shoe, but when it came to the proper application of this shoe to the foot they were lost. This was due to the fact that they were ignorant of the anatomy of the horse's foot. The most essential thing to their way of thinking was to get the shoe fastened to the foot. In connection with the "bar" shoe, my idea is that if your foot and frog are in the slightest degree hard the "bar" shoe should be kept away until you get your foot and frog soft by packing.

A "bar" shoe applied to a hard frog causes undue pressure on the sensitive laminaes and causes many ailments of the foot, such

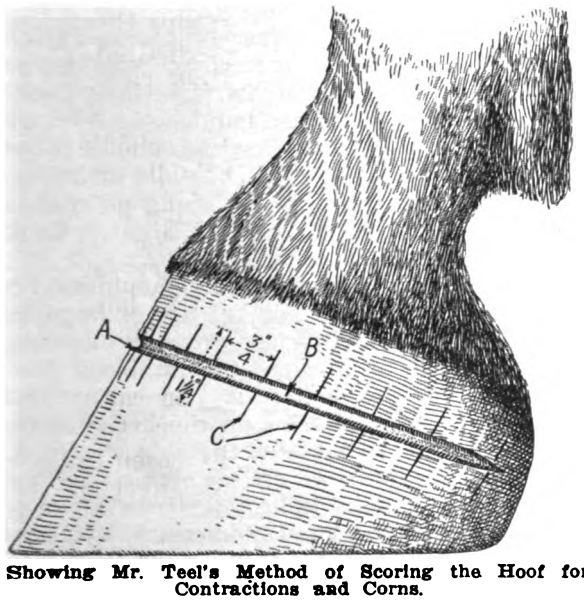
Digitized by Google

as navicular disease, ring-bone, side-bones and also quarter-cracks. The horseshoer of today should devote more time to the study of the foot and leg, and every horse working on hard streets should have its feet packed with a good softening ointment, then a thin leather pad applied, with your bar shoe, made right and fitted right; where this is done you will see no more corns or lame horses on account of foot trouble.

Contraction and Corns.

From F. E. Teel, Oklahoma.—Before beginning the operation, poultice the feet to soften them, then pare the sole as thin as possible. Cut away the bars. There is no danger of injuring the frog, for there is none to injure. Take off all the horn on the bottom and open up the heels that have turned in. If the shoeing knife will not cut it, take a fine saw and saw out a chunk on each side, where the frog is supposed to be.

Do not get scared if you bring a little blood. After you have gone as far as you dare, on the bottom of the foot, take it forward on your knee and with the corner of your rasp cut a groove, "A," about ¾ of an inch below the hair, from heel to heel, clear around the top part of the hoof; file this groove deep and until you see a white or, sometimes, colored tissue (B) known as white Gone. This is a soft, elastic, cushion-like substance in its natural state that lies between the outer wall and the sensitive laminae. Make the groove, A, as large as a lead pencil, especially back on each lateral quarter, where the cartilages are, or should be. Then thin the wall around below this groove. You will not hurt anything, as it has all got to come on new before you have a cure. You will find it very thick, and even if you thin it one-half there will be plenty left. Next take the point of your shoeing knife and cut a row of grooves, C, all around the top of the wall across the big groove. Cut them as deep as you can, but do not cut through. Make them about an inch and a quarter long, and about three-quarters of an inch apart. Put on a plain, flat, bar shoe, with the nail holes punched around the toe; a leather pad; a stiff pair of springs and the usual packing. Apply a blister to the coronary band and let the horse stand in the stable a few days, and when you bring him out you will see about the strongest looking pair of feet you ever saw. But how good they will feel to that poor horse. In a week or two you will see a roll of a new wall growing downward, carrying the circular groove with it. Since the springs expand the heels, the new wall accommodates itself to the order of things. When it has fully grown out, the cartilages will drop back where they belong, if they have not become ossified. The navicular bone will perform its functions and the horse will have brand new feet or a



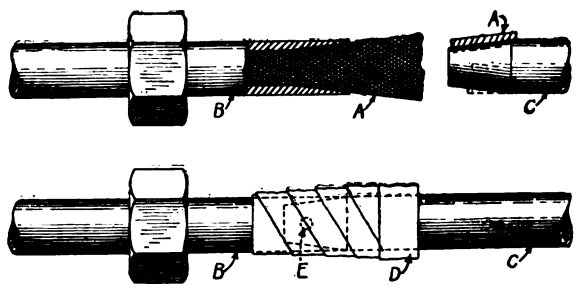
Showing Mr. Teel's Method of Scoring the Hoof for Contractions and Corns.

brand new case on the old bruised and abused foot. Keep the springs in for three months, but remove them and look after the bottom of the foot at least every two weeks.

This treatment can be used in severe cases of contraction where the trouble is from the middle of the quarter, back to heels. In cases that would not be closed, such as "hoof-bound," the main groove should extend from the heel to the middle of the quarter on each side of the foot, the front part of the wall not being touched. The operation will give immediate relief. The horse can be put to work as soon as the soreness from the blister subsides.

Gasoline Pipe Repair.

From D. Work, Texas.—I am sending you a sketch of how I made a good repair of a gasoline pipe on an auto of mine and without fitting new piping, connections and soldering. The pipe had broken near the carburetor and I did not want to wait to send for a new pipe and connections, so went at the job.



Illustrating How to Make a Repair to Broken Gasoline Pipe.

I took a pointed file and reamed out a hole in the sleeve as shown at A and B, and with the flat end of the file I tapered the end of the broken part of the pipe for about ⅜ of an inch, as shown at C. Next I drilled a hole and riveted the pieces as shown at E. I soaped the parts and put them together, using tire tape to wrap the parts. The repair has stood thus far and without any leaking.

Hardening Soft Center Shares.

From A. L. Williams, Washington.—Mr. H. H. Braaks, in the February number, wants to know how to harden soft center shares. I once worked in Iowa, where we had to harden shares and shovels. At that time all I used for a hardening bath was salt and water. The salt was used just to keep the water from growing stale. We heated the steel all over to an even heat, just as hot as the steel would stand without burning, then plunged it in the bath with the point downward.

The town where I had my shop is a small one, and the nearest shop to me is four miles. My place is in the hills, as some would call the mountains. Most of the industries here consists of saw and shingle mills, and some of the ranchers or farmers run dairy farms. A great deal of the work which I do is for logging camps, such as heavy swamp, loading, grab, and running hooks, blocks and pulleys.

Considerable large timber goes out of here on cars, and I live within four miles of the place where the big cedar was cut which went to the World's Fair at Chicago. The stump still stands and measures 26 feet across.

The prices here for shoeing horses, sizes 1 and 2, is $2.00 per horse; sizes 3 and 4, $2.50; size 5, $2.75; 6, 7 and 8, $3.25. For setting 3-inch tires, $1.50; and for light tires, $1.25. For buggy and hack tires I get $1.00.

The automobile has just about finished the driving horse in this part of the country, but I still keep a good one, a pacer which is 20 years old and can still go a mile in 2:15. He did this last fall.

The great salmon country, Belingham, is only 15 miles from here, and there are a number of large canneries in that town. Belingham is a city of about 35,000 and contains, in addition to the canneries, a number of large saw mills.

I am 59 years old and have been in the blacksmith business for over 37 years and can still do lots of heavy work. I read the Blacksmith and Wheelwright and never expect to miss it as long as I am able to hold the hand hammer.

There have been a number of articles about interfering horses, and I think the only way to stop them from interfering is to study their gait and keep experimenting. I used to think that I could stop any of them, but failed once in a while and had some of the conceit knocked out of me.

Mr. Johnston Is Amused.

From James A. Johnston, North Dakota.—I am well pleased with your publication or else I would not renew my subscription. But, say, I want to take a fall out of some of those fellows who want to turn "horses and mules around by the tail a few times for exercise." Now, now, but that does make me laugh. After holding up a 1,600 or 1,800-pound horse as long as you can stand and using the rasp as fast as you can, with all the strength you have left, the perspiration running down your face and out of wind, then twist around 1,600 or 1,800 pounds for exercise! Now what do you know about that fellow? Does he put on four new shoes for 80 cents or does he rob his customer and get a round dollar? Well, I want you to have just a little of the enjoyment. So laugh, and I will do likewise.

Old Fashioned Hoe.

From John Sefcik, Kansas.—In regard to H. B. L., Kentucky, who wanted information as to how to turn eye in old-fashioned hoe, as I understand it he wants one of the old timers. I am enclosing sketch of a type of hoe that my grandfather used, also my father. I am using one and know how to make them.

After making one you will never have any

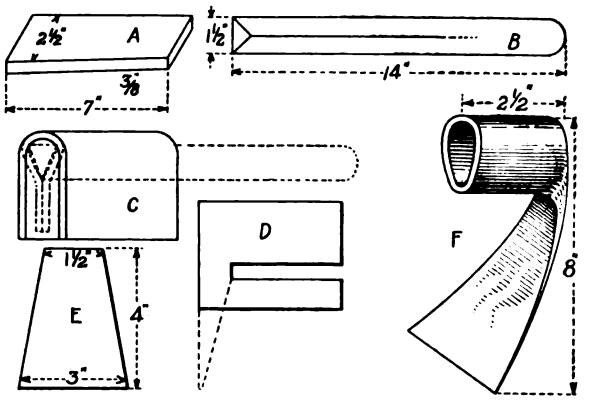


Fig. 1—Illustrating Method and Giving Dimensions for Turning Eye in Old Fashioned Hoe.

trouble making another. The method and dimensions are shown in the drawing at Fig. 1. After turning the part shown at A it is placed in the vise and squeezed as shown at C. A good weld is taken at the dotted lines. The blade of the hoe, which is hammered down and made as wide as possible, is made of a good piece of steel welded to the part E. The sketches show the way to make the hoe.

Hog Butchering Device.

I am also sending you a sketch of a hog butchering device which is handy. It is about 2½ feet long, a size plenty large enough for common use. I use cultivator beams for the device and turn two like shown at Fig. 2, A. Next make two pieces like those shown at B and weld them to A as

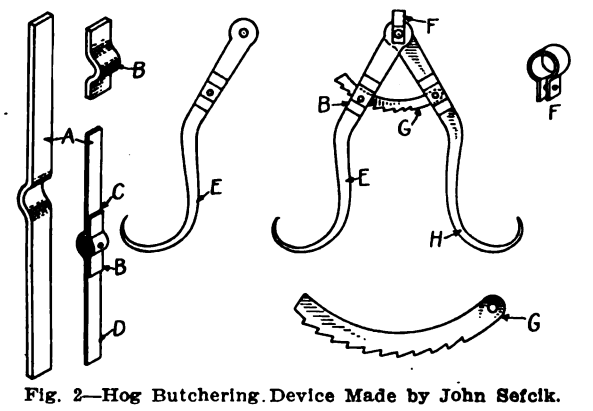


Fig. 2—Hog Butchering Device Made by John Sefcik.

shown at C. You will then have a piece like that shown at D.

Next turn them like that shown at E, which will give you two pieces just alike. Make a clevis like that illustrated at F and a notched brace like G. It works through at B. The way of making the gambrels is shown at H. The part F is drilled or punched to take a ⅜-inch rivet. The notched member G is, of course, riveted at one end.

Digitized by Google

MOTOR CAR AN ESSENTIAL.

The Automobile Is as Necessary as the Telephone, the Telegraph or the Railroad.

BY C. W. NASH.

So closely has the motor car become identified with present day American life that it requires but a moment's consideration to realize that it is just as necessary an institution as the telephone, the telegraph or the railroad.

Perhaps the most obvious as well as the most important role of the automobile is that of a time saver. In this hustling country of ours time is an all important element. To Europeans the speed with which Americans put through their projects has always been a marvel. It was America that first conceived the possibility of sending a locomotive speeding at sixty miles an hour. And it was America that first applied the motor car to the task of increasing the efficiency of modern business. Through its offices we have speeded up transportation, widened operating radii and made distance no longer a matter of miles but a matter of minutes.

Imagine, if you can, an America without motor cars and you will have an America seriously hampered commercially. Can you picture the rush hour traffic, so familiar a part of our modern city life, transformed suddenly to a tangled jam of horse drawn vehicles? The smooth deftness with which the traffic policeman handles the swift moving motor craft would be impossible, and the accomplishment, now a matter of hours, would be drawn into the days.

The Passing of the Horse.

But even were the motor car to be suddenly banished from existence, we could no longer depend entirely on the horse. During the past ten years it has been plainly evident that the days of the horse are numbered. Day by day man has been placing more and more dependence upon his swifter mechanical beast of burden. Gasoline is cheaper than oats and hay.

In consequence the breeding of horses has fallen far below the records of previous years. Then with the outbreak of war in 1914, European governments sent hundreds of buyers into this country to purchase horses for army use. In this way from our already depleted ranks of horses were drafted hundreds of thousands more, and a greater share of the work once done by the horse in farm and city was taken over by the automobile.

Automobiles in the Country.

More and more the importance of the automobile as applied to business life has been made apparent. But the city man holds no monopoly on the automobile. You have but to resort to available figures, or, better still, take a trip through a thriving agricultural community, to realize that the American farmer is now one of the most consistent buyers of motor cars.

The farmer, who formerly depended on his horse and buggy as a means of transportation from farm to city, now sits at the wheel of his automobile and makes the trip in a fraction of the time formerly required under the old regime.

As a result the farmer of today is a better informed man than the farmer of yesterday. He is no longer isolated from society. A matter of ten, fifteen or twenty miles, when the weather is bad, no longer keeps him from attending his Grange meeting, or hearing a lecture on scientific farming in the city. He can drive to town in the evening after his day's work is done. When he returns home at night there is no horse to unhitch; he merely runs his car into his garage and it is there until morning. He covers more territory, sees how other successful men are conducting their affairs, and runs his farm as a business man runs his establishment. Not the least important aid that the automobile has been to the American farmer is the added attraction it has lent to farm life by banishing loneliness and influencing the young men that rural life is not without its attractions after all.

An Aid to the Doctor.

The medical profession as a whole has adopted the motor car. Every doctor drives his car winter and summer while making his daily professional calls. Were he dependent on the horse and buggy, his working radius would be seriously hampered. Incidentally, if an emergency call comes in, when quick response may mean the saving of a human life, the physician's red cross on his radiator permits him to exceed the speed limit and rush first aid when it is needed.

The city salesmen who drive motor cars have automatically widened their working territory many times over. This has enabled business concerns to extend better service to their customers.

Consider how our cities reflect the influence of the motor car. Suburban towns have sprung up miles from the business centers, their inhabitants depending almost entirely on automobiles. The hansom cab has almost disappeared from our city streets. Swift fleets of taxi cabs, stationed at the various depots, distribute transients to all parts of the great cities without loss of time.

A Vital Factor.

We have accepted the revolution as a matter of course. We have been adjusted to this condition. While the equipment of our street car lines and railroads has grown to meet the ever increasing demand placed upon it by the public, it would, nevertheless, be insufficient to take care of the transportation of the entire populace of this great country were the motor car to be banished. Should the automobile suddenly disappear from our city streets there would follow a congested condition which could not be alleviated easily.

People buy cars now because they need them; because it will make them more efficient members of society; because it will save time and money. The man without a car cannot successfully compete with the man who operates an automobile. The function of the automobile to-day is an economic one, pure and simple. It is a vital part of our daily life. It has speeded up transit; it has brought thousands of miles of good roads; it has become a necessity.

ISSUES SET OF RULES.

Hints for Beginners on the Care and Feeding of Horses.

The Boston Work-Horse Relief Association, 15 Beacon street, Boston, Mass., has prepared a set of rules which are entitled "The Care and Feeding of Horses or Hints for Beginners." They were submitted and approved by Col. Frank Tompkins, a well-known cavalry officer, and they have been adopted by Brig. Gen. John A. Johnston for use in the Northeastern Department, which he commands, by the authorities at Camp Devens, Ayer, and by the Commander of the Remount Depot at Ayer. At Camp Devens there are hundreds of men, drawn from the Eastern cities, who are now engaged in the care of horses, although they have never touched a horse before in their lives. In the Western and Southern camps the situation is, no doubt, somewhat different, but even in these camps there must be thousands of men in the artillery, etc. who are ignorant of the rudiments of horsemanship.

Few persons realize how many horses are required by the army. Besides the artillery, ammunition and supply horses, there is an immense number used by mounted officers and orderlies, and by the ambulance and signal corps. Since the battle of Cambrai the formation of a Cavalry Division has been ordered. The association will supply copies of these rules, free, in any number, at the request of any person or organization.

1. Remember that the horse is an extremely timid animal, and must be handled very gently, though firmly. Always speak to the horse when approaching him; take hold of his headstall carefully, pat him on the neck, and draw his head slowly toward you. In tying him, be sure that the rope is not so long that he can get his leg or foot over it, as painful wounds are often caused in that way.

2. In entering a stall do not put your hand on the animal, as that might cause a vicious or stupid horse to kick, especially if you are a stranger to him; but tell him to "get over," and then step in quickly on the **left** of the horse.

3. In leading a horse take a firm grip of his headstall or bridle with your right hand, hold the end of the halter rope in your left hand, and keep beside him, not in front of him. If he rears or pulls back, you can let go of the headstall and hold him by the rope —not trying to struggle with him, keeping your face turned from the animal, but stepping toward him as he goes backward. He must move slowly in going backward, and will soon tire of it.

4. Do not mount a horse equipped only with a halter; and do not attempt to ride a strange horse unless he is bridled, and there is some one with you to hold him, and lead him about at first. You may be willing to take a chance yourself; but a horse never forgets anything, and if he bolts or throws his rider once, he may do the same thing again at a critical moment. The Prince Imperial lost his life because his horse would not stand to be mounted.

5. The stomach of the horse is extremely small, and therefore he should be watered at least three or four times a day, and, if possible, should receive both hay and grain three times a day. The less work he does the more important it is to give him hay often, because a hungry, idle horse is apt to take up some bad habit such as biting, kicking, cribbing or weaving.

6. If the horse gnaws his manger or stall it is certain that he needs salt, unless he is very hungry. Keep a lump of salt always before him, if possible.

7. Horses should be watered first and fed afterward; and, if possible, watered again an hour or two after eating their grain.

8. Never water or grain a horse that is much heated;—to do that is likely to "founder" and so ruin him.

9. Never give grain to a tired horse; let him rest for an hour or two first. Otherwise he is very likely to have indigestion and colic. More horses die from colic than from anything else.

10. Bring your horse into the stable or camp, cool and breathing easily, if possible. Nothing is worse for a horse than a chill after being heated. But if for any reason it is necessary to halt or encamp when your horse is sweating,—then blanket him and walk him about, or put him in a sheltered spot and rub him,—according to circumstances. A horse is cold when his ears are cold. Get in the habit of feeling his ears.

11. Use the currycomb very lightly, if at all. It is apt to hurt the skin of the horse. A stiff brush is better,—and much more efficacious if the horse's coat is long. The head and legs should never be touched with the currycomb. You can clean your horse with a wisp of hay or straw vigorously used, —or even with your bare hands. At least an hour a day of hard work should be devoted to cleaning a horse. This helps the circulation, removes dead skin and dirt, and makes the horse feel right and look right. Look out for frosted bits in winter.

12. Avoid sore backs and shoulders by keeping the inside of your saddle or harness perfectly clean, and by sponging or cleaning off the saddle or harness marks. The dandruff in the horse's hair is very salty, and when this dandruff dries on the horse or on his equipment, it irritates the skin.

13. On reaching camp or stable, do not remove the saddle, unless you can at once clean and dry the hair underneath. If that cannot be done immediately, loosen the girth and leave the saddle and blanket on until the hair is dry underneath.

14. In order to avoid scratches, rub your horse's legs dry when he comes in wet or muddy. This is hard work, but it can be done. In winter, when the roads are muddy, or there is snow on the ground, put a little vaseline or grease on his pasterns and heels to shed the moisture.

Digitized by Google

The 1st of May

THRIFT STAMP DAY IN THE U.S.A.

The Active Co-operation of Every Reader of The Blacksmith and Wheelwright is Urgently Requested to Make it a Success

May 1st, 1918, will be observed throughout the United States as Thrift Stamp Day! On that day retail stores everywhere in every line of business will ask customers to take **part of their change in Thrift Stamps!** It will be patriotic for every man, woman and child to accept at least one Thrift Stamp as change on every purchase made that day—and to make as many purchases as possible on May 1st.

Here is a big, practical way of getting millions of Thrift Stamps into the hands of the people of the United States, and of insuring the success of the Government's War Savings Stamps campaign. Thrift Stamp Day will **help everyone.** It will prove a tremendous boost to business. On May 1st, 1918, the nation should do the biggest total retail business of any single day in our history! The beneficial habit of Thrift will be sown broadcast among the citizens of the U. S. A.! Most important of all, Uncle Sam will be furnished with the sinews of War and Victory!

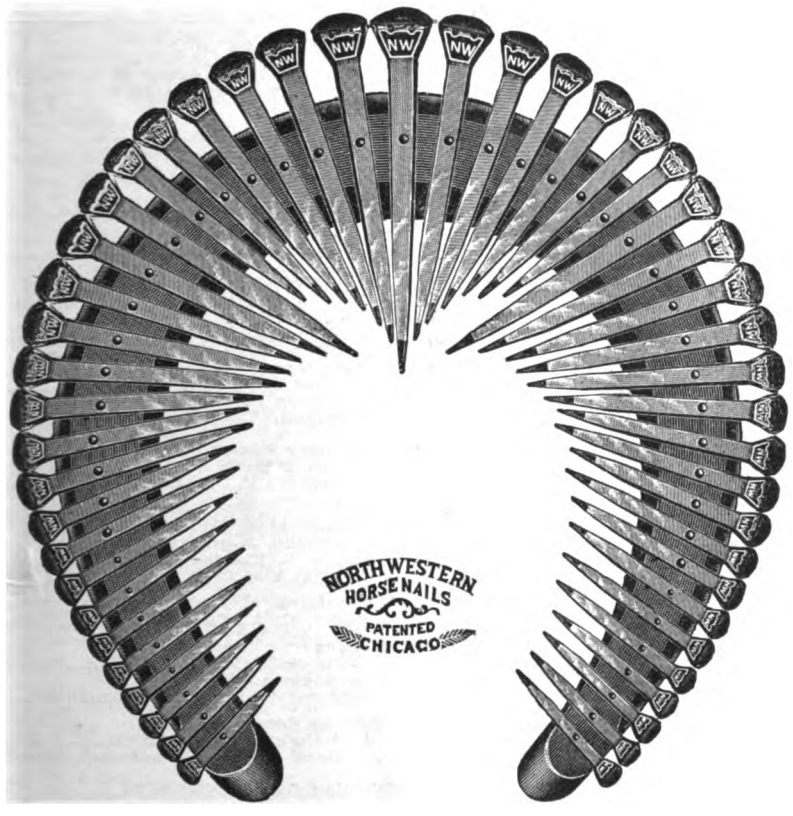
American business must go "over the top" **at once** in a quick drive to make Thrift Stamp Day an overwhelming success. You wholesalers, you jobbers, you salesmen, must **talk** Thrift Stamp Day among your trade, arouse the **enthusiasm** of the retailers, the storekeepers, the clerks behind the counters. Uncle Sam **needs your help.** A practical **plan** has been prepared showing how each one of you can "do your bit" to make Thrift Stamp Day a red letter day in American business annals. Write for this plan **today without fail.** Remember, in helping Uncle Sam you are helping business and helping yourselves. Address Mr. W. Ward Smith, National War Savings Committee, 51 Chambers Street, New York City.

W. S. S.
War Savings Stamps
Issued by the
United States Government

NATIONAL WAR SAVINGS COMMITTEE
51 Chambers Street, New York City
(This space donated by The Blacksmith and Wheelwright)

W. S. S.
War Savings Stamps
Issued by the
United States Government

NORTHWESTERN HORSE NAILS



MADE OF THE BEST QUALITY MATERIAL

The most perfect in form and finish and will hold a shoe longer than any other nail made.

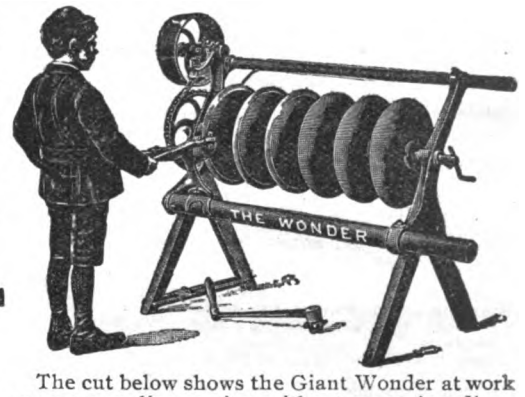
THE RE-ENFORCED POINT makes it the easiest to drive and the safest to use.

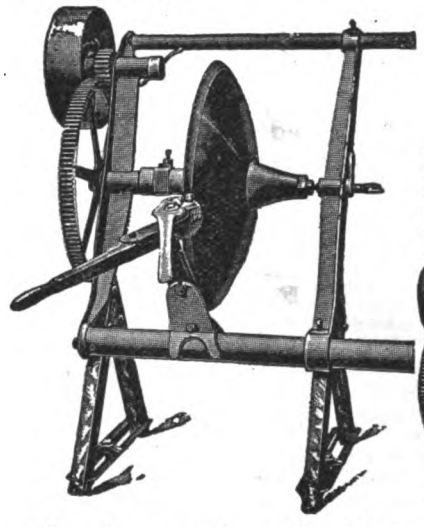
UNION HORSE NAIL COMPANY
Manufacturers
CHICAGO ILLS.

THE WONDER DISC SHARPENERS

BUILT LIKE A LATHE

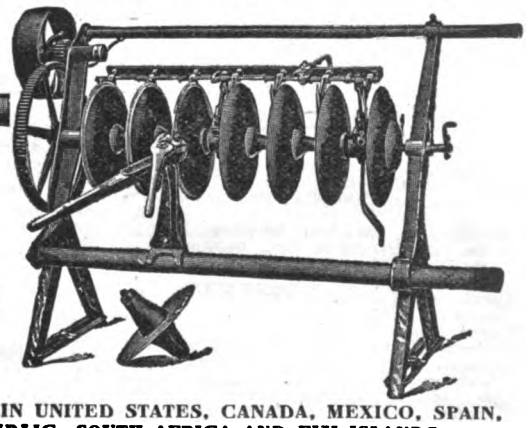
This cut shows the Little Wonder at work on a whole section of discs. This machine is especially adapted for sharpening disc harrows. While the Little Wonder is being successfully used to sharpen plow discs of 22 inches or less, we would recommend the Giant Wonder where disc plows are used extensively.





The above cut shows the Giant Wonder at work on disc plows. Will sharpen any size from 12 to 32 inches in diameter.

The cut below shows the Giant Wonder at work on a seven-disc section without removing discs, thereby saving one-half the time and labor, as in many cases you can sharpen a whole section of discs while your competitor is taking his off the shaft the old fashioned way.



FOR SALE BY LEADING JOBBERS IN UNITED STATES, CANADA, MEXICO, SPAIN, AUSTRALIA, ARGENTINE REPUBLIC, SOUTH AFRICA AND FIJI ISLANDS.

A. E. DURNER, Manufacturer EVANSVILLE, WIS., and BRANDON, MAN., CAN.

ADDRESS ALL INQUIRIES TO

A. E. DURNER; Head Office, Evansville, Wis.

Both size machines are equipped regular, long enough to take in 8 disc section. Special length furnished for 10 and 12 disc section at small cost.

I hold the original patent on this style sharpener. I could build them cheaper, but I won't. I would build them better, but I can't. Write for testimonials from your neighbor. Did you ever buy a cheap machine that gave satisfaction?

THINK ABOUT IT, THEN BUY A WONDER.

Digitized by Google

Heat Treatment of Steel.

We acknowledge receipt of a book from John Wiley & Sons, Inc., of 432 Fourth Ave., New York. This book is written by Mr. Denison K. Bullens, and entitled, Steel and Its Heat Treatment. It contains 483 pages and is fully illustrated with pictures, charts, and microscopic photographs. It covers the subject of steel and iron very thoroughly and is written so that anyone can understand it.

The blacksmith can make no mistake in purchasing a book of this kind, for it contains much information that can be obtained only through long experiment and study.

An Agricultural Plan for Canada.

An interesting plan, offered as a solution of the food problem in Canada, has been brought forward by the Hon. George Langley of Saskatchewan, which calls for an increased production in the wheat crop. This plan calls for the opening of over a million acres of new land for the coming season, the conscription of an agricultural unit of about twenty thousand men, and the purchase of farm implements and tractors, seeds, etc., to the amount of nearly fifteen millions of dollars, by the Government. It has been proposed that land be taken, in as large tracts as possible, either from large owners or from individuals, and to utilize all possible government land which is not now under cultivation. This opens a big field for the tractor manufacturers as well as offers a good opportunity for experienced mechanics. Efficiency is to be the keynote of the whole plan, and the most modern machinery will be used.

Recruits from All Classes.

One thing about conscription and the war business is that it has brought a certain spirit of democracy among all of the classes. A little story is told of a certain American officer in France who had in his division a refractory motorcycle. Many of the mechanics had tried to subjugate the machine without success until finally the officer issued a general call for assistance. One young private stepped forward and volunteered. Upon being asked whether or not he had had experience with that particular machine he suggested that though he was not entirely familiar with it he had owned a Rolls-Royce.

Veterinary Post-Mortem Technic.

An interesting and instructive book published by the J. B. Lippincott Co. of Washington Square, Philadelphia, has been received at this office, and is called Veterinary Post-Mortem Technic. This book is by Walter J. Crocker, B.S., V.M.D., and was written for those interested in the anatomy of the horse. It takes up in a very thorough manner the general post-mortem examination of a horse and is fully illustrated with cuts made direct from photographs, taken of fresh specimens.

England and America.

For their respective first three months, the American War-Savings Campaign is running ahead of the English campaign. America is pouring into the Treasury at the rate of about $2,000,000 a day—over $75,000,000 up to date.

The direct comparison is:

	England	America
First month	$5,172,000	$10,236,451
Second month	2,719,000	24,559,722
Third month	3,402,000	41,148,244
Total	$11,293,000	$75,944,417

The $75,944,417 of spending money already put at the service of the Government by the buyers of War-Savings Securities, has transferred from millions of patriotic citizens' savings to the National Treasury funds, which enables them to command labor and materials enough to build a fleet of about one hundred 5,000-ton ships.

Index to Advertisers

Aetna Nut Co., horseshoe calks....Front cover
A. & J. Mfg. Co., brazing compound.....114
Akron-Selle Co., gears .....Front cover
Akron Rubber Mold & Machine Co., tire repair outfits 119
American Calk Co., calks.....Front cover
American Technical Society, books.....115
Anti-Borax Compound Co., welding compounds 95
Armstrong Mfg. Co., bolt dies.....117
Armstrong-Blum Mfg. Co., punches and shears .....Front cover
Barcus Mfg. Co., horse stocks..... 95
Barnett, G. & H., Co., files and rasps, Front cover
Batavia Rubber Co., rubber tire applying machines .....Back cover
Bertschy-Bermo Co., welding plants.....117
Bicknell Mfg. & Supply Co., dies..... 96
Bradley, C. C., & Son, shaft coupler..... 89
Buffalo Forge Co., blacksmiths' tools..... 95
Burden Iron Works, horseshoes.....3d cover
Bush Motor Co., automobiles.....Front cover
Butterfield & Co., taps, dies and screw plates 96
Campbell Iron Co., supplies.....4th cover
Canedy-Otto Mfg. Co., blacksmiths' tools.120
Capewell Horse Nail Co., horse nails, Front cover
Champion Blower & Forge Co., blowers.... 91
Champion Tool Co., blacksmiths' tools..... 92
Chandlee & Chandlee, patents.....116
Childs, S. D. & Co., steel stamps..Front cover
Columbus Forge & Iron Co., anvils..... 90
Columbian Hardware Co., vises..... 96
Corona Mfg. Co., veterinary remedies, Front cover
Cortland Welding Compound Co., welding compounds 120
Cray Bros., blacksmiths' tools.....119
Diamond Calk Horseshoe Co., horseshoes..94
Durner, A. E., disc sharpeners.....111
Electric Blower Co., blowers.....119
Electric Wheel Co., wheels.....116
Empire Mfg. Co., wheels.....114
Eureka Auto Co., automobiles....Front cover
Felton, Sibley & Co., paints.....89
Firestone Tire & Rubber Co.....Front cover
Fisher & Norris, anvils and vises..... 96
Franklin Steel Works, toe calks.....118
Gardner, R., Electric & Mfg. Works, blowers 96
General Welding Co., welding outfits, 3d cover
Gillette Clipping Machine Co., clipping machines .....3d cover
Gogel Mfg. Co., tire heaters.....116
Greenfield Tap & Die Corporation, screw plates and blacksmiths' machinery, 2d cover
Gwilliam Co., ball bearings.....4th cover
Hart Mfg. Co., stocks and dies.....4th cover
Harvey Spring & Forging Co., auto springs .....4th cover
Hawkeye Mfg. Co., hammers.....117
Hay-Budden Mfg. Co., anvils.....4th cover
Heller Bros., horse rasps, tools, etc..... 96
House Cold Tire Setter Co., tire setters, hollow and spoke augers.....4th cover
Imperial Brass Mfg. Co., welding outfits....115
Jenner, H. W. T., patents.....113
Johnston, R. F., Paint Co., paints..... 94
Kerrihard Co., hammers.....119
Kimball Tire Case Co., tire protectors, 4th cover
Lemoine, N., Co., hoof packing....Front cover
Linde Air Products Co., oxygen..... 68
L. S. P. Calking Machine Co., calking machines 89
Macgowan & Finigan Cordage Co., hammers 117
Mayer Bros. Co., hammers..... 89
Mechanical Hammer Co., Ltd., hammers.. 93
National War Savings Committee, War Savings Stamps 111
Ness, Geo. M., Jr., steel stamps..Front cover
Nicholson File Co., files and rasps..... 94
Oneida National Chuck Co., chucks.....114
Ottawa Mfg. Co., kerosene engines.....114
Parker, C. L., attorney.....114
Parks Ball Bearing Machine Co., woodworking machinery .....4th cover
Peck, Stow & Wilcox Co., pincers.....120
Phoenix Horseshoe Co., horseshoes and toe calks 92
Porter, H. K., bolt clipper.....4th cover
Prentiss Vise Co., vises.....4th cover
Radical Rubber Co., hoof pads....Front cover
Rosewater Electric Co., blowers, Front cover
Root-Heath Mfg. Co., grinders..... 94
Shaler, C. A., Co., vulcanizers.....118
Sheldon Axle & Spring Co., axles.....116
Standard Horse Nail Co., horseshoe nails, 4th cover
Star Mfg. Co., agricultural implements....117
Stokes Bros. Mfg. Co., rasps.....Front cover
Superior Oxy-Acetylene Machine Co., welding outfits 116
Turner Brass Works, welding outfits, Front cover
Thompson Tuyere Iron Co., tuyere iron, 4th cover
Union Horse Nail Co., horseshoe nails.....111
United States Horseshoe Co., horseshoes..119
Warner, R. P., Electric Co., blowers.....117
West Tire Setter Co., tire setters, hammers 119
Wheel, B Top & Hardware Co., supplies....114
Whisler Mfg. Co., nut splitters, jointer heads 114
Witte Engine Works, engines.....117
Wolfe, Matt. L., tire coolers.....114
Young, W. F., veterinary remedies, 4th cover

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co.....117

Anvils
Columbus Forge & Iron Co..... 90
Fisher & Norris..... 96
Hay-Budden Mfg. Co.....4th cover

Attorneys
Parker, C. L. 114

Automobiles
Bush Motor Co.....Front cover
Eureka Auto Co.....Front cover

Automobile Springs
Harvey Spring & Forging Co.....4th Cover

Axles
Sheldon Axle & Spring Co.....116

Ball Bearings
Gwilliam Co. .....4th cover

Blacksmiths' Machinery
Greenfield Tap & Die Corporation..2d cover

Blacksmiths' Tools
Buffalo Forge Co. 95
Butterfield & Co. 96
Canedy-Otto Mfg. Co.....120
Champion Blower & Forge Co..... 91
Champion Tool Co..... 92
Cray Bros. 119
Heller Bros. Co..... 96
Nicholson File Co..... 94
Peck, Stow & Wilcox Co.....120

Blowers
Buffalo Forge Co..... 95
Champion Blower & Forge Co..... 91
Champion Tool Co..... 92
Electric Blower Co.....119
Gardner, R., Electric Mfg. Wks..... 96
Rosewater Electric Co.....Front cover
Warner, R. P., Electric Co.....117

Bolt Dies
Armstrong Mfg. Co.....117

Bolt and Rivet Clippers
Porter, H. K.....4th cover

Books
American Technical Society.....115

Brazing Compound
A. & J. Mfg. Co.....114

Calking Machines
L. S. P. Calking Machine Co..... 89

Calks, Horseshoe
Aetna Nut Co.....Front cover
American Calk Co.....Front cover
Diamond Calk Horseshoe Co..... 94

Calks, Toe
Franklin Steel Works.....118

Chisels
Champion Tool Co..... 92
Peck, Stow & Wilcox Co.....120

Chucks
Buffalo Forge Co..... 95
Oneida National Chuck Co.....114

Clipping Machines
Gillette Clipping Machine Co.....3d cover

Dies
Bicknell Mfg. & Supply Co..... 96

Disc Sharpeners
Durner, A. E. 111
Mayer Bros. Co..... 89

Drills
Buffalo Forge Co..... 95
Champion Blower & Forge Co..... 91

Engines
Ottawa Mfg. Co.....114
Witte Engine Works.....117

Farriers' Tools
Barnett, G. & H., Co.....Front cover
Champion Tool Co..... 92
Heller Bros. Co..... 96
Peck, Stow & Wilcox Co.....120

Files and Rasps
Barnett, G. & H., Co.....Front cover
Nicholson File Co..... 94
Stokes Bros. Mfg. Co.....Front cover

Forges
Buffalo Forge Co..... 95
Champion Blower & Forge Co..... 91

Gasoline Engines
Witte Engine Works.....117

Gears
Akron-Selle Co. .....Front cover

Grinders
Root-Heath Mfg. Co..... 94

Hammers
Champion Tool Co. 92
Hawkeye Mfg. Co.....117
Kerrihard Co. 119
Macgowan & Finigan Cordage Co.....117
Mechanical Hammer Co., Ltd..... 93
Peck, Stow & Wilcox Co.....120
Mayer Bros. Co..... 89
West Tire Setter Co.....119

Hollow Augers
House Cold Tire Setter Co.....4th cover

Hoof Packing
Lemoine, N., Co.....Front cover

Hoof Pads
Radical Rubber Co.....Front cover

Hoof Parers
Champion Tool Co. 92

Hoof Nippers
Champion Tool Co. 92

Hoof Shears
Champion Tool Co. 92

Horseshoes
Burden Iron Works.....3d cover
Diamond Calk Horseshoe Co..... 94
Phoenix Horseshoe Co..... 95
United States Horseshoe Co.....119

Horseshoe Calks
Diamond Calk Horseshoe Co..... 94

Horseshoe Nails
Capewell Horse Nail Co.....Front cover
Standard Horse Nail Co.....4th cover
Union Horse Nail Co.....

Horse Stocks
Barcus Mfg. Co..... 95

Kerosene Engines
Ottawa Mfg. Co.....114
Witte Engine Works 117

Nut Splitters
Whisler Mfg. Co.....Front cover

Oxygen
Linde Air Products Co..... 68

Paints and Varnishes
Felton, Sibley & Co..... 89
Johnston, R. F., Paint Co..... 94

Patents
Chandlee & Chandlee.....116
Jenner, H. W. T.....113
Parker, C. L. 114

Pincers
Peck, Stow & Wilcox Co.....120

Punches
Champion Blower & Forge Co..... 91

Punches and Shears
Armstrong-Blum Mfg. Co.....Front cover
Peck, Stow & Wilcox Co.....120

Rubber Tire Applying Machines
Batavia Rubber Co.....Back cover

Screw Plates
Butterfield & Co..... 96
Champion Blower & Forge Co..... 91
Greenfield Tap & Die Corporation..2d cover

Shaft Couplings
Bradley, C. C., & Son..... 89

Spoke Augers
House Cold Tire Setter Co.....4th cover

Steel Stamps
Childs, S. D., & Co.....Front cover
Ness, George M., Jr.....Front cover

Stocks and Dies
Butterfield & Co..... 96
Champion Blower & Forge Co..... 91
Hart Mfg. Co.....4th cover

Supplies
Campbell Iron Co.....4th cover
Wheel, B. Top & Hardware Co.....114

Swages
Champion Blower & Forge Co..... 91

Tires
Firestone Tire & Rubber Co.....Front cover

Tire Bending Machines
Buffalo Forge Co..... 95
Champion Blower & Forge Co..... 91

Tire Coolers
Wolfe, Matt. L.....114

Tire Heaters
Gogel Mfg. Co.....116

Tire Protectors
Kimball Tire Case Co.....4th cover

Tire Repair Outfits
Akron Rubber Mold & Machine Co.....119

Tire Setters
Buffalo Forge Co..... 95
House Cold Tire Setter Co.....4th cover
West Tire Setter Co.....119

Tire Shrinkers
Buffalo Forge Co..... 95
Champion Blower & Forge Co..... 91

Tire Upsetters
Buffalo Forge Co..... 95
Champion Blower & Forge Co..... 91

Tongs
Champion Tool Co..... 92

Tool Grinders
Phoenix Horseshoe Co..... 92

Trucks
Akron-Selle Co. .....Front cover

Tuyere Irons
Buffalo Forge Co..... 95
Champion Blower & Forge Co..... 91
Thompson Tuyere Iron Co.....4th cover

Veterinary Remedies
Corona Mfg. Co.....Front cover
Young, W. F. .....4th cover

Vises
Butterfield & Co. 96
Columbian Hardware Co..... 92
Fisher & Norris..... 96
Prentiss Vise Co.....4th cover

Vulcanizers
Shaler, C. A., Co.....118

Wagons
Akron-Selle Co. .....Front cover

War Savings Stamps
National War Savings Committee.....111

Welding Compounds
Anti-Borax Compound Co..... 95
Cortland Welding Compound Co.....120

Welding Outfits
General Welding Co.....3d cover
Imperial Brass Mfg. Co.....115
Superior Oxy-Acetylene Machine Co.....116
Turner Brass Works.....Front cover

Welding Plants
Bertschy-Bermo Co. 117

Welding Supplies
Linde Air Products Co..... 68

Wheel Dishers
House Cold Tire Setter Co.....4th cover

Wheels
Electric Wheel Co.....116
Empire Mfg. Co. 114

Woodworking Machinery
Buffalo Forge Co..... 95
Parks Ball Bearing Machine Co.....4th cover

Wrenches
Champion Tool Co..... 92

Wrenches (Knife Handle and Pipe)
Peck, Stow & Wilcox Co.....120

Digitized by Google

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

will be inserted under this head at 3 cents a word, including the address, for each insertion, payable in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York.

PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT.

Patents

PATENTS FOR INVENTIONS.

H. W. T. JENNER, patent attorney and mechanical expert, 608 F Street, Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trade-marks registered.

PATENTS.

C. L. PARKER, attorney-at-law, and solicitor of patents. American and foreign patents secured promptly. Handbook for inventors sent free upon request. McGILL BUILDING, Washington, D. C.

Miscellaneous

QUICK COLLECTIONS.

Send your accounts to-day to a live wire firm and get your money NOW! Established 25 years; collections made everywhere. WILLIAM H. DODD, 87 Nassau St., New York. Phone 6231 Cortland.

AUTOMOBILE REPAIRS.

Blacksmiths who own automobiles or repair automobiles in their shops should subscribe for the AUTOMOBILE DEALER AND REPAIRER: 100-page illustrated monthly devoted exclusively to the care and repair of the car. It is the only magazine in the world devoted to the practical side of motoring. Many garages and repair shops subscribe for no other automobile magazine. The "Trouble Department" contains five pages of numbered questions each month from car owners and repairmen which are answered by experts on gasoline engine repairs. $1 per year; 15 cents per copy. Postals not answered. CHARLES D. SHERMAN, 52 Windsor Avenue, Hartford, Conn.

AUTO TIRE VULCANIZING PLANTS.

We buy, sell or exchange. Catalog is free—you save 30%. Instruction book on Vulcanizing, 75c. EQUIPMENT CO., 360 Eighth St., Cincinnati, O.

For Sale

FOR SALE.

Gasoline tank and pump, 2" retreading moulds and cash register. VANDERPOOL CO., Springfield, O.

FOR SALE.

Make money easy. While business is good. Vulcanize tires. Our book tells you how. $1.00. VANDERPOOL CO., Springfield, Ohio.

FOR SALE

300 sets carriage and wagon hubs XX Elm and Oak, sizes 3½ x 6½ to 10 x 14. Big bargain to anyone who can use them. Address HARRY KLENERT, 325 East 124th Street, New York City.

FOR SALE OR TO RENT.

Fine old established blacksmith and wheelwright shop; two-story building, 30 feet by 70; location excellent; well equipped for business; large country trade. Owner has recently died. Address for price and further particulars, A. B. S., Box 822, Chatham, N. Y.

FOR SALE.

12-in. x 5-ft. Screw Cutting Engine Lathe. For particulars write B. C. LESTER, Haigler, Nebr., Star Route.

FOR SALE.

Wagon Factory and Repair Shop with good repair trade. New fireproof building, 40 x 80 ft. Would be an excellent opportunity for garage in connection. Equipment includes complete power machinery and all tools and material for turning out all classes of work. Property being sold to settle an estate. Box 325, Athens, Michigan.

For Sale

FOR SALE.

Blacksmith shop; complete stock and tools. In good farming community; splendid business; only shop in town; nearest shop 7½ miles. Reason for selling, failing health. E. C. WHISLER, Taintor, Iowa.

FOR SALE.

First-class Blacksmith and Wagon Shop. Two-story brick building, 30 x 50. Wagon shop is 16 x 40. Have four fires, good tools and machinery and work for five men steadily. I will sell stock and tools and rent the shop. Have been in business twenty-five years and wish to retire. For further particulars address FRANZ NIEMANN, New Ulm, Minn.

FOR SALE.

On account of sickness, Horseshoeing and General Repair Shop, with stock and tools, house and lots, in live town; 1,100-1,500 population. On main line between Portland and Seattle and Pacific Highway. A1 chance for right man. OTTO WICHERT, Winlock, Wash.

FOR SALE.

Blacksmith shop, tools and drilling, with one acre lot. Only shop in town. Owing to poor health am obliged to retire. Address, MARTIN NEHRT, R. R. No. 2, Frogtown, Ill

Wanted

WANTED.

Second hand House Cold Tire Setter, with punch and shear, or with shear. Must be cheap. J. L. SCOTT, 4048 Laclede avenue, St. Louis, Mo.

WANTED.

Good all-around blacksmith. Young married man preferred. Top wages for right man. Address M. W. ABTS, Morrill, Nebr.

WANTED.

Salesman: Calling on quarries, mines, mills, factories and railroads to handle our Damascus Tempering Solution. Used by the largest railroads and steel industries. EMPIRE CHEMICAL CO., Huntington, W. Va.

WANTED.

Blacksmith and Horseshoer; married man, with good habits, preferred. State wages. A. J. ZAWORSKY, Groton, So. Dak.

WANTED.

Blacksmith and blacksmith helpers. FISCHER & DACKERMAN, East Broad and Chestnut Sts., Elizabeth, N. J.

WANTED.

Blacksmith wanted; a good all around man; steady job. A. H. PRIME, Fairfax, Mo.

Gears

GEARS & SHAFTS

Transmission gears and shafts, differential gears and axle shafts in stock for over 125 makes (500 models) of pleasure cars and trucks. Obsolete, Orphan and Current models.

Dealers and repairmen, send for our 125-page price list and make a good profit on your repair work.

AUTO GEAR CO., Inc.

844 Eighth Avenue, New York, N. Y. — 1461 S. Michigan Ave., Chicago

275 Marietta St., Atlanta, Ga.

NO SECOND-HAND PARTS OR JUNK

Tires

Double Tread Tires

Notice Our Prices Before Going Elsewhere

PRICE LIST

Size	Plain	Size	Plain
30x3	$5.00	35x4	$9.00
30x3½	5.50	36x4	9.50
32x3½	6.50	36x4½	10.00
32x4	7.00	36x5	10.00
33x4	7.50	37x4½	10.00
34x4	8.00	37x5	10.50
34x4½	8.50		

For Non-Skid, 50 cents more on all sizes.

We Carry a Full Line of New and Used Tires & Tubes

GINSBERG & BERKOWITZ, Inc.

236 WEST 48th STREET, NEW YORK

DOUBLE TREAD TIRES

GUARANTEED

SPECIAL OFFER TO AGENTS. Write for Catalogue

Get our special price on new tires

M. LIBEN & CO.

205-AK West 48th St. New York City

Personal

PERSONAL

Piles and Eczema make life miserable. Why suffer? Mention your trouble and send address for immediate help. G. S. STOKES, Mohawk, Fla.

Employees Wanted

WANTED.

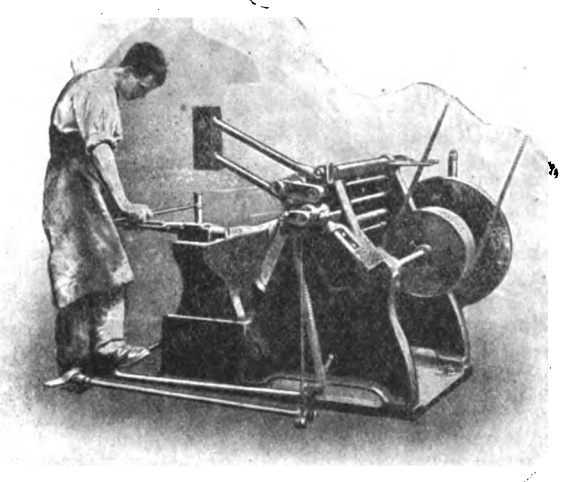
Working foreman in woodwork department of custom commercial body factory. Must have ability to do fine work and manage workmen; also some designing ability. Apply Box 888, Ogden, Utah.

SPARKS AND SHAVINGS



The Blacker Belt-Driven Striker.

We illustrate herewith a very interesting machine which has recently been brought out in England for the use of blacksmiths. This is a blacksmiths' power hammer and is called the Blacker belt-driven striker. This machine was invented a few years ago by Mr. Wm. Blacker, M. I., M. E., for his own use and was so successful that it was at length decided to put the tool on the market and cover it by patents all over the world. In England this hammer is selling wonderfully; France is taking large numbers, and it is now proposed to introduce this machine into the United States. The hammer was specifically invented for general smithing and is designed to enable one to dispense with the services of "strikers," or smith's helpers. Having greater power and precision than a manual worker, it effects a great improvement, both as regards output and quality of work. This machine has an automatic motion for traversing the head backwards and forwards along the face of the anvil and controlled at the will of the smith, thus enabling him to do jobs with the hammer that could not be done otherwise. In addition to ordinary forging work, the hammer is also suitable for making horse shoes, welding tires, repairing tools, etc. The anvil, as shown in the cut, has a cut-away portion. The front of the hammer head is arranged dead flush with the front of the anvil at the cut-away, and thus it is possible to draw down a perfectly square double shoulder simultaneously. The anvil, which weighs 500 pounds and stands on a 300-pound cast iron block, a back to front adjustment being provided, and operated by means of two screws. The machine itself weighs 1,100 pounds and requires less than one H. P. to drive. When the hammer is at work the belt runs constantly on the tight pulley, and revolves the flywheel, which in its turn oscillates a long slotted lever, to which it is secured by means of a rod passing freely through an eye in the center of flywheel, the rod being acted on by a coiled spring on each side of the eye. The slotted lever is pivoted on a shaft, passing horizontally through the side of the frame. The hammer head forms one side of a parallelogram, the remaining sides being the two arms and a travelling nut, which is operated by a square thread screw and is secured in position by top and bottom cross shafts. The cross shafts spoken of carry the sleeves into which the arms are bedded. Through the top sleeve a further cross shaft passes, being secured on the right hand side by a swinging lever held by a connecting rod. The connecting rod is secured to a fork which carries a sliding bowl, arranged to slide freely along the long slotted oscillating lever previously mentioned. When the treadle is in the "rest" position the connecting rod, fork and bowl are at the pivot of the slotted lever, so that the oscillations of the latter leaves them unaffected. Immediately the treadle is depressed, however, a worm geared into a gun-metal segment feeds them along the slot, and the connecting rod begins to acquire an up and down motion. This motion is duly passed on to the head by means of left-hand lever, front cross shaft, top hammer sleeve and arm. It will thus be seen readily that the more the treadle is depressed, the further the connecting rod moves away from the pivot of the slotted lever, the greater the swing imparted to the hammer head, and the heavier the blow. The weight of the blow is, in this way, under the direct and immediate control of the operator. As mentioned above, the gun-metal travelling nut forming the fourth side of a parallelogram is fitted to a square thread screw, which is revolved clockwise, or counter clockwise, by means of steel bevel. By a simple depression of this foot lever the head can be travelled to any point on the anvil, and can thus readily be brought into position for shouldering, heading, piecing shafts, drawing down, cutting off, etc. Between the face of the hammer head (at rest) and the anvil there is a distance of 8½ to 9 inches, so that there is plenty of room for the use of ordinary top and bottom swages and other tools. The hammer is capable of regular work on material up to 2½ inches square, and occasionally jobs can be done on material a little larger. Readers who are interested in getting further particulars in regard to this hammer, or those who wish to make propositions of any kind to the English makers, should write to the Mechanical Hammer Co., Ltd., Stayley Iron Works, Staylybridge, England.



The Blacker Belt Driven Striker.

The Crescent Universal Wood Workers.

All over the country the blacksmith has rather a difficult problem in deciding what equipment he had best purchase in the way of wood working machines. The Crescent line of Universal wood workers has assisted the smith in solving this problem. This line includes Universal wood workers, band saws, jointers, saw tables, planers, disk grinders, shapers, swing cut-off saws, hollow chisel mortisers, borers, and variety wood workers. Every reader who is at all interested in wood working machines should write, without fail, for the interesting free illustrated catalog issued by the manufacturers of this line: the Crescent Machine Co., 203 Main street, Leetonia, Ohio.

Tires

Tires

BUY EARLY AND SAVE MONEY

Double Tread Tires and Tubes

GUARANTEED

Come to the Tire Clearing House—here are prices—clear cut and plain as daylight. We buy wholesale the best "try out" Tires—and you get the benefit—you want truthful tires, and truth is never crushed to earth if given a square deal—real truth is puncture proof—

SO ARE OUR TIRES.

Size	Plain	Non-Skid	Tubes
28x3	$4.40	$4.95	$2.00
30x3	5.50	6.05	2.00
30x3½	6.60	7.15	2.50
32x3½	7.15	7.70	2.75
34x3½	8.25	8.80	3.00
30x4	7.70	8.25	2.75
32x4	8.80	9.35	3.00
33x4	8.80	9.90	3.50
34x4	8.80	9.90	3.50
35x4	9.90	11.00	3.60

Get your order in quick for goods listed here—by all means get in touch with us for further information about our special process—it means money in your pocket. Get in right—write today—yes—today.

Look up rating in Dunn's or Bradstreet's.

Size	Plain	Non-Skid	Tubes
36x4	$9.90	$11.00	$3.60
32x4½	9.90	11.00	3.75
34x4½	11.00	12.10	4.00
35x4½	11.00	12.10	4.10
36x4½	11.00	12.10	4.25
37x4½	12.10	13.20	4.35
34x5	11.00	12.10	4.50
35x5	13.20	14.30	5.00
36x5	13.20	14.30	5.00
37x5	13.75	14.85	5.00

For (non-skid) sizes up to 32x4, 50c extra; all other sizes $1.00 extra.
For rebuilding your old tires we charge you 60% of the above prices.

B. LIBEN & COMPANY

261-A West 54th Street — NEW YORK CITY — 112-A East 110th Street

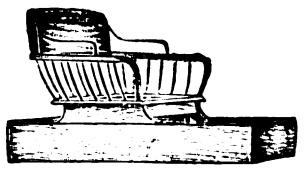
THE HOME OF DOUBLE TREAD TIRES

Digitized by Google



No. 244. BODY AND SEATS

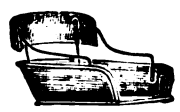
Price, no seats .....$8.25 and up
Price with seats..... 11.95 "



STICK SEAT BODY
$8.44 and up

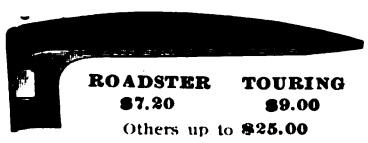


PIANO BODY
With seat.....$6.07 and up
Without seat..... 4.87 "



ROUND CORNER SEAT
Untrimmed..$3.00 and up
Trimmed..... 8.00 "

You can make $5.00 in a few hours to apply this Auto Roof Cover. Easy to apply. We furnish instructions.



ROADSTER $7.20 **TOURING** $9.00
Others up to $25.00

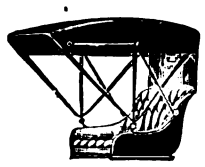
CURTAIN LIGHTS
Sticktite



No sewing. Cost $7.20 doz. and up. Parcel Post Paid. You can make 100% profit.



BUGGY GEARS
Each $12.50
With Wheels and Shafts...$26.90 and up

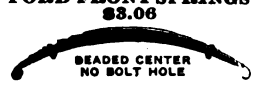


AUTO SEATS—Top Seats
Seat .....$3.56 and up
Cushion and back... 7.63 "
Top.....12.84 "

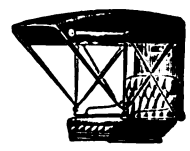


POLES
Buggy or Surrey size.....Per bundle, $7.50

FORD FRONT SPRINGS
$3.06



Guaranteed not to break
Can furnish springs for any make car.

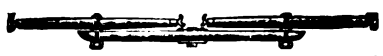


TOP SETS
Seat ..... $1.55 and up
Cushion..... 1.88 "
Back..... 2.06 "
Top..... 9.94 "

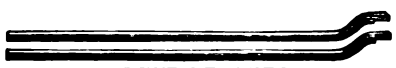
JUST OUT

Our New 1918 Auto Parts Catalogue

JUST FULL OF NEW THINGS & MONEY MAKERS

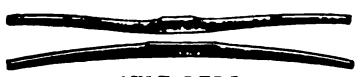


DOUBLE TREES WITH SINGLE TREES
Buggy and Surrey size.....Each 95c



BENT REACHES
Assorted sizes.....10 for 75c

STRAIGHT REACHES
Assorted sizes.....20 for 75c



AXLE BEDS
Assorted sizes—drop.....14 for 60c
Assorted sizes—arch.....8 for 60c



SPRING BARS
Assorted sizes .....14 for 75c



BUGGY AND SURREY SINGLE TREES
Assorted .....6 for 75c



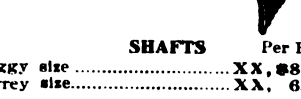
BUGGY SPOKES

	Per 100
1 in., Sar. Pat.	$1.80
1 1/16 in., Sar. Pat.	2.10
1 1/16 in., C. B.	2.25
1 7/16 in., Sar. Pat.	3.50
15/16 in., Warner Pat.	1.25

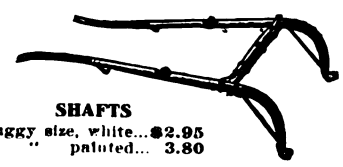


WOOD HUB SPOKES

	Per set
2 in.	$3.05
2¼ in.	3.23
2½ in.	4.35



SHAFTS Per Bdl.
Buggy size .....XX, $8.90
Surrey size.....XX, 6.50



SHAFTS
Buggy size, white...$2.95
" painted... 3.80



Roadster Tops $17.95
Touring, $21.55

AUTO SEAT COVERS
$7.75 and up
We recover your old Auto Frame.
Send for sample of goods we use in our Tops and Seat Covers.

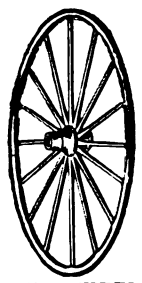


Elliptic Springs
$1.10 and up

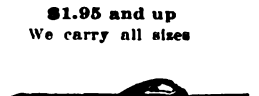
PRICES SUBJECT TO CHANGE OWING TO UNSETTLED CONDITIONS OF RAW MATERIAL MARKET. BETTER ORDER NOW.

Send for our large **CATALOGUE**
On Carriage, Wagon and Auto Parts and learn how we do it.
Our freight offer will interest you.
Adjust your wants to the sizes and styles we furnish at the above prices and save money.

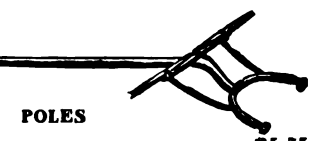
B. WHEEL, TOP & HDWE. CO.
127 East Eighth Street CINCINNATI, OHIO



LIGHT WHEELS
With Steel Tire on, $7.40 and up
With Rubber Tire on, $16.80 and up
We make all sizes.
Auto Wheels with Demountable Rims $14.85



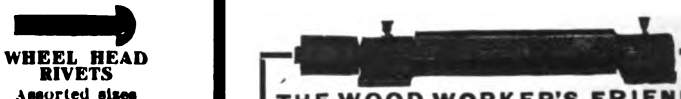
RIMS
We carry all sizes
Plain Rims.....$1.25 and up
Beveled Rims.... 1.50 "
Bored and Rounded Rims 1.80 "
15 pieces bored and rounded rims, assorted sizes, for 75c



POLES
In the white..... $5.75
Painted 6.65



BUGGY AND WAGON AXLES
$1.95 and up
We carry all sizes



WHEEL HEAD RIVETS
Assorted sizes
8 lbs. for.....75c



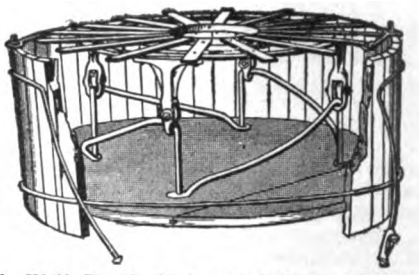
DASHES

20 in. drill	$0.20
17 in. leather	1.20
26 in. leather	1.20
29 in. leather	2.60



PARAMOUNT SPOKE WEDGES
1000 Assorted Sizes
Spoke Wedges 60c

HEAD BLOCKS
Assorted sizes,
8 for 75c



The Wolfe Tire Cooler has stood the test for 12 years in many of the best shops, and proven all that is claimed for it. The machine is right, so is the price.
Write for circulars.
MATT. L. WOLFE, WEST CARROLLTON, OHIO

Mend Broken Castings
Braze in your own forge with Braziron.
BEST COMPOUND FOR BRAZING CAST IRON.
If your jobber does not handle it, write us.
THE A. & J. MANUFACTURING CO.,
559 West Lake Street
Chicago, Ill.

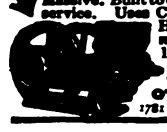
"NATIONAL" BLACKSMITHS' DRILL CHUCK



Made especially for Blacksmithing and Carriage Work. Positive, durable, strongest, self-cleaning, always works, quickest to change Drills, casts no shadow, will save its cost over other Chucks in saving of time. BUY THE BEST. Money refunded if not as represented. Ask your jobber for it, or send direct for prices and circular.
ONEIDA NATIONAL CHUCK CO., Oneida, N. Y.

PATENTS
C. L. PARKER
Ex-Member Examining Corps, U. S. Patent Office
Attorney-at-Law and Solicitor of Patents
American and foreign Patents secured. Trade marks registered. Searches made to determine patent ability, validity and infringement. Patent suits conducted. Pamphlet of instructions on request.
McGill Building WASHINGTON, D. C.

OTTAWA KEROSENE ENGINES



Latest design. Durable, Powerful, Reliable. Massive. Built to do hard, heavy work—to give lasting service. Uses Cheapest Fuel. Pulls 25 to 50% more H-P. than rated. Shipped on three months' trial. Easy terms. Sizes 1½ to 22 H-P. 10-Year Guarantee. Book free—postal gets it.
OTTAWA MFG. CO.
178 King St., Ottawa, Kans.
FREE BOOK

THE WOOD WORKER'S FRIEND
Get directions for building table and operating our Jointers. This information is valuable to wood workers. We manufacture 20 styles and sizes. Try a Jointer Head 30 days, if you are not pleased, return at our expense. Get prices.
Manufactured by WHISLER MFG. COMPANY, Gibson, Iowa

EMPIRE STEEL WHEELS



Plain or Grooved Tire
To Fit Any Wagon.
FARM TRUCKS
All Standard Types
Write today for Proposition to Blacksmiths
EMPIRE MFG. CO.
P. O. B. 208
QUINCY, ILL.

The Imperial Welding and Cutting Equipment.

It is generally predicted that the tendency to thrift and economy due to the war will make 1918 the greatest year for repair work ever known. This undoubtedly means that many blacksmiths could install oxy-acetylene welding and cutting equipment to great advantage. The Imperial Brass Mfg. Co., 512 South Racine avenue, Chicago, Ill., manufactures a thoroughly reliable and dependable line of welding and cutting equipment, which is sure to interest a great many of our readers, who are asked to send for the new illustrated catalog showing work actually done. This is a valuable book for all blacksmiths interested in this subject, even if they do not happen to be in the market for welding equipment. It is entirely free, if you write for it, using your business letter head.

Automobiles on the Installment Plan.

The Eureka Auto Co., of Beavertown, Pa., are advertising that they sell their automobiles on the installment plan, at the rate of $10.00 down and $10.00 a month. Any who are interested in this offer may obtain full information by sending 25 cents to this company for their attractive bulletin, which describes their automobile and gives details of the generous offer made.

Johnston's "Krakno."

Krakno is an elastic, non-corrosive, heat-resisting preparation for repainting old work, such as carriages, wagons and automobiles. It is impervious to moisture and has an inhibitive coating, which prevents rust and scale. The manufacturers state that this is an ideal filler and surfacer. By the use of Krakno the painter is saved all the time and trouble of burning off and repriming; yet the result is said to be absolutely satisfactory. Krakno is manufactured by the R. F. Johnston Paint Co., southeast corner Main and Pearl streets, Cincinnati, Ohio. If one wants a beautiful, durable and economical finish for repaint jobs, one should certainly try Krakno. The manufacturers suggest an order for one gallon on trial. If you will mail a postcard for a trial gallon, the R. F. Johnston Paint Co. will tell you just how to use it. Krakno is made in the following shades: Red, slate, yellow, white, blue, green, maroon, gray and blue black. If not prepared to order a trial gallon, write for full particulars and prices. We feel sure that a great many of our readers will be interested in this proposition.

Aetna Steel Toe Calks.

The Black Horse Brand of steel calks is well known in the trade, and this line has a favorable reputation throughout the country. Black Horse toe calks are made by the Aetna Nut Co., Southington, Conn. The line includes toe and heel calks, which, the manufacturer states, are made of the best steel, with approved shape and spur. These calks will wear well and will help any blacksmith to please his customers.

The Kazoo Blower.

The Kazoo variable speed forge blower is an electric machine made by the R. P. Warner Electric Co., of Kalamazoo, Mich. This blower has no outside rheostat or resistance box. Any speed may be obtained simply by moving the handle, and the current consumption is in proportion to the speed. This blower is manufactured for direct sales to blacksmiths and the price is now $30.00 F. O. B. Kalamazoo. As a special inducement this blower will be sent on 30 days' trial, the customer to return the blower if it has not been found satisfactory in every respect. Readers who are interested should write direct to the main office of the company at Kalamazoo, Mich.

The Last Parry Vehicle.

As a matter of historical interest in the trade, it should be noted that the last horse-drawn vehicle bearing the famous name of Parry has recently been sent out from the large works of the Parry Mfg. Co., at Indianapolis, Ind. This concern was famous for many years and gained a great reputation not only for quantity production, but also for the quality of its product, in relation to the price. The Parry Mfg. Co. for many years used as its slogan the phrase, "Largest manufacturers of carriages in the world." The immense factory of this company at Indianapolis is still an extremely busy place, but the products now being manufactured are commercial bodies for Fords, also Ford and other light truck bodies. The manufacturers say that in this line the late reputation of the Parry Mfg. Co. is fully maintained.

Star Steel Shapes.

This is the plowing season, and farmers throughout the country are purchasing new plowshares to take the place of old worn-out ones. The Star steel shapes, manufactured by the Star Mfg. Co., of Carpentersville, Illinois, include a complete line of plowshares, listershares, moldboards, landside plates, landside points, shovel points, plow points, seeder points, subsoilers, drill points, cultivator shovels and drill points. These shapes are made with soft centers, of solid cast crucible steel. Quality and durability of this product are absolutely the best. Free catalog will be sent gladly on application.

Digitized by Google

Why Not Do Tire Repairing?

Many blacksmiths are installing tire repair equipment as a means for securing extra income, and there are hundreds of blacksmiths who should investigate this proposition, because, if properly managed, tire repairing can be made a very profitable business. The Akron Rubber Mold & Machine Co., Sweitzer Ave., Akron, O., manufacture a thoroughly reliable line of vulcanizing machinery. Readers who are interested should write today for free booklet which is published by this company and entitled "Tire Repairing, the Business of the Times." In writing, readers are requested to use the coupon attached to the advertisement of this company, or else mention The Blacksmith and Wheelwright.

Automobile Engineering.

A valuable work of reference, in five volumes, called "Automobile Engineering," is offered to our readers in an interesting announcement, which appears in this issue, from the American Technical Society, Department A 7644, Chicago, Ill. The work is flexibly bound in genuine morocco leather, gold stamped. In all, there are 2,400 pages, measuring 5¼x8¼ inches, with 2,000 interesting illustrations, tables, diagrams, etc. Many of our readers, by a careful study of this work, can gain valuable information, enabling them to become skilled automobile mechanics. A well known fact is that it has become necessary, in self-defense, for the blacksmiths of this country to take up automobile repair work and also to sell automobile accessories and supplies. Owing to the war, there is a great deficiency at present of automobile mechanics. Factories and garages are clamoring for help of this kind. The U. S. Government also needs great numbers of trained men as truck, transport and motorcycle drivers. By the careful study of this book, together with a little practical experience, any young man, or old man either, can become easily a skilled automobile repair man. The work is offered to our readers for seven days' free examination, and if the books are perfectly satisfactory they may be purchased by an advance payment of $2.00, with nominal payments thereafter at the rate of 50 cents per week, until the entire price is paid. Those who are interested should cut out the coupon attached to the advertisement of the American Technical Society in this issue, fill it out with their correct name and address and send it in, when the five volumes will be sent to any address in the United States for free examination.

Thrift Stamp Day.

The 1st of May will be observed throughout the United States as Thrift Stamp day. On that day retail stores everywhere, in every line of business, will ask customers to take part of their change in Thrift Stamps, and it will be a patriotic act for every man, woman and child to accept at least one Thrift Stamp as change on every purchase made that day. There are thousands, and indeed hundreds of thousands, of people in this country who cannot afford to buy a Liberty Bond to help win the war, but there is no one who cannot assist in this humble way by taking Thrift Stamps, and it is hoped that there will be hearty and widespread co-operation in this effort throughout the country.

Make Money Repairing Tires.

This is the suggestive heading of an advertisement which appears in this issue from C. A. Shaler Co., 1800 Fourth street, Waupun, Wis. This company is one of the oldest and largest concerns in America manufacturing apparatus and equipment for repairing tires. There is no question but what a great many blacksmiths could add largely to their incomes by installing apparatus of this kind. The Shaler tire vulcanizer is a thoroughly practical machine and will do all that the highest priced machines will do, despite its low first cost, for it is easily within the reach of any blacksmith's pocketbook. This machine handles up to 200 tubes and 12 casings a day and is said to do perfect work. The manufacturers state that one great advantage of this machine rests on the fact that it has an automatic heat control, which makes explosions impossible and prevents overheating or the damaging of tires. Shaler vulcanizers can be supplied for gas, gasoline or electric heat. When you consider that you may add easily $200 or more to your income by the purchase of one of these outfits, the importance of the matter will be seen readily, and we hope that a great many of our readers will write to the C. A. Shaler Co., at the main office in Waupun, Wis., for their very interesting catalog, which is entirely free. This catalog explains every detail of the Shaler repair shop vulcanizers, the principles of the Shaler wrapped tread method of mending casings, and tells about the special money-back guarantee, which is made by this company. Even if you do not think you are quite ready to purchase tire vulcanizing equipment, this book will be useful to you in your business. Send for it now before you forget it.

The Ideal Lawn Mower Grinder.

If you have not a good lawn mower grinder installed in your shop, such a machine is well worth considering. Hundreds of blacksmiths are making considerable extra money by sharpening lawn mowers for their customers. Many blacksmiths make as much as $300.00 in one season from this source, so that a good grinder will soon pay for itself. The Ideal lawn mower grinder is an exceedingly efficient and reliable machine. This device is manufactured by the Root-Heath Mfg. Co., of Plymouth, O. It grinds all makes of mowers perfectly in 15 minutes without removing the mower wheels, ratchets or reel-knife. The best part of this machine is that it can be utilized also in the winter months, as it has a perfect skate sharpener attachment. This machine can be operated by hand or power. It has ball bearings and is easy running. It will do the work so much better, quicker and easier that one cannot afford to be without it. Nearly 10,000 Ideal lawn mower grinders are in use, and you ought to have one in your shop. These machines are sold on easy payment terms. Write to-day for catalog and full information. The same company also manufactures the Peerless Horse Lawn Mower Grinder, which is in use on many large estates, also in public parks and other large tracts.

Phoenix Shoes and Bull Dog Toe Calks.

The Phoenix horse and mule shoes and the Bull Dog toe calks are manufactured by the Phoenix Horse Shoe Co., with extensive rolling mills and factories at Joliet, Ill., and Poughkeepsie, N. Y. The main office of this company is in Chicagó, Ill. Their product is famous for quality throughout the world, and they advertise as being the largest manufacturers of horse and mule shoes in the world. If you do not have already samples of the products made by this company, it might be well to send for such samples. An interesting free catalog will be furnished on application.

Northwestern Horse Nails.

Northwestern horse nails are known already to a large majority of our readers. They are made of the best quality material, perfect in form and finish, and are said to hold a shoe longer than any other nail made. The re-enforced point makes it one of the easiest to drive and one of the safest to use. Write for samples, prices and full particulars to the Union Horse Nail Co., Chicago, Ill.

Columbian Vises and Anvils.

A standard line of vises and anvils for the blacksmiths' trade is manufactured by the Columbian Hardware Co., Cleveland, Ohio. We understand that any reader who is interested may obtain a catalog fully describing this line, the only requirement being that one must write for this catalog on their regular printed letter head. The trade-mark on these vises and anvils is the letter "C" enclosed in a triangle, with the apex of the triangle turned down.

The Turner Kerosene Torch.

This is a good burning torch, which is very handy in any repair shop. It is a rapid seller and meets all requirements of a good blow torch. It produces a steady, powerful blue flame, which is not affected by wind or bad weather. Subscribers who are interested should write for a complete free catalog to the manufacturers, The Turner Brass Works, Sycamore, Illinois.

Suregrip Calks.

This well-known brand of calks is manufactured by the American Calk Co., of Detroit, Mich. Readers who are interested should write for sample and full information direct to this company.

Jenkins Vulcan Spring Announcement.

A new and important step in the progress of an automobile service which has become nation-wide is the removal of the general offices of the Jenkins Vulcan Spring Company from St. Louis, Mo., to Richmond, Ind., March 10th. An immensely increased demand for the Vulcan Spring has caused the change, and the new plant has already proved its capacity for an output exceeding anything in the past history of the company.

The Richmond factory is not only larger but is equipped with the most modern spring-making machinery and is located in close proximity to the supplies of raw materials which enter into the Vulcan product. The company has anticipated war conditions by laying in a large stock in all these lines.

The Jenkins Vulcan Spring Company manufacture a spring which is immediately adjustable to any car and a distinct and separate spring which exactly replaces any make of spring on any machine. Its service has been described as "the standard of spring replacement," and 3,000 dealers now handle it—and recommend the proper make of Vulcan Spring when a broken spring on any car brings a worried and anxious autoist to their repair-shops.

The company's Texas branch has been moved from 708 Commerce street, Fort Worth, to 209 South Houston street, Dallas. It is in charge of Messrs. Egan & Rhame, carries a full stock of all numbers and ranks high in the Vulcan organization for the thoroughness and quality of its service.



Rush This Examination Coupon

Before High Cost of Paper Forces Advances in Price

See these books before you decide to buy. Remember—don't send us a penny. Just fill in and mail the coupon. This offer is open to any person within the boundaries of the U. S. and Canada.

Automobile Engineering

5 Volumes, Flexibly Bound in Genuine Morocco Leather, Gold Stamped

Recognized everywhere as the final authority on automobiles, their operation and repairing. Almost two entire volumes on latest Ignition, Starting and Lighting Systems. 2,400 pages (5¼x8¼) and 2,000 illustrations, tables, diagrams, etc.

Every man who has anything to do with automobiles needs this wonderful set of books—the most complete, practical, helpful, up-to-the-minute auto books in existence. They tell you, instantly, anything you want to know about all kinds of automobiles and garage work.

These Books Help You Make Big Money

Factories and garages are clamoring for automobile mechanics and will pay big salaries to competent men. The U. S. Government needs great numbers of trained men as truck, transport and motorcycle drivers. "Uncle Sam" pays good salaries.

Every Garage Owner, Repairman, Chauffeur and Car Owner needs "AUTOMOBILE ENGINEERING."

Everything About Automobiles

Including

Explosion Motors, Welding, Motor Construction and Repair, Carburetors, and Settings, Valves, Cooling, Lubrication, Fly-Wheels, Clutch, Transmission, Final Drive, Steering Frames, Tires, Vulcanizing, Ignition, Starting and Lighting Systems, Wiring, Diagrams, Shop Kinks, Commercial Garage Design and Equipment, Electrics, Storage Batteries, Care and Repair, Motorcycles, Commercial Trucks, Glossary.

50c a Week If You Decide To Keep Them

Just your name and address in the coupon brings the entire set for seven days' examination. Pay only small shipping charge when they arrive. If you decide to keep them, send only $2.00 within 7 days and then $2.00 a month—50c a week—until the special price of $17.80 has been paid. This offer is good only within the borders of the United States and Canada.

Free Consulting Service

In addition to the books, you get free of all charge a year's Consulting Membership. If any question puzzles you, write us and our corps of auto experts will answer any question. Ask all the questions you want for a whole year. This service is absolutely free.

Mail the Coupon

AMERICAN TECHNICAL SOCIETY
Dept. A-7644, Chicago, Ill.

American Technical Society
Dept. A-7644, Chicago, Ill.

Please send me the 5-volume Automobile Engineering for 7 days' examination. I will pay net shipping charge. If I decide to buy, I will send $2.00 within 7 days and the balance at $2.00 a month, until $17.80 has been paid. Then you send me a receipt showing that the $25.00 set of books and the $12.00 consulting membership are mine and fully paid for. If I think I can get along without the books, after the 7 days' trial, I will return them at your expense.

Name.....

Address.....

Reference.....

IMPERIAL
WELDING CUTTING EQUIPMENT

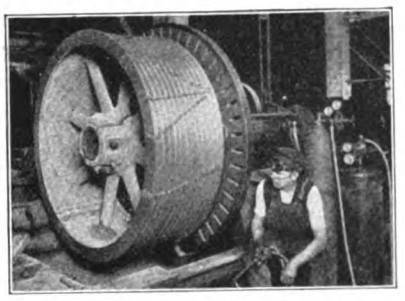
Profitable Repair Work

Equip your shop NOW to handle automobile, machinery, tool and metal repair work of all kinds by investing in Imperial Welding and Cutting Equipment. An industrial necessity, it often pays for its cost in a single operation.

Blacksmiths and practical mechanics quickly learn to operate an Imperial Outfit and make money by its use. Portable and ready for use at all times, it welds anything in metal and cuts everything in wrought iron and steel.

Write today for Free Catalog giving cost of operation, savings effected and views of work actually done.

IMPERIAL BRASS MFG. CO.,
512 S. Racine Ave. Chicago, Ill.



Large rope drive pulley broken in seven pieces, welded with Imperial Equipment.

Digitized by Google

WAGON BUILDING

"Build me a wagon that will last forever."

"Sorry, Sir, but 'axle troubles' (due to wear—wear on the spindle, or on the box, or both) make it impossible."

You've often received a specification like that and been obliged to give that answer—haven't you?

The Sheldon "TON-DON"—an axle that will not wear, run hot or break—allows your meeting the requirements of the man who wants a wagon to last forever, **and we have told him so.**

The Sheldon "TON-DON" was originally made for buggies and carriages. Its success was so instantaneous and pronounced that we were deluged with requests for an axle embodying the same principle for use on Delivery, on Business and on Express Wagons.

Hence, the "TON-DON" CONCORD EXPRESS.
In EFFICIENCY—The HIGHEST.
In CONSTRUCTION—The SIMPLEST.
In SERVICE—The MOST SATISFACTORY.

The Spindle of the Sheldon Ton-Don Axle

Ordinary axles wear flat on the bottom of the spindle because the bottom side is the point of contact and where the wear of the spindle is concentrated. It takes a spindle of unusual hardness to resist this wear—greater hardness than any ordinary axle affords. The spindle of the "TON-DON" is hardened by a special process, producing a wearing surface of such hardness that a fine file makes no impression on it—yet the center remains soft or "natural."

The Phosphor-Bronze Lined Box

The peculiarity of this box lining is that while somewhat softer than the spindle, there is no perceptible wear after thousands of miles of running, but becomes harder and more wear-resisting with use.

Phosphor-Bronze (of a mixture which increases its toughness, smoothness under friction, and wear-resisting qualities) is a metal used for making the propellers of ocean steamships, bearings for locomotives, crank-shaft bearings for automobiles and other fine machinery. Imagine what a metal must be to meet such conditions, and you will grasp the advantages of applying such metal to axle purposes.

THESE AXLES CARRIED IN STOCK BY THE FOLLOWING JOBBERS AND CAN BE OBTAINED AT MANUFACTURERS' PRICES.

Baltimore, Md.....E. Scott Payne Co.	Providence, R. I...Congdon & Carpenter Co.
Boston, Mass.....E. P. Sanderson Co.	Rochester, N. Y.....Burke Iron & Steel Co.
Buffalo, N. Y.....H. D. Taylor Co.	San Francisco, Cal....Waterhouse & Lester Co.
Chicago, Ill.....E. D. Kimball Co.	Scranton, Pa.....Bittenbender & Co.
Cincinnati, O.....G. B. Schulte Sons Co.	Seattle, Wash.....Gray Bros. Co.
Indianapolis, Ind.....W. J. Holliday & Co.	Springfield, Mass.....Chas. C. Lewis & Co.
Los Angeles, Cal.....Percival Iron Co.	St. Louis, Mo.....Sligo Iron Store Co.
Milwaukee, Wis....Shadbolt & Boyd Iron Co.	Washington, D. C.....Louis Hartig
Pittsburgh, Pa.....McLean & McGinness	Wilmington, Del.....Delaware Hardware Co.
Portland, Oregon.....J. E. Haseltine & Co.	Bridgeport, Conn.....Chapman & Bangs Co.
Ft. Wayne, Ind.....Mossman, Yarnelle & Co.	San Antonio, Texas Heusinger Hardware Co.
New Orleans, La.....Joe. Schwartz & Co.	

SHELDON

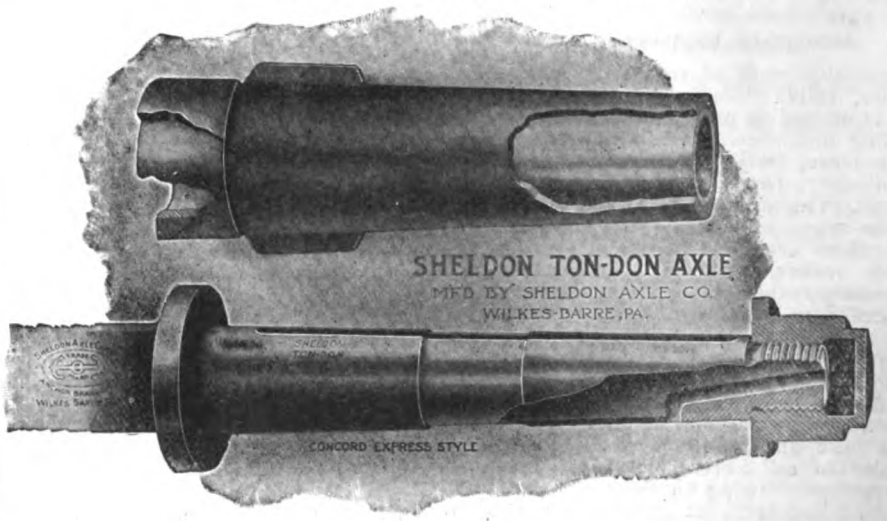
"TON-DON"

CONCORD EXPRESS STYLE

NOT A BALL OR ROLLER BEARING—BUT

ANTI-FRICTION—EVERLASTING—INTERCHANGEABLE

IT WILL NOT CUT, HEAT OR STICK



NOTICE THE PATENTED OILING DEVICE
HAS ALL THE ADVANTAGES OF FRICTION AND ANTI-FRICTION AXLES WITHOUT THEIR DISADVANTAGES
"TON-DON" MEANS KNOWN QUALITY WITHOUT FANCY PRICE
MADE ALSO FOR BUGGIES AND SURRIES

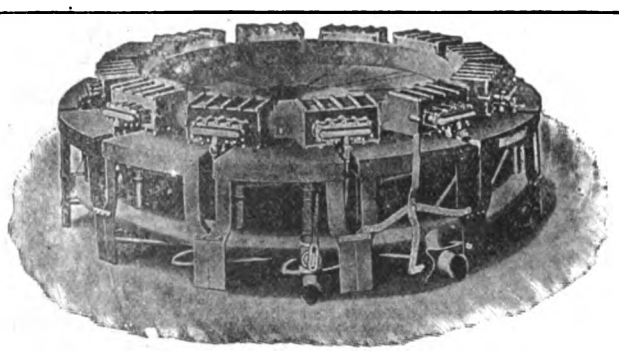
SHELDON AXLE & SPRING CO.,
WILKES-BARRE, PA.

LARGEST AXLE FACTORY IN THE WORLD.

SUBSCRIBE FOR

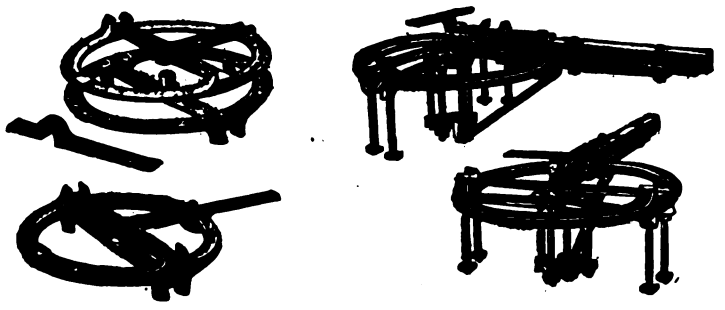
The Blacksmith and Wheelwright

$1.00 The Year



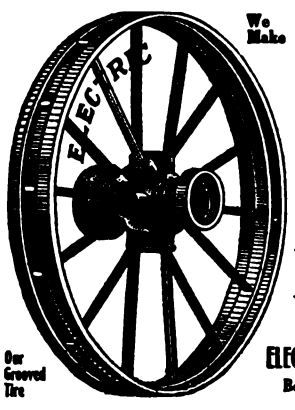
TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.

OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.



Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE COGEL MFG. CO., TOLEDO, OHIO.



We Make **STEEL WHEELS**
To Fit Any Axle
Plain or Grooved Tire
Steel or Hickory Axles
Any Size
A Full Line of Wood and Steel
Farm Trucks
With Steel or Wood Wheels
Write for Large Catalog and Prices
ELECTRIC WHEEL CO.
Box N, Quincy, Ill.
Our Grooved Tire

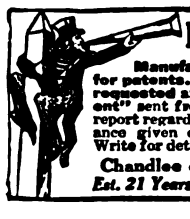
SUPERIOR Welding and Cutting Outfits, designed for the Blacksmith's use

Increase your profits by being able to take care of your repair work by the Oxy-Acetylene process. Saves time and money.

Write for complete catalog and monthly price sheet.

AGENTS WANTED

SUPERIOR OXY-ACETYLENE MACHINE CO.
HAMILTON, OHIO



Inventions Wanted!

Manufacturers constantly writing us for patents. List of inventions actually requested and book "How to Obtain a Patent" sent free. Send rough sketch for free report regarding patentability. Special assistance given our clients in selling patents. Write for details of interest to every inventor.

Chandlee & Chandlee, Patent Attorneys
Est. 21 Years 587 7th St., Washington, D. C.



HARDENING, TEMPERING, ANNEALING AND FORGING OF STEEL

BY JOSEPH V. WOODWORTH.

A WORK treating in a clear, concise manner all modern processes for the Heating, Annealing, Forging, Welding, Hardening and Tempering of Steel, making it a book of great practical value to metal-working mechanics in general, with special directions for the successful hardening and tempering of all steel tools used in the arts, including milling cutters, taps, thread dies, reamers, both solid and shell, hollow mills, punches and dies, and all kinds of sheet metal working tools, shear blades, saws, fine cutlery, and metal cutting tools of all description, as well as for all implements of steel both large and small. In this work the simplest and most satisfactory hardening and tempering processes are given.

The uses to which the leading brands of steel may be adapted are concisely presented, and their treatment for working under different conditions explained, also the special methods for the hardening and tempering of special brands.

A chapter devoted to the different processes for Case-hardening is also included, and special reference made to the adoption of Machinery Steel for Tools of various kinds.

Fully Illustrated. Price $2.50.

☞ **Copies of this book sent prepaid on receipt of the price.** Address

M. T. RICHARDSON CO., 71-73 Murray St., New York.

ROBERGE'S GREAT BOOK

"THE FOOT OF THE HORSE"

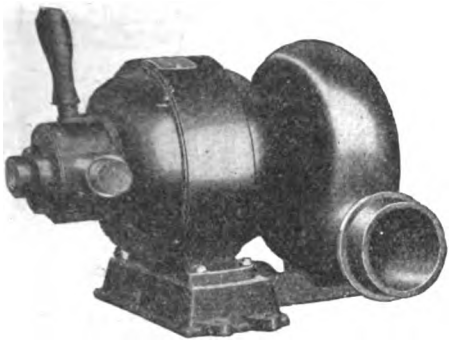
By DAVID ROBERGE

The author of this book for many years enjoyed the entire confidence of Robert Bonner, who, in his day, owned many of the fastest trotters the world has ever seen. Bonner and Roberge worked together in shoeing the former's horses. Many believe that David Roberge was the ablest horseshoer this country has ever seen. His book is filled with plates and illustrations showing proper methods of shoeing horses for every kind of lameness. We have sold large numbers of these books and they have always given entire satisfaction. The work represents the life experience of its author. Sent to any address, postage prepaid, on receipt of price, **$5.00.** Address

M. T. RICHARDSON CO., Publishers, 71-73 Murray Street, New York.

Digitized by Google

THE KAZOO
VARIABLE SPEED FORGE BLOWER



No outside Rheostat or resistance box. Any speed from 0–3600, by simply moving the handle. Current consumption in proportion to speed.

Mr. Blacksmith, why not deal direct with manufacturers and save middleman's profit?

Price now for direct sales to Blacksmiths, $30.00. F. O. B. Kalamazoo.

30 days' trial. You to return the blower if not satisfactory in every respect.

R. P. WARNER ELECTRIC CO., Kalamazoo, Mich.

The Perfect Power Hammer



Note the difference in construction over other makes:

Extra Long Guides, insuring a direct movement of the ram without any side motion, which causes guides and springs to break on other Hammers.

The only Hammer made with a disk attachment with special anvil for sharpening harrow and plow disks.

A recently invented **Friction Clutch** fitted with **Ball Bearings,** absolutely controls the operation of the Hammer by foot pressure from the lightest tap to the heaviest blow. This ease of operation makes the Hammer particularly well adapted for plow work, as you can get as light a stroke as you desire.

Will ship to any responsible party on approval. If not as represented, no sale.

Made in two sizes:

3 inch square, 40 lb. ram—shipping weight, 1,150 lbs.
4 " " 80 " " " " " 1,800 "

Write any jobber for prices, or

Macgowan & Finigan Cordage Co.,
204 North Third St., ST. LOUIS, MO.



I Will Sell You A Better Engine—on Your Own Terms—Cash, Payments or No Money Down

I Can Make You The Best Price

IMMEDIATE SHIPMENT Now!

90 Days Trial—5-Year Guarantee

Let me ship you my Special Model Kerosene Engine using 8-cent Kerosene instead of high-priced gasoline, to earn its own cost the first three to six months. Thousands are making money with WITTE Engines---Superior in design, construction and durability. Easy starting battery or magneto. Every engine shipped ready for business, including Speed Regulator and Free Equipment.

Four Plans of Purchase—Buy for Cash, on Payments, Bank Deposit or No Money Down. Use engine 90 days. See how little it costs for fuel and how easy it is to operate on kerosene, with a WITTE. You don't have to wait for your engine---I ship at once---make you the best price. I build engines exclusively---sell them direct to my customers at factory prices. You get your engine when you want it.

WITTE HIGH GRADE ENGINES

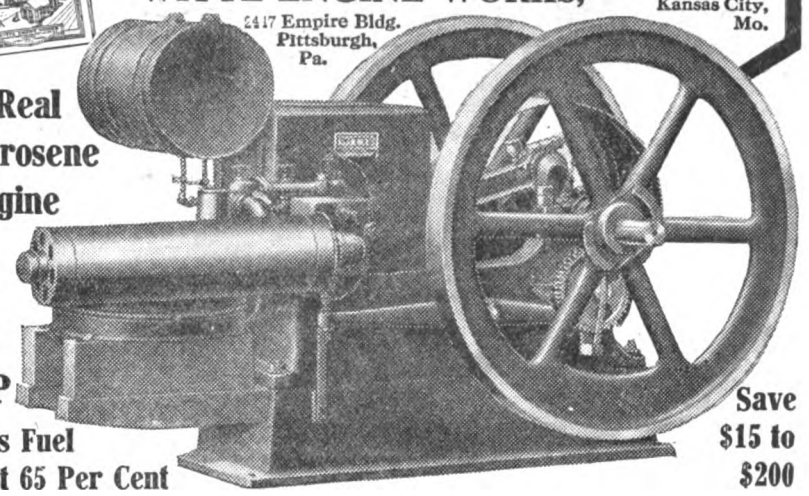
STATIONARY AND PORTABLE



On the market continuously for 31 years without a break. Why pay more than my factory price to get quality, or buy a cheap engine to get a low price. **My Free Book,** "How to Judge Engines" is copyrighted. It tells how I have been able to reduce manufacturing costs, why vertical values are best, why I use the highest grade semi-steel instead of cast iron, why kerosene engines must be specially made for kerosene, all about vaporizing fuel, built-in adjustable speed regulator, automobile ignition and other desirable features. You can see the engine you want before you pay me a dollar. Write today for my low factory prices on kerosene engines---the lowest possible consistent with quality saving you $15 to $200.---ED. H. WITTE.

WITTE ENGINE WORKS, 2447 Oakland Ave., Kansas City, Mo.
2447 Empire Bldg., Pittsburgh, Pa.

A Real Kerosene Engine 2 to 22 H-P



Cuts Fuel Cost 65 Per Cent

Save $15 to $200

JUST PUBLISHED



AUTOMOBILE WELDING
WITH THE OXY-ACETYLENE FLAME

By M. KEITH DUNHAM

167 Pages **Price $1.00** **Fully Illustrated**

Sent Postpaid to Any Part of the World.

This is the only complete book on the "Why" and "How" of Welding.

EXPLAINS in a simple manner apparatus to be used, its care, and how to construct necessary shop equipment. Proceeds then to the actual welding of all automobile parts, in a manner understandable by everyone.

Gives principles never to be forgotten. Aluminum, cast iron, steel, copper, brass, bronze and malleable iron are fully treated, as well as a clear explanation of the proper manner to burn the carbon out of the combustion head.

AUTOMOBILE OWNERS, GARAGE AND SERVICE STATIONS, BLACKSMITHS AND MACHINE SHOPS, as wel as industries using the oxy-acetylene flame, will find this book of the utmost value, since the perplexing problems arising when metal is heated to a melting poin. are fully explained and the proper methods to overcome them shown.

CONTENTS

CHAPTER I.—APPARATUS KNOWLEDGE.

Oxygen Supply—Care of Oxygen Cylinder—Acetylene Generator—Care of Generator—Regulators—Care of Regulators—Creeping Regulators—Gauges—Care of Gauges—Welding Torch—Care of Welding Torch—Effects of Heat—Hose and Goggles.

CHAPTER II.—SHOP EQUIPMENT AND INITIAL PROCEDURE.

Preheating Agencies—Welding Table—Location of Welding Outfit—Starting the Welding Outfit—Adjustment of Flame—Principle of Welding—General Welding Knowledge—Welding Rods and Fluxes—Choice of Tip—Expansion and Contraction.

CHAPTER III.—CAST IRON.

Simple Welding—How to Hold the Flame—Hard Cast Iron—Pin Holes and Blow Holes—Lug on Cylinder—Water Outlet—Cylinder Welding—Compression Head—Finishing and Testing—Scored Cylinders—Cylinder Parts—Fly Wheels—Pistons—Crank Cases—Babbitted Bearings—Valve Guides—Preserving Threads—Conclusion of Cast Iron.

CHAPTER IV.—ALUMINUM.

Use of—Welding Knowledge—Puddle System—Flux System—Comparison of Systems—Welding Rod—Preparation of the Weld—Inlet Manifold—Arm of Crank Case—Welding the Arm Without Taking Out the Motor—Break in the Body of Case—Welding Cold—Wrong Method of Setting Up—Lug or Boss Welding—Preheating the Case—Gas Preheating Flame—One Side or Both—Collapse of Weld—Broken Bearings—Direction of Welding—Shrinkage Cracks—Missing Parts—Finishing—Die Mould Castings—Body—Other Parts.

CHAPTER V.—STEEL

Welding Knowledge—What the Flame Does to Steel—The Welding Rod—Simple Welding—Position of Flame—Reinforcing the Weld—Frame Welding—Lengthening the Chassis—Tube Housings—Worn Parts—Gear Welding—Case Hardening—Light Metal Welding—Gasoline Tank—Welding Adjacent to Rivets—Shaft Welding—Construction of Parts.

CHAPTER VI.—MALLEABLE IRON, COPPER, BRASS, BRONZE.

How to Detect Malleable Iron—Brazing Malleable Iron—Real Housing—Reinforcing the Braze—Brazing Tube to Housing—Building Up Worn Parts—Copper—Brass and Bronze—Silver Soldering.

CHAPTER VII.—CARBON BURNING AND OTHER USES OF OXYGEN AND ACETYLENE.

Principle of Carbon Burning—Method of Operation—Lead Burning—Soldering—Case Hardening—Heating Uses.

CHAPTER VIII.—HOW TO FIGURE COST OF WELDING.

Oxygen Consumption—Dissolved Acetylene Consumption—Torch Consumption Test—Acetylene Generator Consumption—Cost Card—Conclusion.

ADDRESS ALL ORDERS TO

M. T. RICHARDSON COMPANY, 71-73 Murray St., NEW YORK

THE ARMSTRONG MFG. COMPANY

BRIDGEPORT CONN., U.S.A. **NEW YORK OFFICE 248 CANAL STREET**

like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



"Makers of the Genuine ARMSTRONG Stocks and Dies."

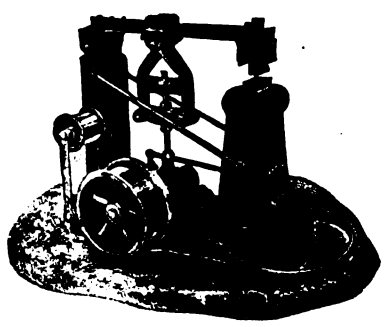
STAR STEEL SHAPES

PLOWSHARES	LANDSIDE PLATES	PLOW POINTS
LISTERSHARES	LANDSIDE POINTS	SEEDER POINTS
MOLDBOARDS	SHOVEL POINTS	SUBSOILERS
CULTIVATOR SHOVELS		DRILL POINTS
Soft Center	Solid Cast	Crucible Steel

STAR MANUFACTURING CO., Carpentersville, Ill.

The HAWKEYE HELVE HAMMER'S Built in Three Sizes.

12 years in successful operation. Fully guaranteed. Note the principle of stroke. Double the capacity of any upright hammer of the same weight and price.



For price and descriptive literature write,

The Hawkeye Mfg. Co.
CEDAR RAPIDS, IOWA, U. S. A.

WELDING PLANTS, $25.00 to $300.00

Designed for all purposes. Small cash payment; balance, three to six months. Every mechanic and shop should have one.

BERTSCHY-BERMO CO. **OMAHA, U. S. A.**

Digitized by Google



VULCANIZING

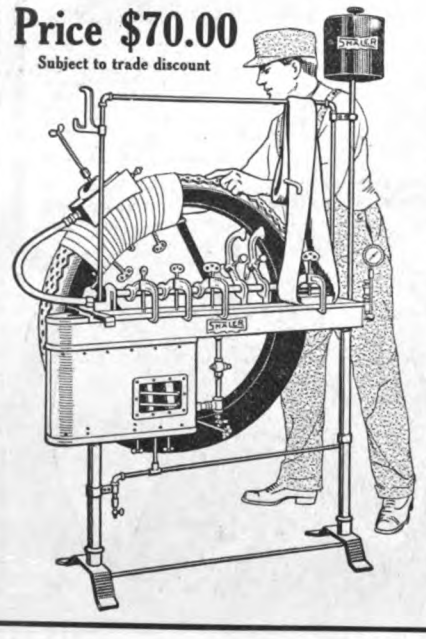
Make Money Repairing Tires

You can easily add $200 or more to your income every month doing tire repairing. Every motorist in your vicinity has tire repairing to be done right along. Car owners are willing to pay you a good price to have this repairing done—and the greater part of the money you take in is ***actual profit!***

WITH A

SHALER Vulcanizer

Price $70.00
Subject to trade discount



it is a simple matter to turn out perfect jobs. You don't need experience—your regular help can easily vulcanize any size or style of tire—either casing or inner tube.

The SHALER Vulcanizer is a thoroughly practical vulcanizer—and will do all that the highest priced machines will do. It handles up to 200 tubes and 12 casings a day—and does perfect work.

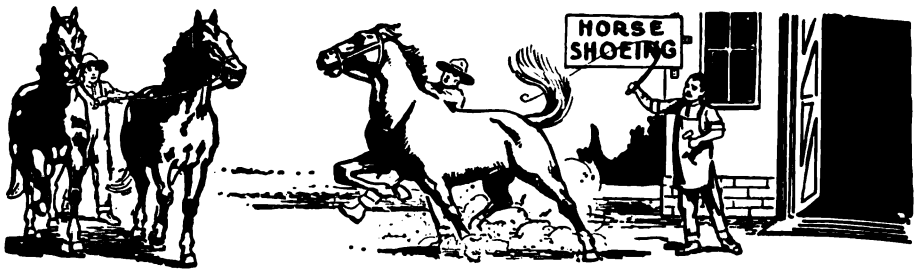
It is the only vulcanizer that has automatic heat control, which makes explosions impossible and prevents overheating or damaging tires.

SHALER Vulcanizers can be supplied for either gas, gasoline or electric heat.

Send for Catalog

which explains every detail about the SHALER Repair Shop Vulcanizers, the principle of the approved SHALER Wrapped-Tread method of mending casings, and tells about our "Money-Back" Guarantee. Don't delay, write at once.

C. A. Shaler Company
1800 Fourth Street, WAUPUN, WIS.
Oldest and Largest Manufacturers of Vulcanizers



QUIT DRIVING YOUR TRADE AWAY

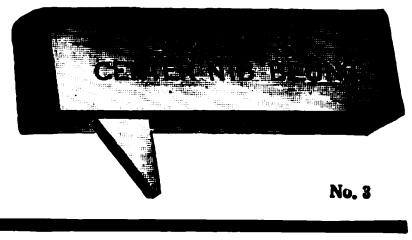
Stop! Look! Think! Every time you put on a set of calks that an owner can replace himself, you are driving trade away from your shop.

When you use ***welded*** calks, the owner must bring his horse to the shop when the calks need renewing.

Also, every horse's hoofs need the frequent attention of a horseshoer. You're doing the owner a good turn by using ***Sweet's Toe Calks***—"The Cold Cut Dreadnaught"—as well as keeping your shop full.

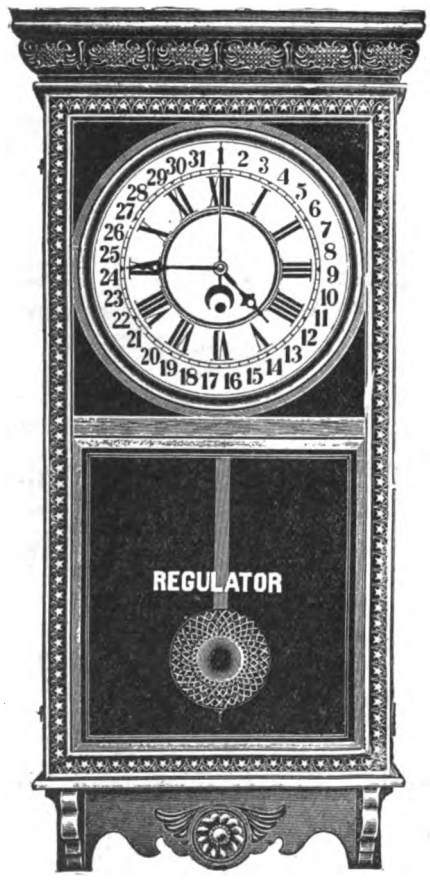
FRANKLIN STEEL WORKS

Joliet, Ill. Cambridge, Mass.
Hamilton, Ont.



No. 3

Every Blacksmith Shop Ought to Have a Clock



Having made a very favorable arrangement with one of the largest clock companies in this country, we now offer to our readers a Regulator Eight-Day Calendar Clock, 38½ in. high with a 12 in. dial, with a subscription to THE BLACKSMITH AND WHEELWRIGHT for a year for **$4.90.** We cannot fill orders for these clocks to foreign countries.

Every blacksmith shop ought to have a clock of this description, which gives you the time and the day of the month. The engraving shown herewith gives a correct impression of the appearance of the clock.

THIS OFFER IS GOOD FOR EITHER OLD OR NEW SUBSCRIBERS.

ADDRESS

M. T. RICHARDSON CO., Publishers,
71-73 Murray St., New York

THE
SCREW-CUTTING LATHE

How to select, set up, adjust and operate

By JAMES F. HOBART, M. E.

THIS book is a concise and exhaustive treatise on everything pertaining to the SCREW-CUTTING LATHE, including costs, erection, operation and adaptability. It is written by one who thoroughly understands his subject in all its details, and is so copiously illustrated that everything in it will be readily understood.

It will be found invaluable to those desiring to know just how a Screw-Cutting Lathe should be run.

There are ***92 illustrations,*** and the book is substantially bound in cloth. ***Price, $2.00.*** A copy will be sent postage prepaid to any address on receipt of price.

M. T. RICHARDSON CO.
PUBLISHERS
71-73 Murray St., New York

Digitized by Google

BORROWING money at 10% to put into business that nets about the same is much like the Irishman cutting off the top of his blanket and sewing it on the bottom to make the blanket longer.

THE ROCHESTER HELVE HAMMER

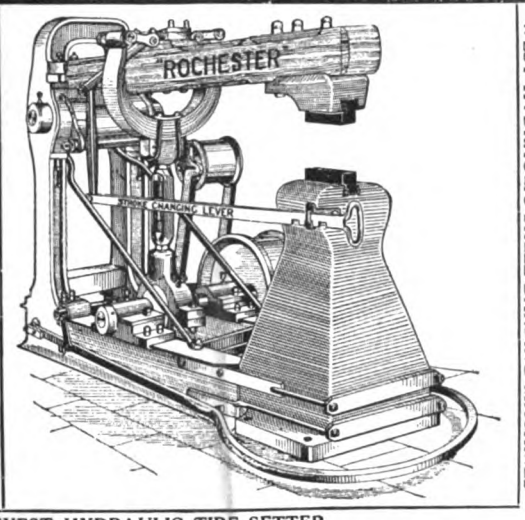
WE FOOLED YOU

this time. You've been so used to seeing a picture of the Rochester Helve Hammer on this side, we just thought we'd stick it on the other, for a wee bit of a change. We've heard you say so often, in our mind, that our Hammer is the best on the market, we want you to go a little further now and

BUY ONE

That'll get us somewhere. You'll be saving money, doing quicker and better work, and blessing us for making it for you.

6 SIZES
2 Styles of Frames

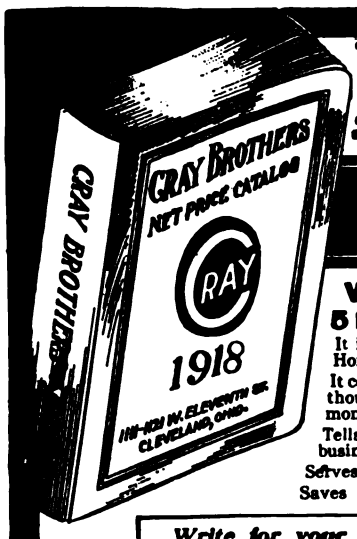


WEST HYDRAULIC SHELL BANDING MACHINES

THE WEST HYDRAULIC TIRE SETTER

SEND A CARD TO THIS ADDRESS FOR OUR CATALOGUE AND PRICES.

WEST TIRE SETTER CO.
ROCHESTER, NEW YORK



Free 512 PAGES OF BARGAINS

POST PAID

WE WANT TO SEND YOU THIS 512 PAGE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

Tells how you can work up a profitable auto supply and repair business.

Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories
1117 W. 11th Street, Cleveland, Ohio, U. S. A.

UNITED STATES
HORSE AND MULE SHOES
ARE REAL TRADE WINNERS


Front Lt. Long Heel

PERFECT ALL THROUGH AND EASY TO FIT


Hind Lt. Long Heel

Prove It Out On Your Next Order

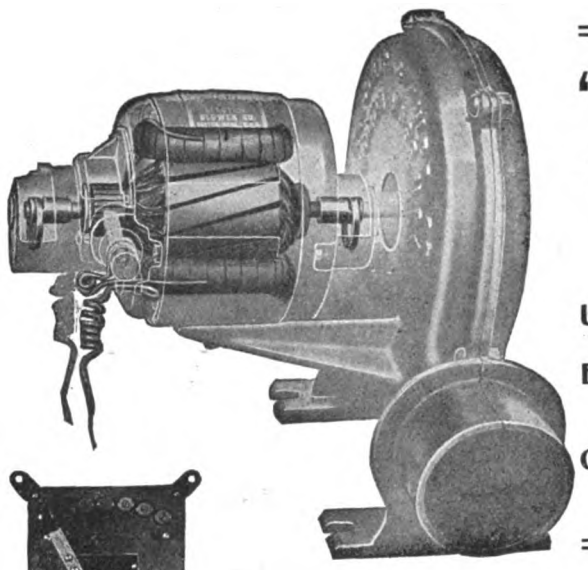
Carried in Stock by All Jobbers

A Handsome Souvenir Watch Fob Given Away Free To All Blacksmiths and Horsemen Upon Request.

WRITE FOR OUR LATEST CATALOG No. 16 ILLUSTRATING OUR COMPLETE LINE

Manufactured By

United States Horse Shoe Co.
ERIE, PA.



"ONE FIRE"
"MARVEL" $35.00

A. C. or D. C.
or
UNIVERSAL MOTORS

Extra Large Ring Oil Bearings

Case Hardened Armature Shaft

The cut above shows the inside design and mechanical construction of our OIL RING BEARING MOTORS used on our "ONE FIRE" MARVEL.

With the enlarged oil wells and CASE HARDENED SHAFT, you get long wearing qualities and ruggedness found only in a MARVEL BLOWER. As long as there is ANY oil in the oil-well, the RING revolving on the CASE-HARDENED SHAFT keeps a STREAM OF OIL on the bearings.

This prevents OLD AGE.

Show this cut to the best mechanical engineer you can find, and ask him his opinion regarding our claims.

You naturally want the BEST and the MOST that your money will buy, and in a Forge Blower you will find those qualities in a MARVEL.

Any of the LEADING HARDWARE FIRMS will ship you any one of our MARVEL BLOWERS on 30 days' trial.

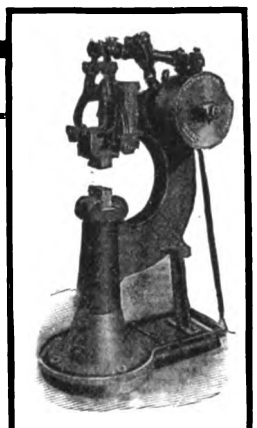
NOW is the time to improve your shop equipment.

Ask YOUR Dealer to have us send you one on 30 days' free trial. Unless you get a RING OIL BEARING "MARVEL" Blower, you are not getting the MOST your money will buy.

15 Different Sizes. *Descriptive Circular Mailed on Request.*

ASK YOUR DEALER.

ELECTRIC BLOWER CO.,
352 Atlantic Avenue, BOSTON, MASS.



I CAN take you out of a hole and make you win the goal—I take the "old-timer" and make him a climber—I make the present beginner a future winner.

Men who walk hand in hand with me, land with me—on the top rung with the victors!

I AM THE
KERRIHARD POWER HAMMER

I Do the Work of Four Men

Write for full information

THE KERRIHARD COMPANY
Kerrihard Station Red Oak, Iowa, U. S. A.

START REPAIRING AUTO TIRES

Make Automobile Profits

Blacksmiths! Everyone connected with the automobile trade is making big money. YOU CAN TOO.

Demand for tire repairing is enormous—thirty million tires in use, and increasing all the time. Automobiles are Stable—present patriotic and industrial demands cannot be met without them. High price of tires means more tire repairing than ever before. Help the Nation by helping to keep her motor equipment in fit condition. Investigate



TIP-TOP OF AKRON TI-RE-PAIR OUTFIT

Write today for FREE BOOKLET, "Tire Repairing, the Business of the Times." USE THE COUPON.

We make a complete line of Tire Repair Equipment for all kinds of service and at all prices. Catalog on request.

THE AKRON RUBBER MOLD & MACHINE CO.
937 Sweitzer Avenue : : : Akron, Ohio
Pacific Coast Distributors: Geo. W. Eno Rubber Co., 280 Golden Gate Ave., San Francisco; 1026 S. Los Angeles St., Los Angeles.

New-Type-F Equipment



Big Capacity Vulcanizer With Self-Contained Boiler

Only $180

Please send full particulars regarding your Ti-Re-Pair Equipment, and copy of Free Booklet. (B. & W.)

Name .....

Address .....

Digitized by Google

The Better Your Equipment The Bigger Your Profits

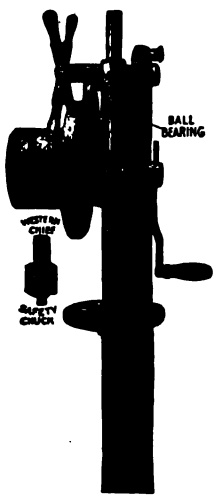
Buy CANEDY-OTTO

AND INCREASE YOUR INCOME

Once Tried, Always Used : There's a Reason—Quality

OVER 200 DIFFERENT STYLES

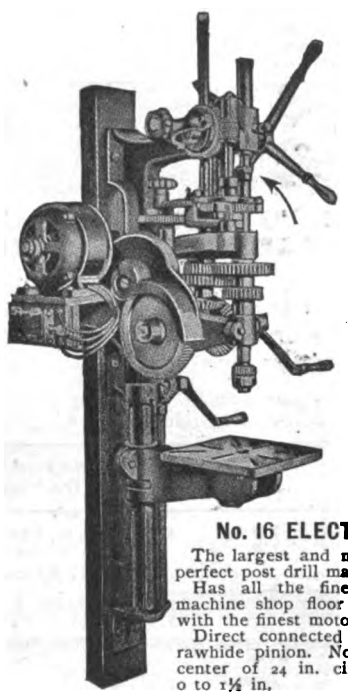
SEND FOR CATALOGUE No. 12



No. 19 DRILL

A low-priced combined hand and power self-feed drill.

Drills to center of 16½ in. circle.

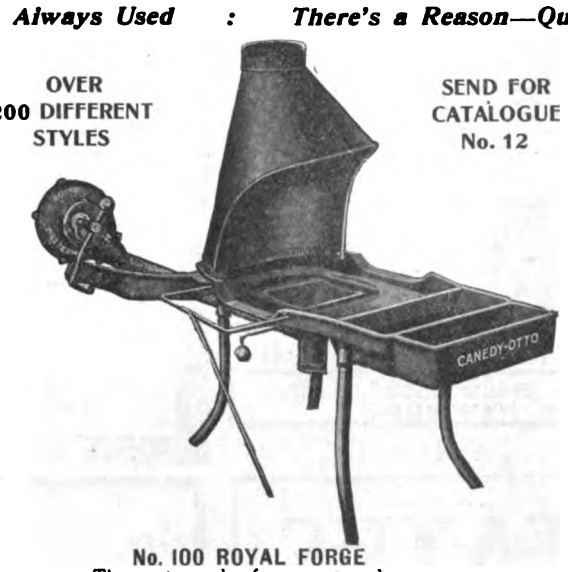


No. 16 ELECTRIC DRILL

The largest and most mechanically perfect post drill manufactured.

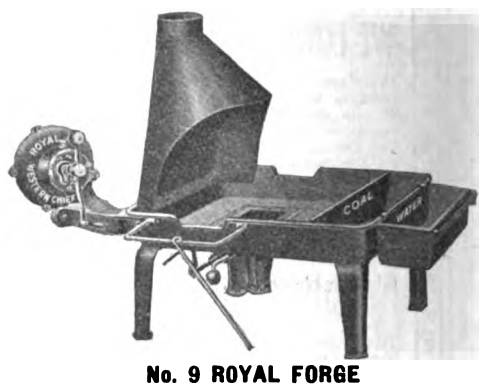
Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.

Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1½ in.



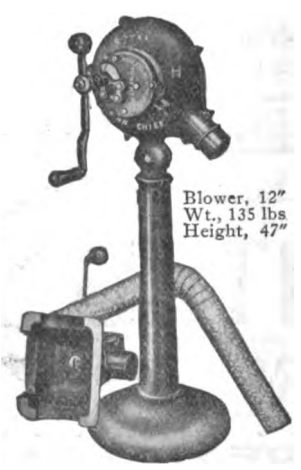
No. 100 ROYAL FORGE

The most popular forge ever made.
Fan, 12 in. Hearth, 31½x45½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x50 in. Blower, 14 in.

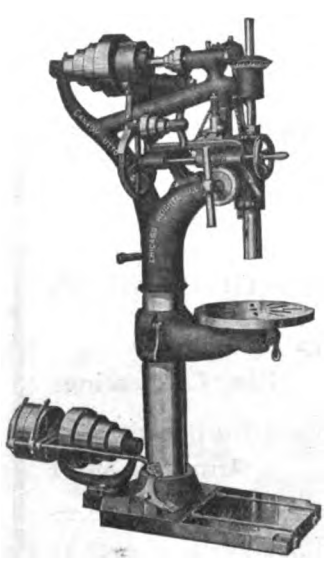


ROYAL BLOWER

(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.

Fire pot is 8x9 in. inside.



No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.

All machines are tested before leaving the factory, and guaranteed in every respect.

Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

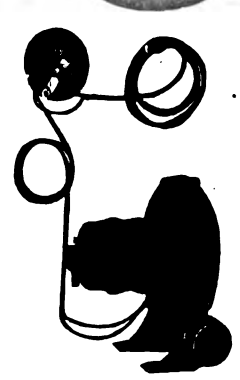
Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS



No. 1 1/2 SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



No. 8 ELECTRIC BLOWER

The best outfit money can buy.

FREE SAMPLE OF FLUX



WELD TRADE A MARK CAST

A SUPERIOR FLUX FOR

OXY-ACETYLENE WELDING

"WELD-A-CAST" Flux No. 1 for Welding Cast Iron.

Eliminates pin holes and blow holes, leaving the metal soft.

"WELD-A-CAST" Flux No. 3 for Welding Brass, Bronze, High Speed Steel, and all High Carbon Steel.

Prove it! Write for Sample.

CORTLAND WELDING COMPOUND CO.

CORTLAND, N. Y.



PEXTO

No Slip to This Grip

Snap! The jaws close like a vise. A twist, a pull and out comes the nail.

With Pexto Shoeing Pincers there's *no slipping, no binding*. The jaws open wide and close without sticking.

Made in three sizes, 10, 12 and 14 inches.

High-grade steel gives Pexto Blacksmiths' and Farriers' tools their strength, experienced toolmakers their superior workmanship and finish.

There's a large line to pick from, including pincers, nippers, parers, butterises, farriers' hammers, etc.

Every tool bears the P. S. & W. guaranty. This means not only right materials and construction but right design for the purpose. Ninety-six years of experience in manufacturing and a great organization stand behind this guaranty.

Ask your dealer.

THE PECK, STOW & WILCOX CO.

Mfrs. of Mechanics' Hand Tools, Tinsmiths' and Sheet Metal Workers' Tools and Machines. Builders' and General Hardware.

SOUTHINGTON, CONN. CLEVELAND, OHIO

Address all correspondence to 209 West Center St., Southington, Conn.

Digitized by Google

ESTABLISHED 1880

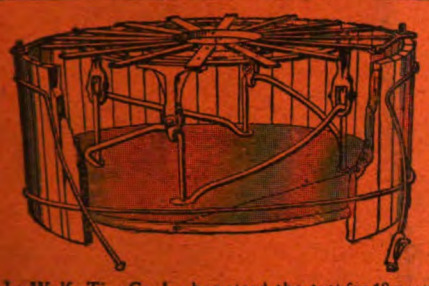
The Pioneer Journal of its Class

THE BLACKSMITH & WHEELWRIGHT

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U. S. Patent Office.

Vol. LXXVII. No. 5 NEW YORK, MAY, 1918 TERMS: One Dollar a Year. Foreign, $1.50. (6s. 3d.)



The Wolfe Tire Cooler has stood the test for 12 years in many of the best shops, and proven all that is claimed for it. The machine is right, so is the price.

Write for circulars.

MATT. L. WOLFE, WEST CARROLLTON, OHIO



Saw Those Heavy Bars ON A MARVEL Power Hack Saw

Machine stops when work is cut off. Requires very little power.

Price is Low. Write Us.

Ask for reply by return mail.

ARMSTRONG-BLUM MFG. CO.

340 N. Francisco Ave., Chicago, Ill., U. S. A.

STEEL STAMPS

BURNING BRANDS

RUBBER STAMPS

STENCILS

GEO. M. NESS, JR.

61 FULTON ST. NEW YORK

Send for price list.



SUREGRIP CALKS

American Calk Co.

DETROIT, - - MICH.

THE TEETH IN

BLACK DIAMOND RASPS

ARE MINGLED

So as to Cut Clean and Free and Leave no Furrows in the Work

Twelve Medals of Award by Jurors



At International Expositions

G. & H. BARNETT COMPANY

Black Diamond File Works, PHILADELPHIA, PA.

Owned and Operated by NICHOLSON FILE CO.

Copy of Catalog sent Free to any interested file users upon application.

AETNA STEEL TOE CALKS

Made by THE AETNA NUT CO., Southington, Conn.

BLACK HORSE BRAND

BEST SHAPE

BEST SPUR

TO DRIVE

BEST STEEL



TOE AND HEEL CALKS

SOLD BY ALL DEALERS

STEEL STAMPS

LETTERS and FIGURES

For Marking Your Tools and Your Product

NAME PLATES OF ALL KINDS

S. D. CHILDS & CO.

DEPT. 2

136 S. CLARK ST. CHICAGO



Our Grooved Tire

We Make **STEEL WHEELS**

To Fit Any Axle Plain or Grooved Tire

Steel or Hickory Axles

Any Size

A Full Line of Wood and Steel

Farm Trucks

With Steel or Wood Wheels

Write for Large Catalog and Prices

ELECTRIC WHEEL CO.

Box N. Quincy, Ill.

HORSESHOERS

It pays to pack the horse's hoofs with Lemoine's hoof packing. It has no equal for dry, hard, contracted hoofs, quarter cracks, corns and thrush. It never fails to do the work.

N. LEMOINE COMPANY

P. O. Box 88 FRAMINGHAM, MASS.



Inventions Wanted!

Manufacturers constantly writing us for patents. List of inventions actually requested and book "How to Obtain a Patent" sent free. Send rough sketch for free report regarding patentability. Special assistance given our clients in selling patents. Write for details of interest to every inventor.

Chandlee & Chandlee, Patent Attorneys

Est. 21 Years 587 7th St., Washington, D. C.

PATENTS

C. L. PARKER

Ex-Member Examining Corps, U. S. Patent Office

Attorney-at-Law and Solicitor of Patents

American and foreign Patents secured. Trade marks registered. Searches made to determine patentability, validity and infringement. Patent suits conducted. Pamphlet of instructions sent upon request.

McGill Building WASHINGTON, D. C.

SUPERIOR Welding and Cutting Outfits, designed for the Blacksmith's use

Increase your profits by being able to take care of your repair work by the Oxy-Acetylene process. Saves time and money.

Write for complete catalog and monthly price sheet.

AGENTS WANTED

SUPERIOR OXY-ACETYLENE MACHINE CO.

HAMILTON, OHIO

Capewell Horse Nails

No matter what sort of shoes you are putting on—what the size of the horse or the class of work he is to do—Capewell nails are equal to the task.



There is no nail like "The Capewell" to give you results in time saving, money saving, labor saving, and above all to keep customers satisfied.

Make a point to order Capewell nails.



On the front face of each nail head is the Trade Mark—a pattern formed by lines crossing each other diagonally.

Look for it. The world's best nail at a fair price — not the cheapest regardless of quality.

The Capewell Horse Nail Company

HARTFORD, CONN.

Leading Horse Nail Makers of the World

Stokes Bros.' Improved Horse Rasps

Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A.



THE [illegible] FRIEND

If y[illegible] Corona Wool Fat Compe[illegible] for FREE SAMPLE and our Dealers Proposition.

For Hard and Contracted Hoof, Quarter Cracks, Corns, Grease Heel, Scratches, Wounds, and sores of almost any nature on man or beast.

Good profit on sales for you.

Box 2 The Corona Mfg. Co., Kenton, O.



Make Automobile Profits

START REPAIRING AUTO TIRES



Every blacksmith shop should do auto tire repairing. There's more money in it than there ever was in horse shoeing. And there's more demand for tire repairing than tire repair shops can begin to take care of (also present high price of tires is going to keep tires in service to the last mile before new tire

Investigate the New-Type-F Equipment illustrated at the right. Write today for free booklet, "The Repairing the Business of the Times."

WE make a complete line of Tire Repair Equipment. Complete catalog on request.

THE AKRON RUBBER MOLD & MACHINE CO.

937 Sweitzer Avenue : : : Akron, Ohio



New-Type-F Equipment

Big Capacity Vulcanizer With Self-Contained Boiler

Only $180

TIP-TOP OF AKRON TI-RE-PAIR OUTFIT

Pacific Coast Distributors: Geo. W. Eno Rubber Co., 280 Golden Gate Ave., San Francisco; 1026 S. Los Angeles St., Los Angeles

Please send full particulars regarding your Ti-Re-Pair Equipment, and copy of Free Booklet.

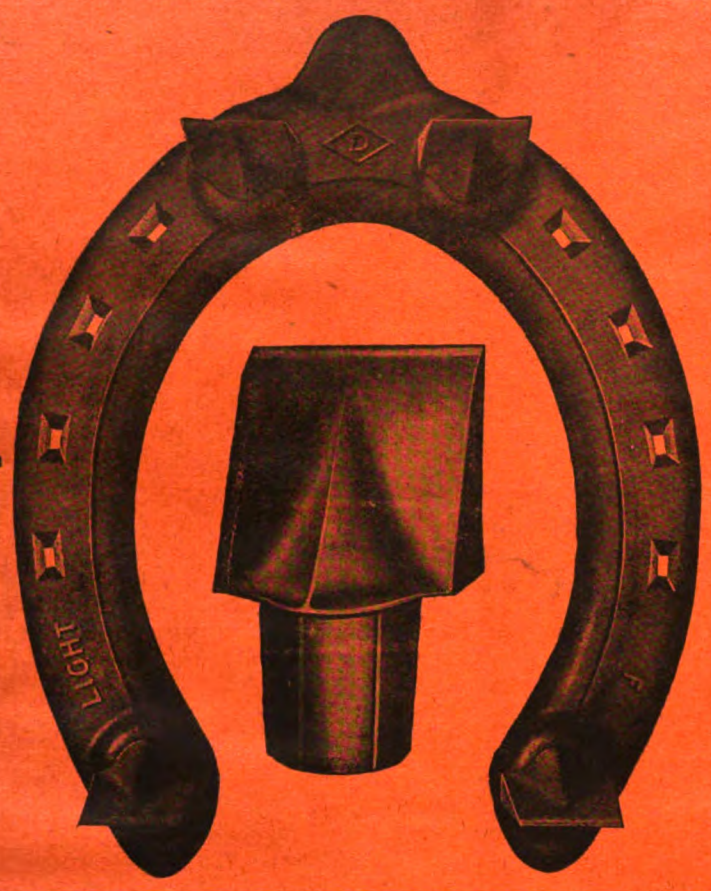
Name .....

Address .....

(B. & W.)

BUYERS' GUIDE AND INDEX TO ADVERTISEMENTS, PAGE 142

Digitized by Google



THE BEST COMBINATION

For Horses' Hoofs and the Horse Owner's Pocketbook Are

DIAMOND Shoes and Calks

The **Shoes** are perfectly shaped, well finished, easy to put on and guaranteed frost-proof.

The **Calks** are the hardest and toughest manufactured—and they fit the calk holes absolutely tight.

They don't twist in the shoe, fall out, or break off, and they wear like a Diamond besides.

DIAMOND CALK HORSE SHOE CO., DULUTH, MINN.

Save Time and Money



The experienced blacksmith who is extra hard to please in rasps will stop short of nothing but the best. He will always

Use NICHOLSON RASPS

BY INVITATION MEMBER OF

TRADE NICHOLSON U.S.A. MARK

See that this brand is on every Rasp you buy

NEW YORK, U.S.A.

Over 50 years' experience, as well as special study of blacksmiths' needs, enter into the making of every one of these rasps.

Every NICHOLSON rasp is rigidly inspected for temper and cutting qualities before it is wrapped in our *rust-proof* paper, boxed and sealed.

SOLD BY LEADING DEALERS

Catalogue Sent Free on Request

NICHOLSON FILE CO., Providence, R. I.

UNITED STATES HORSE AND MULE SHOES ARE REAL TRADE WINNERS


Front Lt. Long Heel

PERFECT ALL THROUGH A EASY TO FIT


Hind Lt. Long Heel

Prove It Out On Your Next Order

Carried in Stock by All Jobbers

A Handsome Souvenir Watch Fob Given Away Free To All Blacksmiths and Horsemen Upon Request.

WRITE FOR OUR LATEST CATALOG No. 16 ILLUSTRATING OUR COMPLETE LINE

Manufactured By

United States Horse Shoe Co.

ERIE, PA.

FOR ALL



VEHICLES

Johnston's "Krakno"

is elastic, non-corrosive, heat-resisting, impervious to moisture, an inhibitive coating which prevents rust and scale—and is the ideal filler and surfacer.

"KRAKNO" On Old Work

"KRAKNO" saves you all the time and trouble of burning off and repriming and gives you a perfect job besides. You know what a surfacer and filler that will do what we claim "KRAKNO" does, will mean on all refinishing jobs. Check up the evidence by using "KRAKNO" in your shop. Test it thoroughly. Don't wait for a special job to come along, but try "KRAKNO" on your next regular job if you want the most beautiful, durable and economical finish.

Order one gallon or more on trial.

Mail us a post card for a trial gallon. We will tell you how to use it. If "KRAKNO" makes good for you, you will have made a valuable discovery.

"KRAKNO" is made in the following shades:
Red, Slate, Yellow, White, Blue, Green, Maroon, Gray and Blue Black.

The R. F. Johnston Paint Company

Makers of Paints to Meet Every Need

S. E. Cor. Main and Pearl Sts.

CINCINNATI, O.

SEND FOR ONE GALLON ON TRIAL

SEND FOR ONE GALLON ON TRIAL

Digitized by Google

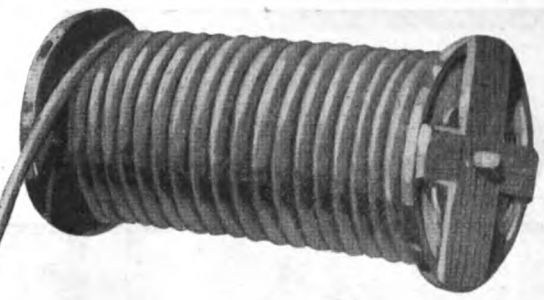
"F-S" PAINTS



You Want a Brilliant Finish? Use "F-S" Products

Your reputation for doing first-class work is enhanced by the "Brilliancy" of the "F-S" Gloss Wagon Paints you use. They are durable. Try them—made in 8 colors.

FELTON, SIBLEY & CO., Inc.
Manufacturers of Colors, Paints, Varnishes since 1863
136-140 North Fourth Street, Philadelphia
(149)



Tie Up to Firestone

—*because* vehicle owners all know that Firestone Carriage Tire gives Most Miles per Dollar. Such is the equipment for you to offer now, particularly when people demand better service than ever and are buying with more care.

The quality of Firestone Carriage Tire makes it wear evenly down to the channel. It does not chip, crack and break. It wears down slowly and gives easy, resilient riding.



Internal Wire

Firestone carriage rubber combines full size with the lightness which makes it profitable equipment for you to apply. Write your jobber or us for our interesting proposition.



Side Wire



Cushion

FIRESTONE TIRE & RUBBER COMPANY
FIRESTONE PARK, AKRON, O.
Branches and Dealers Everywhere

Carriage Tire



VULCANIZING

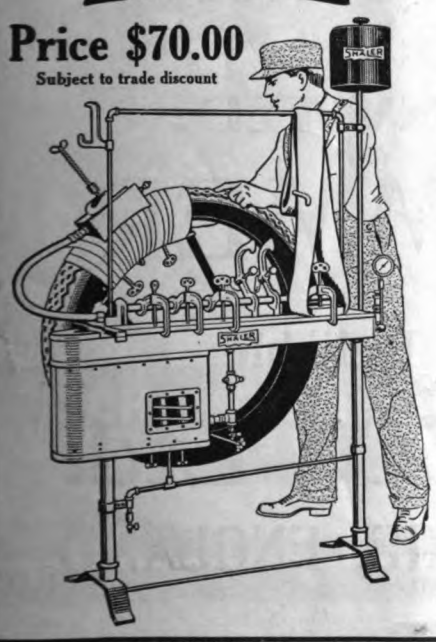
Make Money Repairing Tires

You can easily add $200 or more to your income every month doing tire repairing. Every motorist in your vicinity has tire repairing to be done right along. Car owners are willing to pay you a good price to have this repairing done—and the greater part of the money you take in is ***actual profit!***

WITH A

SHALER Vulcanizer

Price $70.00
Subject to trade discount



it is a simple matter to turn out perfect jobs. You don't need experience—your regular help can easily vulcanize any size or style of tire—either casing or inner tube.

The SHALER Vulcanizer is a thoroughly practical vulcanizer—and will do all that the highest priced machines will do. It handles up to 200 tubes and 12 casings a day—and does perfect work.

It is the only vulcanizer that has automatic heat control, which makes explosions impossible and prevents overheating or damaging tires.

SHALER Vulcanizers can be supplied for either gas, gasoline or electric heat.

Send for Catalog

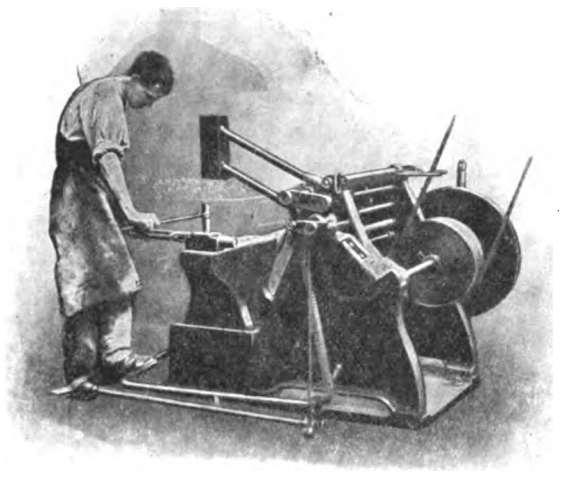
which explains every detail about the SHALER Repair Shop Vulcanizers, the principle of the approved SHALER Wrapped-Tread method of mending casings, and tells about our "Money-Back" Guarantee. Don't delay, write at once.

C. A. Shaler Company
1801 Fourth Street, WAUPUN, WIS.
Oldest and Largest Manufacturers of Vulcanizers

Digitized by Google

GENERAL BLACKSMITHING

BY THE "BLACKER" METHOD



"BLACKER"
PATENT STRIKER AT WORK.

AS DEMONSTRATED
IN THE PRINCIPAL TECHNICAL COLLEGES
and before the leading Engineering Societies of the United Kingdom

OVER 1,000 SUPPLIED IN 3 YEARS
IN GREAT BRITAIN ALONE.

PROPOSITIONS OF ALL KINDS INVITED.

WHAT OUR USERS SAY

A. KELLY & CO.
GUILFORD ST., GRAY'S INN RD.
LONDON, W. C.
The hammer is a great boon to us.

HUGH DENBY
60-64 TOMB ST., BELFAST
The hammer is giving me perfect satisfaction. It does away with the smith's helper.

JOHN MILLER
STOCKPORT RD., GUIDEBRIDGE
Five years ago you supplied me with a Blacker Hammer and I am getting splendid service from it for wheelwrighting, general & horseshoe smithing.

WILDE & BENNETT
STATION RD., HADFIELD
The hammer supplied over three years ago has given every satisfaction. It is well adapted for all kinds of smith's work and hoop piecing.

"OUR SMITHS REALLY LIKE THEM"

RIPPON BROS.
HUDDERSFIELD
Your hammer is a wonderful tool. Our smiths really like them. They would not like to go back to the old method.

Sir W. A. Sanderson & Co., Ltd.
NEWCASTLE-ON-TYNE
The one (Blacker Hammer) which we have installed is fully in use and we anxiously await arrival of the other six.

Wm. VINCENT
CASTLE ST., READING
The hammer which I purchased from you is in every way satisfactory.

Wm. Hardill Sons & Co., Ltd.
CLECK HEATON
We are only sorry we did not install the hammer sooner.

"WISH I HAD IT YEARS AGO"

ARTHUR BRUNT
ANCHOR RD., LONGTON
Your hammer will recommend itself if anyone sees it at work who knows anything about hammers.

WALTON CLIFFE, Esq.
CLECK HEATON
Your hammer has certainly proved to be a most efficient tool, very sensitive, and under complete control when working either lightly or at its full capacity.

T. D. BATTEN
ST. PINNOCK, NEAR LISKEARD
I am in my 69th year and it is a pleasure to me to go into the shop to work, knowing that it is an easy thing to do the work which was before a heartsickening terror.

A. C. PENMAN
DUMFRIES, N. B.
Our output of war office lurries depends entirely on the Blacker Hammer.

EASY TO WORK—ECONOMICAL TO RUN
PATENTED IN ALL COUNTRIES.

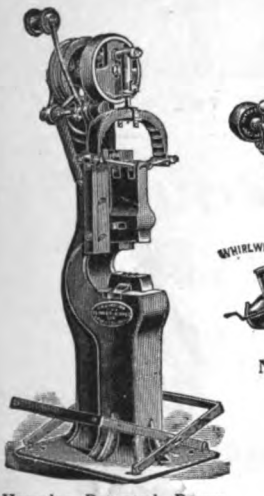
PROPOSITIONS OF EVERY KIND INVITED.

THE "BLACKER" HAMMER
IS
Always There—Always Ready—In All Ways Reliable

MECHANICAL HAMMER CO., Ltd.
STAYLEY IRON WORKS STALYBRIDGE, ENGLAND

Digitized by Google

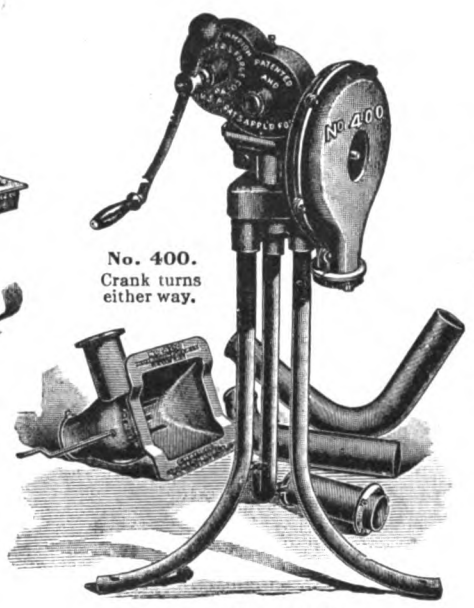
THE FAMOUS CHAMPION BLACKSMITH TOOLS



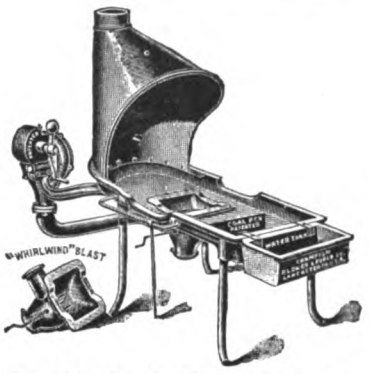
Hercules Patented Power Hammer. Weight of ram, 65 pounds.



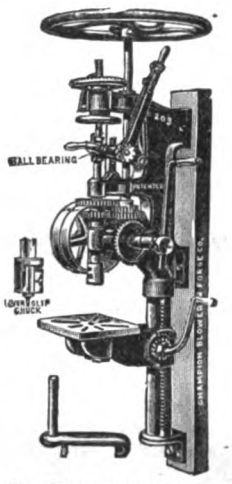
No. 40B. Steel Blacksmith's Forge.



No. 400. Crank turns either way.



No. 433. Cast Iron Blacksmith's Forge.



No. 203. Self-Feed and Double Compound Lever Feed Drill.

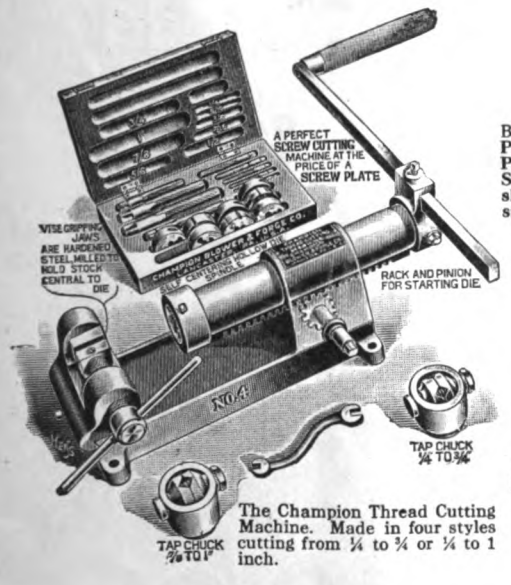


The Champion "Columbian" Tire Bender. Made in 3 sizes.

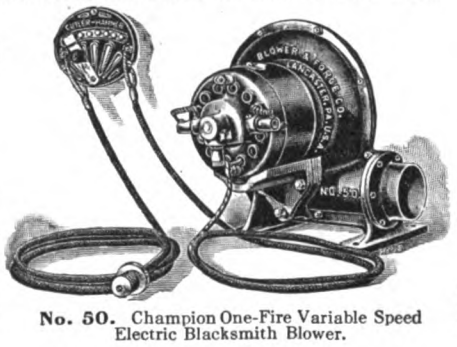
FAMOUS 400

Don't Fail to Get 1918 Catalog

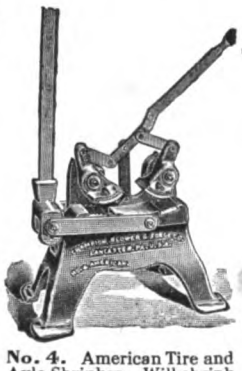
Before purchasing a Hand Blower, Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



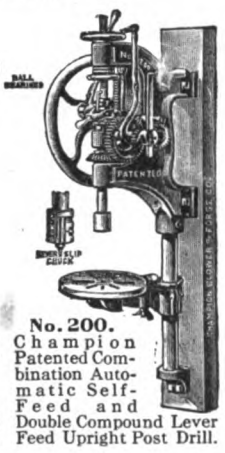
The Champion Thread Cutting Machine. Made in four styles cutting from ¼ to ¾ or ¼ to 1 inch.



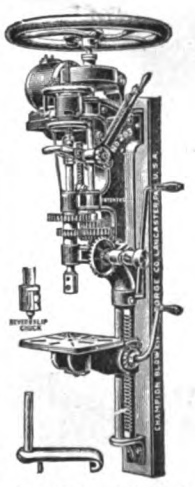
No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower.



No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



No. 200. Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

F.M.

Digitized by Google

WAGON BUILDING

"Build me a wagon that will last forever."

"Sorry, Sir, but 'axle troubles' (due to wear—wear on the spindle, or on the box, or both) make it impossible."

You've often received a specification like that and been obliged to give that answer—haven't you?

The Sheldon "TON-DON"—an axle that will not wear, run hot or break—allows your meeting the requirements of the man who wants a wagon to last forever, **and we have told him so.**

The Sheldon "TON-DON" was originally made for buggies and carriages. Its success was so instantaneous and pronounced that we were deluged with requests for an axle embodying the same principle for use on Delivery, on Business and on Express Wagons.

Hence, the "TON-DON" CONCORD EXPRESS.
In EFFICIENCY—The HIGHEST.
In CONSTRUCTION—The SIMPLEST.
In SERVICE—The MOST SATISFACTORY.

The Spindle of the Sheldon Ton-Don Axle

Ordinary axles wear flat on the bottom of the spindle because the bottom side is the point of contact and where the wear of the spindle is concentrated. It takes a spindle of unusual hardness to resist this wear—greater hardness than any ordinary axle affords. The spindle of the "TON-DON" is hardened by a special process, producing a wearing surface of such hardness that a fine file makes no impression on it—yet the center remains soft or "natural."

The Phosphor-Bronze Lined Box

The peculiarity of this box lining is that while somewhat softer than the spindle, there is no perceptible wear after thousands of miles of running, but becomes harder and more wear-resisting with use.

Phosphor-Bronze (of a mixture which increases its toughness, smoothness under friction, and wear-resisting qualities) is a metal used for making the propellers of ocean steamships, bearings for locomotives, crank-shaft bearings for automobiles and other fine machinery. Imagine what a metal must be to meet such conditions, and you will grasp the advantages of applying such metal to axle purposes.

THESE AXLES CARRIED IN STOCK BY THE FOLLOWING JOBBERS AND CAN BE OBTAINED AT MANUFACTURERS' PRICES.

Baltimore, Md.....E. Scott Payne Co.	Providence, R. I....Congdon & Carpenter Co.
Boston, Mass.....E. P. Sanderson Co.	Rochester, N. Y.....Burke Iron & Steel Co.
Buffalo, N. Y.....H. D. Taylor Co.	San Francisco, Cal....Waterhouse & Lester Co.
Chicago, Ill.....E. D. Kimball Co.	Scranton, Pa.....Bittenbender & Co.
Cincinnati, O.....G. B. Schulte Sons Co.	Seattle, Wash.....Gray Bros. Co.
Indianapolis, Ind.....W. J. Holliday & Co.	Springfield, Mass.....Chas. C. Lewis & Co.
Los Angeles, Cal.....Percival Iron Co.	St. Louis, Mo.....Sligo Iron Store Co.
Milwaukee, Wis....Shadbolt & Boyd Iron Co.	Washington, D. C.....Louis Hartig
Pittsburgh, Pa.....McLean & McGinness	Wilmington, Del. ....Delaware Hardware Co.
Portland, Oregon.....J. E. Haseltine & Co.	Bridgeport, Conn.....Chapman & Bangs Co.
Ft. Wayne, Ind.....Mossman, Yarnelle & Co.	San Antonio, Texas . Heusinger Hardware Co.
New Orleans, La. .....Jos. Schwartz & Co.	

SHELDON

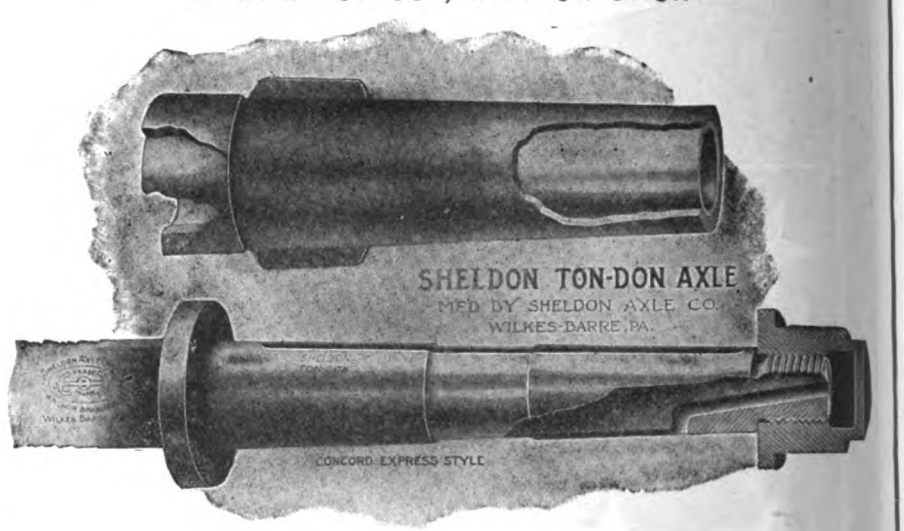
"TON-DON"

CONCORD EXPRESS STYLE

NOT A BALL OR ROLLER BEARING—BUT

ANTI-FRICTION—EVERLASTING—INTERCHANGEABLE

IT WILL NOT CUT, HEAT OR STICK



NOTICE THE PATENTED OILING DEVICE
HAS ALL THE ADVANTAGES OF FRICTION AND ANTI-FRICTION AXLES
WITHOUT THEIR DISADVANTAGES
"TON-DON" MEANS KNOWN QUALITY WITHOUT FANCY PRICE
MADE ALSO FOR BUGGIES AND SURRIES

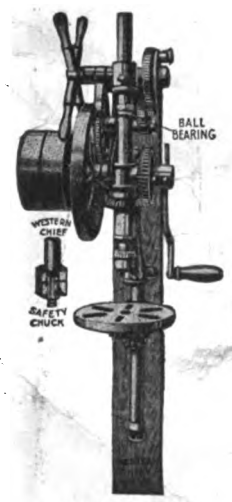
SHELDON AXLE & SPRING CO.,
WILKES-BARRE, PA.

LARGEST AXLE FACTORY IN THE WORLD.

The Better Your Equipment The Bigger Your Profits

Buy CANEDY-OTTO
AND INCREASE YOUR INCOME

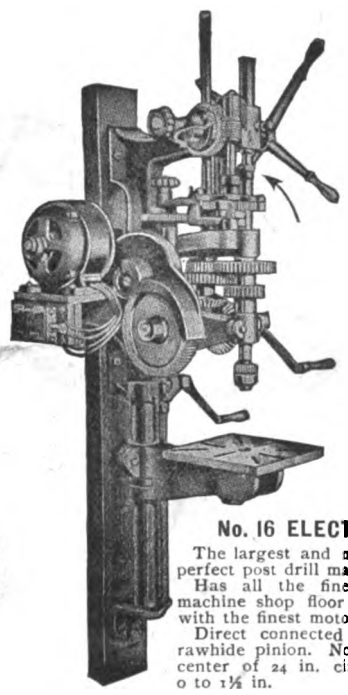
Once Tried, Always Used : There's a Reason—Quality



No. 19 DRILL

A low-priced combined hand and power self-feed drill.

Drills to center of 16½ in. circle.



No. 16 ELECTRIC DRILL

The largest and most mechanically perfect post drill manufactured.

Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.

Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1½ in.

OVER 200 DIFFERENT STYLES

SEND FOR CATALOGUE No. 12



No. 100 ROYAL FORGE

The most popular forge ever made.
Fan, 12 in. Hearth, 31½x45½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x50 in. Blower, 12 in.



Blower, 12"
Wt., 135 lbs
Height, 47"

ROYAL BLOWER

(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.

Fire pot is 8x9 in inside.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS



No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.

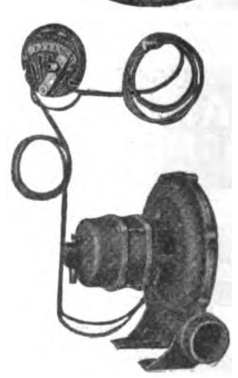
All machines are tested before leaving the factory, and guaranteed in every respect.

Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.



No. 1 1/2 SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



No. 8 ELECTRIC BLOWER

The best outfit money can buy.

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

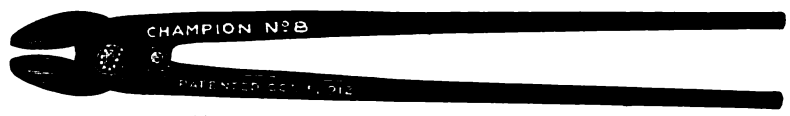


Digitized by Google

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge

Nothing to get out of order.



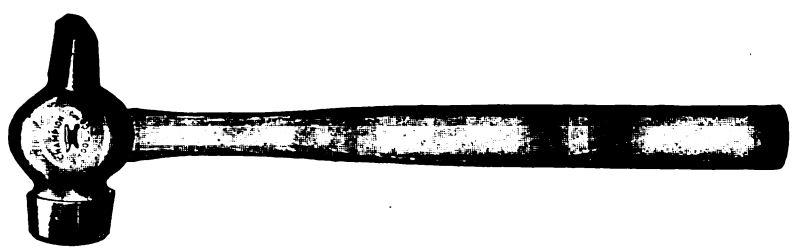
Will hold securely any size of shoe.

No. 8 16 Inches Long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

Weights, 1¾ to 3 lbs.

This Hammer is the most popular Sharpening Hammer on the market.

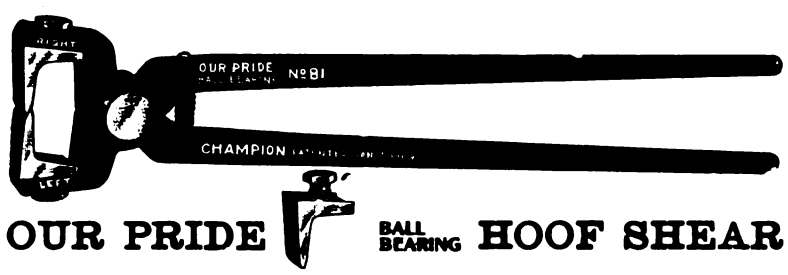


Corrugated Pein.

IT GIVES RESULTS.

No. 12 ELECTRIC SHARPENING HAMMER

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.



Blades easily replaced when worn out.

All parts interchangeable.

OUR PRIDE BALL BEARING HOOF SHEAR

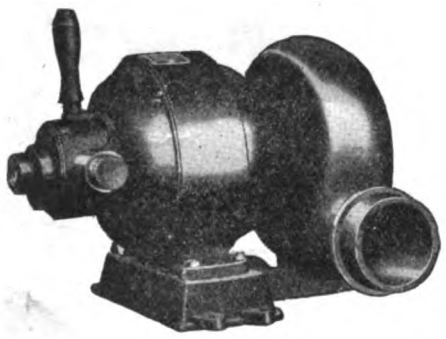
Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY, - Meadville, Pa., U. S. A.

THE LIVINGSTON CO., 131 E. 23rd Street, NEW YORK, Eastern Representatives

THE KAZOO

VARIABLE SPEED FORGE BLOWER



No outside Rheostat or resistance box. Any speed from 0–3600, by simply moving the handle. Current consumption in proportion to speed.

Mr. Blacksmith, why not deal direct with manufacturers and save middleman's profit?

Price now for direct sales to Blacksmiths, $30.00. F. O. B. Kalamazoo.

30 days' trial. You to return the blower if not satisfactory in every respect.

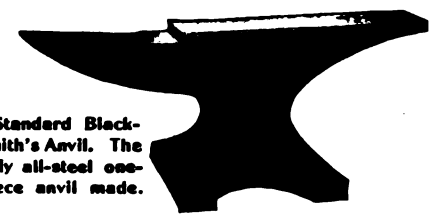
R. P. WARNER ELECTRIC CO., Kalamazoo, Mich.



Forged Steel Solid Box LegVise Series "X"

COLUMBIAN

VISES AND ANVILS



Standard Blacksmith's Anvil. The only all-steel one-piece anvil made.

If your jobber does not carry Columbian Tools, write us for catalog and prices.

THE COLUMBIAN HARDWARE CO.,

Manufacturers **CLEVELAND, OHIO**

916 Pages instead of 824 **1918—SEVENTH EDITION** **3362 Illustrations instead of 2000**

$3.82 prepaid **DYKE'S AUTO ENCYCLOPEDIA** **$3.82 prepaid**

Entirely re-written, hundreds of illustrations and many new subjects added. Practically a new book. A non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 50 **Instructions**—Simplified and Practical.

3362 **Illustrations**—the kind you understand at a glance.

2 **Supplements**, part printed in two colors, treating on the construction, operation, repairing and adjusting of the **FORD** and **PACKARD**—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.

778 illustrations and 279 pages on **Electric Ignition, Electric Starters and Generators**, etc.

51 pages and 79 illustrations on the **Delco** system alone.

60 pages and 254 illustrations on **Adjustments, Tests**, etc., of leading **Electric Systems.**

154 pages and 1189 illustrations on **Repairing.**

Oxy-Acetylene welding. **Axle, Differential** and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.

27 pages and 180 illustrations on **Tires and Tire Repairing.**

44 pages and 119 illustrations on **Carburetion.**

89 pages and 291 illustrations on **Engines and Parts.**

16 pages on **Digest of Troubles.**

6000 lines to the **Index.** This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. **Index** begins on colored paper, easy to refer to.

Dictionary is also included, which gives the meaning of motoring terms.

Inserts: There are five—printed in colors. **New** features you never before saw or heard of in one of the inserts.

Additions to the Seventh Edition:

TRUCKS, TRACTORS, MOTORCYCLES, AIRPLANES AND AIRPLANE ENGINES

HOW TO BECOME AN EXPERT AUTOMOBILE MECHANICIAN

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion subject so thoroughly, you can adjust any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

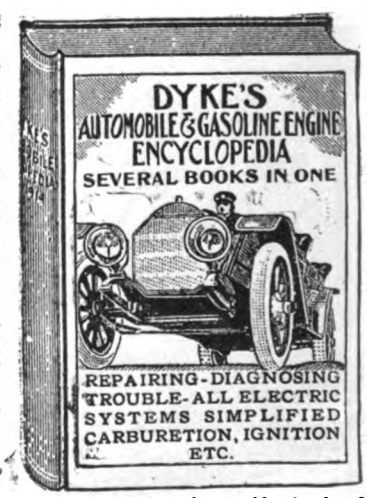
Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical Automobile book in America. Price $3.82, prepaid.

Address all orders to

THE BLACKSMITH & WHEELWRIGHT

73 MURRAY STREET NEW YORK



It's worth ten times its cost if only placed on the shelf and used as a reference.

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

BUFFALO BLACKSMITH TOOLS

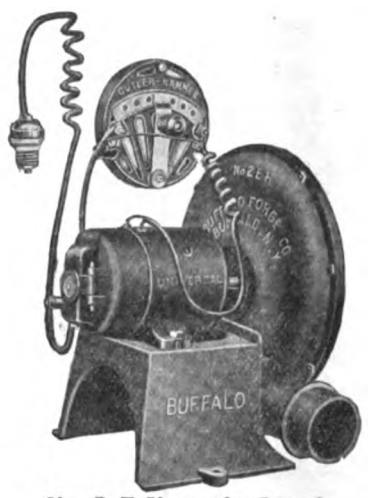


BUFFALO
Drill No. 124-CE
Capacity: 1½ in. holes, with ½ H.P. motor.

Write us about your requirements, we can satisfy them.



BUFFALO Forge No. 847-H
Size: 32x45 inches.

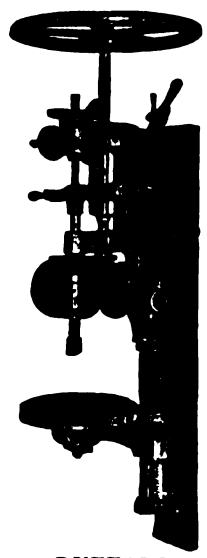


No. 2-E Variable Speed Electric Blower
The Blower with a Conscience

Arrangements can be made for trial of "Buffalo" Tools without expense for freight if returned.



BANNER Upsetter
Capacity up to 4x1 in.



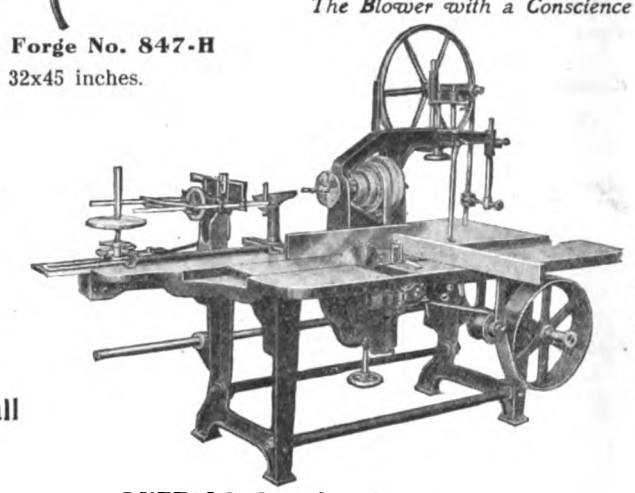
BUFFALO
Drill No. 221



No. 200 Hand Blower
Sizes: 12, 14 and 16 in.
Sold with a Ten-Year Guarantee.

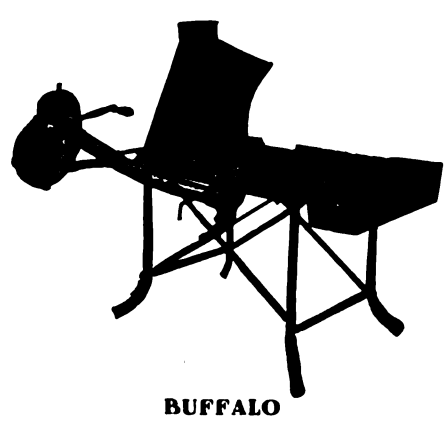
Machines for Every Service

Large or Small



BUFFALO Complete Woodworker
12 Machines in One. Economy of Space. Low Power Consumption.

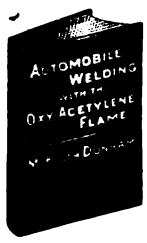
Catalog 179-6 **illustrates and describes our complete line of hand and power operated machines.**



BUFFALO
Forge No. 243-H
Size: 28x40 inches.

BUFFALO FORGE CO., BUFFALO, N. Y.

JUST PUBLISHED



AUTOMOBILE WELDING

WITH THE OXY-ACETYLENE FLAME

By M. KEITH DUNHAM

167 Pages **Price $1.00** **Fully Illustrated**

Sent Postpaid to Any Part of the World.

This is the only complete book on the "Why" and "How" of Welding.

EXPLAINS in a simple manner apparatus to be used, its care, and how to construct necessary shop equipment. Proceeds then to the actual welding of all automobile parts, in a manner understandable by everyone.

Gives principles never to be forgotten. Aluminum, cast iron, steel, copper, brass, bronze and malleable iron are fully treated, as well as a clear explanation of the proper manner to burn the carbon out of the combustion head.

AUTOMOBILE OWNERS, GARAGE AND SERVICE STATIONS, BLACKSMITHS AND MACHINE SHOPS, as well as industries using the oxy-acetylene flame, will find this book of the utmost value, since the perplexing problems arising when metal is heated to a melting point are fully explained and the proper methods to overcome them shown.

CONTENTS

CHAPTER I.—APPARATUS KNOWLEDGE.

Oxygen Supply—Care of Oxygen Cylinder—Acetylene Generator—Care of Generator—Regulators—Care of Regulators—Creeping Regulators—Gauges—Care of Gauges—Welding Torch—Care of Welding Torch—Effects of Heat—Hose and Goggles.

CHAPTER II.—SHOP EQUIPMENT AND INITIAL PROCEDURE.

Preheating Agencies—Welding Table—Location of Welding Outfit—Starting the Welding Outfit—Adjustment of Flame—Principle of Welding—General Welding Knowledge—Welding Rods and Fluxes—Choice of Tip—Expansion and Contraction.

CHAPTER III.—CAST IRON.

Simple Welding—How to Hold the Flame—Hard Cast Iron—Pin Holes and Blow Holes—Lug on Cylinder—Water Outlet—Cylinder Welding—Compression Head—Finishing and Testing—Scored Cylinders—Cylinder Parts—Fly Wheels—Pistons—Crank Cases—Babbitted Bearings—Valve Guides—Preserving Threads—Conclusion of Cast Iron.

CHAPTER IV.—ALUMINUM.

Use of Welding Knowledge—Puddle System—Flux System—Comparison of Systems—Welding Rod—Preparation of the Weld—Inlet Manifold—Arm of Crank Case—Welding the Arm Without Taking Out the Motor—Break in the Body of Case Welding Cold—Wrong Method of Setting Up—Lug or Boss Welding—Preheating the Case—Gas Preheating Flame—One Side or Both—Collapse of Weld—Broken Bearings—Direction of Welding—Shrinkage Cracks—Missing Parts—Finishing—Die Mould Castings—Body—Other Parts.

CHAPTER V.—STEEL

Welding Knowledge—What the Flame Does to Steel—The Welding Rod—Simple Welding—Position of Flame—Reinforcing the Weld—Frame Welding—Lengthening the Chassis—Tube Housings—Worn Parts—Gear Welding—Case Hardening—Light Metal Welding—Gasoline Tank—Welding Adjacent to Rivets—Shaft Welding—Construction of Parts.

CHAPTER VI.—MALLEABLE IRON COPPER, BRASS, BRONZE.

How to Detect Malleable Iron—Brazing Malleable Iron—Rear Housing—Reinforcing the Braze—Brazing Tube to Housing—Building Up Worn Parts—Copper—Brass and Bronze—Silver Soldering.

CHAPTER VII.—CARBON BURNING AND OTHER USES OF OXYGEN AND ACETYLENE.

Principle of Carbon Burning—Method of Operation—Lead Burning—Soldering—Case Hardening—Heating Uses.

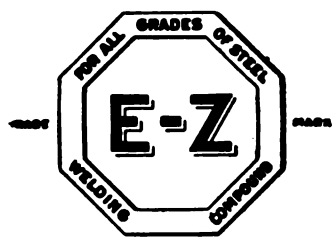
CHAPTER VIII.—HOW TO FIGURE COST OF WELDING.

Oxygen Consumption—Dissolved Acetylene Consumption—Torch Consumption Test—Acetylene Generator Consumption—Cost Card—Conclusion.

ADDRESS ALL ORDERS TO

M. T. RICHARDSON COMPANY, 71-73 Murray St., NEW YORK

"E-Z" WELDING COMPOUND



is the best **BECAUSE**

It works Equally good on all Kinds of steel.

It welds at **lower heat** than any other.

It **sticks** to metal at a **very low** heat.

It leaves **no scale.**

USE IT ONCE AND YOU WILL ALWAYS WANT IT

Crescent Welding Compound

MAKES SMOOTHER WELDS THAN ANY OTHER

It is fine for plow work or where parts are fastened together before welding, or for making split welds, finishing heats, or for welding under dies, etc., etc.

CRESCENT WELDING COMPOUND TRADE MARK

It insures smooth finish and perfect welds on Toe Calks.

"Money back" from any jobber if "E-Z" or Crescent does not give perfect results.

We will send samples free of charge.

MADE ONLY BY

Anti-Borax Compound Co.

FT. WAYNE, IND.

Digitized by Google

LINDE OXYGEN

From Coast to Coast 65 Producing Plants and Distributing Stations provide an unlimited supply of Linde Oxygen for users everywhere.

LINDE SERVICE means no investment except for oxygen actually received—no expensive overhead or upkeep charges.

Linde Oxygen may be obtained from any of the following Linde Plants and Distributing Stations where a large supply of charged 100 to 200 cu. ft. cylinders is kept on hand constantly to insure immediate shipments.

Mail or telephone your order to THE LINDE AIR PRODUCTS CO., at the nearest point. **Shipments will be made on day order is received.**

PRODUCING PLANTS AND WAREHOUSES

Alabama
*Birmingham
10th Ave. & 28th St.
California
*Emeryville, Oakland
*Los Angeles
1405 Mission Road
Colorado
Denver
1017 17th Street
Connecticut
Hartford
1095 Main Street
District of Columbia
Washington
9th & Maryland Ave., S. W.
Georgia
*Atlanta
Piyant St. & Southern R. R.
Savannah
Ogeechee Canal, So. of Bay St.
Illinois
*Chicago
3633 Wall Street
East St. Louis
6th & Walnut Ave.
Peoria
721-731 So. Washington St.
Indiana
*East Chicago
S. E. Cor. Kennedy & 145th St.
Fort Wayne
414 E. Columbia Street
*Indianapolis
2819 Roosevelt Ave.
Iowa
Davenport
118 Harrison Street
Des Moines
117 W. 5th Street
Kansas
Wichita
Rock Island Ave. & 2nd St.
Kentucky
Louisville
126 East Main St.
Louisiana
New Orleans
861 Fulton Street
Maryland
*Baltimore
25th & Montebello Ave.
Massachusetts
Cambridge
25 Waverly Street
Springfield
Napier Street
*Worcester
961 Southbridge St.
Michigan
*Detroit
St. Aubin Ave. & Newton St.
Grand Rapids
Pearl Street by the Bridge
Minnesota
Duluth
Seventh Ave., West
*Minneapolis
1809 Hennepin Ave.
Missouri
*North Kansas City
14th & Charlotte St.
*St. Louis
4218 Forest Park Blvd.
Nebraska
Omaha
1007 Jones Street
New Jersey
*Elizabeth
Linden Ave.
Newark
354 Plane Street
New York
Albany
Montgomery & Colonie Sts.
*Brooklyn
475 Driggs Ave.
*Buffalo
155-183 Chandler St.
New York City
217 W. 29th St.
New York City (Bronx)
3168 Park Ave.
*Utica
Walnut & Schuyler Sts.
Ohio
*Cleveland
802 East 72nd Street
*Cincinnati
Stanton & Mellish Aves.
Columbus
310 Dublin Ave.
Dayton
521 E. First Street.
Lima
338 East High Street
Toledo
441 South Erie Street
*Youngstown
601-621 Jones Street
Oklahoma
Oklahoma City
27 E. Grand Ave.
Tulsa
1 North Boulder St.
Oregon
Portland
15th & Hoyt Streets
Pennsylvania
Erie
1502 Sassafras Street
*Norristown
*No. Philadelphia
18th & Cambria Streets
Pittsburgh
16th & Pike Streets
*Trafford
Tennessee
Chattanooga
212-238 King Street
Memphis
203 Washington St.
Texas
*Dallas
Harwood & Coombs St.
Houston
Cedar & Baker Sts.
San Antonio
512 Dolorosa St.
Utah
Salt Lake City
112 West Second St., South
Virginia
Richmond
1709 E. Carey Street
Washington
Seattle
530 First Ave., South
Spokane
121-123 S. Madison St.
Wisconsin
Manitowoc
810 Quay Street
*Milwaukee
36th St. & National Ave.

(Star) * Designates Plants.

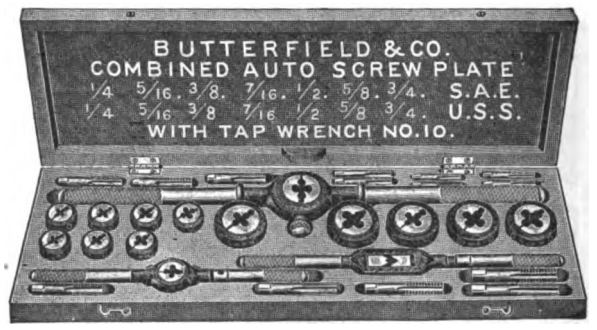
Other Plants and Distributing Stations are planned for other industrial centers throughout the country and will be established as fast as and wherever the local demand for oxygen warrants.

THE LINDE AIR PRODUCTS COMPANY

Largest Producers of Pure Oxygen in America

Forty-Second St. Building **NEW YORK**

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

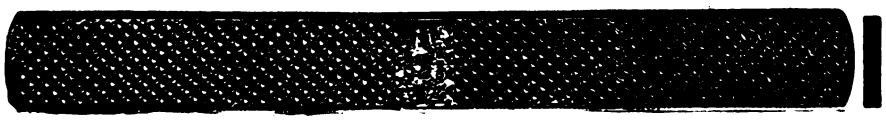
Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.

New York Store: 126 Chambers Street

The Horse Rasp of Quality

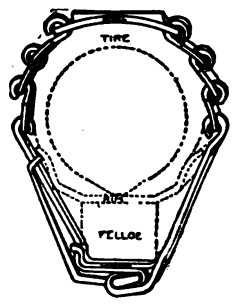


Ask your Dealer for the

IMPROVED HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, **"Slim," "Light," "Slim Light"** and **"Fine Cut."** Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial. New catalogue mailed free on application.

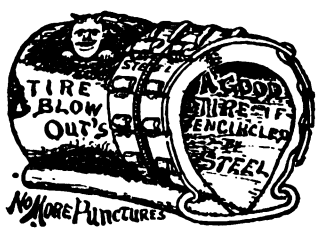
HELLER BROTHERS CO. *Established in 1836* **Newark, N. J.**



MUD CHAIN

Can be put on in a jiffy with one hand while standing on the run board. If you get in a mud hole, you will laugh out loud. Hook the ends together and pull the little lever and they are on tight. One or two will take you out of a hole. but it is better to use about 6 for continuous running. Good for blow-outs.

STEEL TIRE PROTECTORS



Tires can't wear out if covered with **Steel.** Try a few sections over any old blow-out. Tires are as flexible as ever. **Can't Skid.**

Special Inducements to Those in New Territory

KIMBALL TIRE CASE CO.
175 Broadway Council Bluffs, Iowa

Each Section 2 inches Wide, ¼ inch Thick
Write for Prices and Full Particulars



THICK, SWOLLEN GLANDS

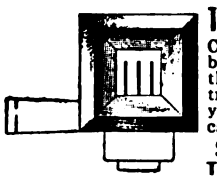
that make a horse Wheeze, Roar, have Thick Wind or Choke-down, can be reduced with



ABSORBINE

also other Bunches or Swellings. **No blister, no hair gone,** and horse kept at work. Economical—only a few drops required at an application. $2.50 per bottle delivered. Book 3 R free. ABSORBINE, JR., the antiseptic liniment for mankind, reduces Cysts, Wens, Painful, Swollen Veins and Ulcers. $1.25 a bottle at dealers or delivered. Book "Evidence" free.

W. F. YOUNG, P. D. F., 55 Temple St., Springfield, Mass.



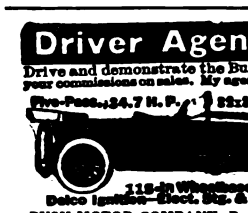
The S. S. TUYERE IRON

Can't Be Beat. Parts that burn out can be taken off the top. Give this iron a trial. It saves coal. Ask your dealer for them, if he can't supply you send to

S. SCHWARZKOPF,
Toledo, Ohio. Price $6.00

Driver Agents Wanted

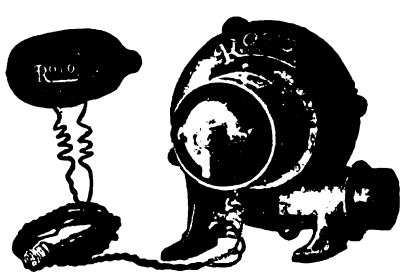
Drive and demonstrate the Bush Car. Pay for it out of your commissions on sales. My agents are making money. Shipments are prompt. Bush Cars guaranteed or money back. 1918 models ready. Write at once for my 48-page catalog and all particulars. Address J. S. Bush, Pres. Desk 9-TW



Five-Pass., 34.7 H. P., 112-in Wheelbase, 32x3½ tires, Delco Ignition—Elect. Stz. & Lts.

BUSH MOTOR COMPANY, Bush Temple, Chicago, Illinois

The ROTO ELECTRIC BLOWER $27.50 COMPLETE



N. B.—The above price is subject to change without notice.

THE U. S. GOVERNMENT

Wants everybody to avoid waste. Why should the middleman come between you and the maker? Our direct plan of selling

ELIMINATES THE MIDDLEMAN.

The latest model AIR COOLED ROTO BLOWER is better than any $35 or $40 Blower on the market. It will weld the largest size axles or the lightest calks. No forge is too large for this Roto. It will make your work easier—Save 50% of your time—Let you do twice the work in less time—Costs only 2 cents per day to run and is fully guaranteed.

The Navy Department Uses The Roto

It surely ought to be good enough for you if it can pass government inspection. You can't go wrong by sending us the coupon for a free trial. If it doesn't satisfy you in every respect send it back at our expense. That's fair isn't it?

CUT OUT THE COUPON
SEND IT TODAY DO IT NOW!

THE ROSEWATER ELECTRIC CO.
5516 KINSMAN ROAD CLEVELAND, OHIO

Send me by..... An AIR COOLED ROTO BLOWER with one year's guarantee, complete with cord, plug and Speed Regulator. I will return it to you at the end of 30 days, if it does not give the entire satisfaction, and if I keep it, I will pay you $27.50 at the end of 30 days.

Name..... Address.....

Current..... Voltage..... Cycles.....

Your Electric Light or Power Company Will Give You This Information

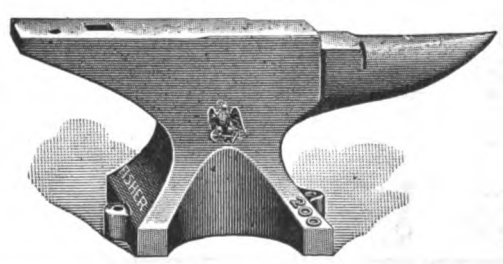
1843 **EAGLE ANVILS** 1918

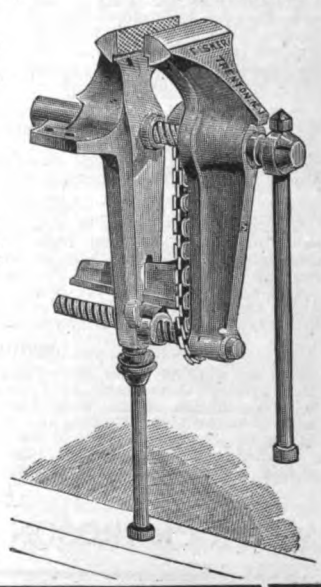
AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE
BLACKSMITH AND WHEELWRIGHT

Vol. LXXVII. No 5. NEW YORK, MAY, 1918. TERMS ONE DOLLAR A YEAR

Design, Construction, Operation and Repair of Motor Vehicles

Part IV—How Gasoline Engines Are Cooled, Various Types of Radiators, Carburetion, and Fuel Feed Systems in General Use

At the time of explosion the temperature in the cylinders reaches a point above that of molten iron and one may readily see that unless some means were provided for absorbing or carrying away this heat, after there were two or three explosions, the engine would be reduced to a mere mass of junk. Two cooling methods are used; in the first, air is circulated around the firing chamber, literally wiping away the heat. A typical example of this method is found in the Franklin car where the air is drawn over the top of the cylinders, down to the bottom, and out through the back by a radial fan arrangement in the flywheel. In the air-cooled type of engine, the cylinder walls are comparatively thin and fitted with flanges in order to distribute the heat and offer more surface for radiation. The Franklin automobile is practically the only air-cooled machine on the market today, the air-cooled engine being used mostly for motorcycles and aeroplanes.

Water Cooling Systems.

The second type of engine is cooled by a liquid, usually water, which is circulated around the cylinders and the valve chambers and across the head, in spaces which are termed water passages or water jackets. Two methods of circulation are used. The first is termed thermo-syphon, the second pump circulation.

The word thermo-syphon means heat-syphoning, and as the name indicates, a thermo-syphon system circulates the water through the action of heat. In this system the passages from the radiator to the cylinder block or engine are very large and as the water is heated by the engine action, it has a tendency to rise as well as expand, thereby passing into the top of the radiator. The cold water from the bottom of the radiator passes into the water jackets. This action continues as long as the engine is running or until the water reaches the boiling point. Then a peculiar thing happens.

Immediately the water begins to boil or reach the temperature of 212 degrees, steam is generated. Now steam will not absorb any appreciable amount of heat from the cylinders and as soon as steam begins to generate, thermo-syphon action ceases and the engine begins to overheat. It is therefore essential that the water in the system be kept below the boiling point.

Pump Circulation.

The second method of pump circulation adopted for cooling has as its main unit a rotary or centrifugal pump. This pump is driven by the engine and forces the water through the water jackets and into the top of the radiator, drawing the water from the lower part of the radiator. The pumps are divided into two classes, centrifugal and strictly rotary. The former differing from the latter in that the water enters at the center rather than from the outside as in the rotary. Both types of pumps are illustrated herewith. If the water were to be circulated through the water jackets from a tank, it would rise quickly in temperature to the boiling point, unless some means were adopted to cool the liquid. For this reason radiators are provided.

Now a radiator is nothing more or less than a device designed for exposing as much of the water surface to the air as possible. A radiator may be made up in a great number of forms and designs. In general, however, two types are used; tube and honeycomb.

The Tubular Radiator.

The tubular type of radiator consists of an upper and a lower tank connected by small vertical tubes. The water circulates through these tubes from the upper tank to the lower, and the passage of the air past these tubes reduces the temperature of the water in them.

To increase the radiating surface the same means is adopted as in the air-cooled car,

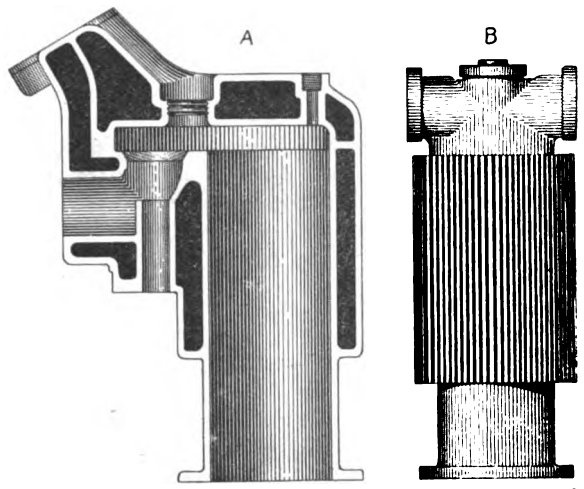


Fig. 10.—Two Types of Cylinders. A, Water Cooled, Water Jackets Are Shown in Black; B, Air Cooled Franklin Cylinder.

namely fins are provided the tubes. These fins are usually thin pieces of sheet iron or steel and are usually soldered to the tubes from the outside. The Ford radiator is a good example of the tubular type.

The honeycomb type, as the name indicates, resembles a piece of honeycomb. The holes in the comb permit the circulation of the air; while the walls are extremely thin and hollow and the water circulates through spaces in these thin walls. As a general rule thermo-syphon systems are fitted with tubular radiators; the honeycomb type of radiator being generally used on pump circulating systems.

Reason For Cooling.

We have spoken of the cooling system as being a means for carrying away the heat caused by the explosions and there are two things to consider. In the first place, the high temperature must be reduced to a great extent or the valves, pistons, and piston rings would soon lose their usefulness and the engine cease to work. If, however, the temperature is reduced too greatly, the engine will not work efficiently because of the fact that the gasoline or fuel is not vaporized properly, and so engineers for a long time made a study of cooling systems in order to determine the correct size of the radiator. Having once determined this, they then found that the varying temperature of air made quite a difference to the system.

For instance, a machine might be cooled very successfully while it was being run at from ten to fifteen miles an hour, but as soon as the car was stopped and the engine left running, the radiating area was not great enough, and so the engine commenced to overheat. A larger radiator would work efficiently while the car was standing still and the engine running, but as soon as the car reached a speed of from ten to fifteen miles an hour, the engine temperature would be reduced too greatly, and so the engineers set to work again, in an effort to solve a problem that was seemingly insolvable.

They finally evolved what is termed the thermo regulator, a device which is attached to the pump systems on such cars as the Cadillac, and acts as follows:—

Action of the Thermo-Regulator.

When the engine is first started and while the water is cold, all of the liquid is circulated through the pump and cylinders only. After the water has reached a temperature of from 160 to 180 degrees, the thermo-regulator causes a valve to open, and the water circulates not only through the pump and cylinders, but also through the radiator.

The carburetor has sometimes been termed the stomach of the engine, for the very reason that it is through this unit that the engine obtains its fuel or nourishment. Gasoline in itself is not explosive and must be combined with a certain amount of air. The best explosive mixture varies with the quality of the gasoline, and varies from four parts of air to one part of gasoline; to seventeen parts of air to one part of gasoline. Should more gasoline reach the cylinders the excess will be blown through the exhaust, while the engine is operating, and should the mixture consist of less than one part of gasoline to seventeen parts of air, it will be non-explosive.

Carburetor an Air Mixer.

For this reason then the carburetor must be so designed as to mix the gasoline and air properly. This might seem like a simple matter, and it would be, if gasoline vaporized at a stated temperature, but it does not. Gasoline is composed of many different liquids and vaporizes at temperatures from eighty to one hundred and fifty degrees. By this we mean that a certain part of the gasoline will vaporize at or around eighty degrees

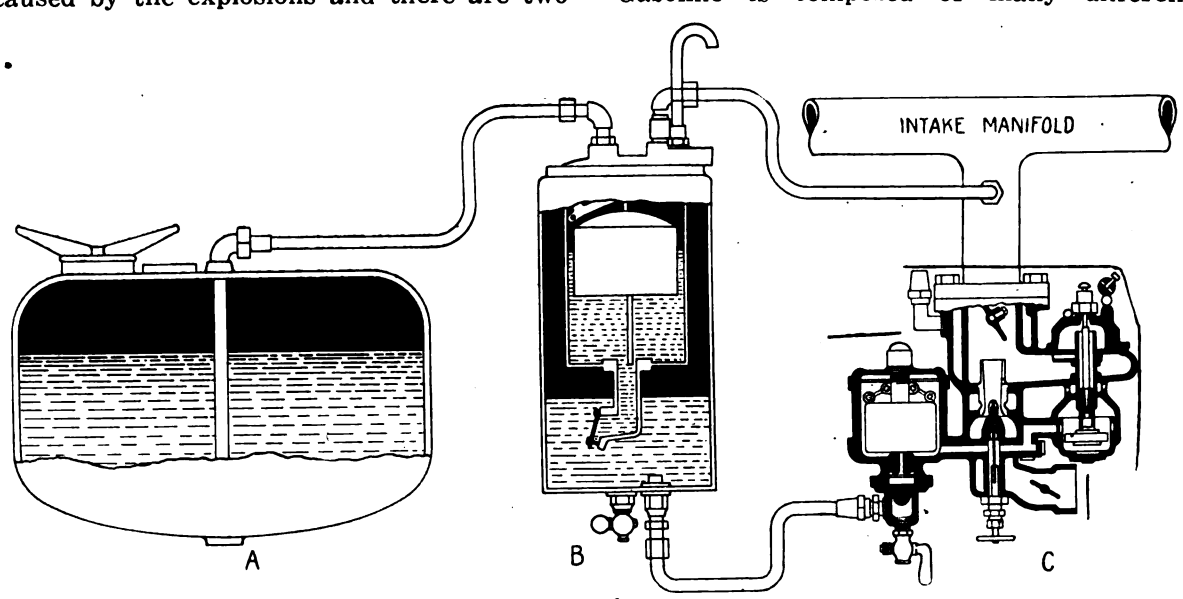


Fig. 11.—A Typical Fuel Feed System. A, Gasoline Tank; B, Vacuum Tank; C, Carburetor.

Digitized by Google

while the rest will remain liquid to around one hundred and twenty degrees, when a part of it will vaporize. Some of the rest will vaporize at a slightly higher temperature and leave more to vaporize at still higher temperatures. This is the reason why the cooling system is designed to keep the tem-

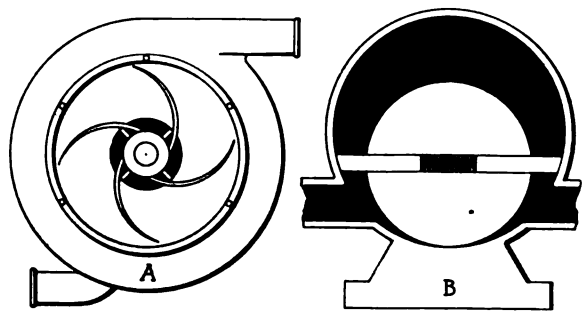


Fig. 12.—A, Centrifugal Water Pump; B, Rotary Type.

perature around one hundred and eighty degrees by means of the thermo-regulator.

Methods of Mixing.

The general method of mixing the gasoline with air is by spraying the gasoline into a passage through which air is being carried very rapidly into the engine. The rapidity of motion carries the fine spray along in the form of drops which eventually mix with the air forming the explosive mixture in the cylinders.

At low engine speeds the proportion of gasoline to air must be higher than the proportion of gasoline to air at high engine speeds, and so it is necessary that the carburetor be designed so as to admit more air with increase in engine speed.

Having these different requirements in mind, many types of carburetors have been designed,—some of them having single jets which operate at low engine speed, others having multiple jets and various air-controlling devices. The simplest form of carburetor is the single jet type with an inadjustable air intake. The typical carburetor of this kind is the Holly, installed on Ford cars.

In this type of carburetor the gasoline or needle valve is so arranged that the amount of gasoline passing through it may be regulated by the operator. This form of carburetor adjustment is made with the engine throttled down running at its lowest speed. Just enough gasoline is admitted to permit smooth engine action. With the increase in engine speed more air is drawn in, but since the gasoline is a liquid and the needle valve opening very small indeed, the amount of gasoline passing from the valve does not increase in proportion to the increase in the amount of air.

The second type of carburetor, which is represented by the Schebler, is fitted with an adjustable needle valve and an air intake through which the air passes at low engine speeds. At higher engine speeds a second air intake valve which is controlled by a coil spring is opened by the suction, admitting more air and securing leaner mixtures.

The third type of carburetor is fitted with an ordinary jet for low speed and a second jet through which the fuel passes for higher engine speeds. This second jet is usually designed to operate with the increase in the amount of air passing through the carburetor. In addition to these three main types are the multiple jet types, having three or more jets which furnish more fuel with the increase of engine speed.

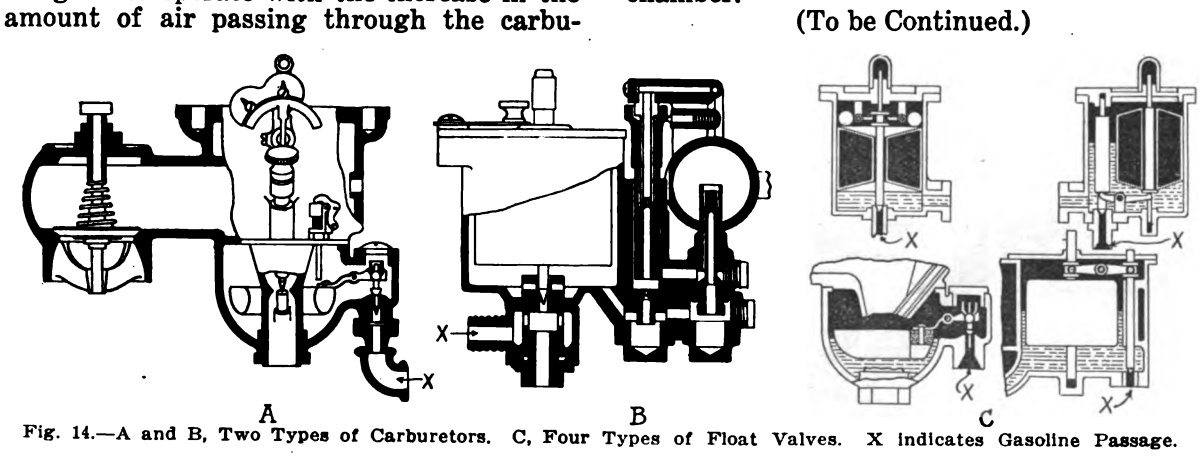


Fig. 14.—A and B, Two Types of Carburetors. C, Four Types of Float Valves. X Indicates Gasoline Passage.

The Float Chamber.

In every case the fuel is drawn from what is termed the float chamber. If the fuel were drawn directly from the tank, when the engine was stopped all of the gasoline from the tank would flow out through the needle valve. For this reason a second or so-called float valve is arranged on the carburetor in such a way that when the gasoline in the carburetor reaches a predetermined level, the valve closes and prevents any more gasoline from entering the chamber. This floating mechanism varies in different carburetors.

In some carburetors cork is used for the float material while in others hollow tin floats are used. As a general rule the float level, or the maximum height of the gasoline in a float chamber, is slightly below the needle valve opening.

Gasoline Systems.

Two general methods of gasoline supply systems are used, gravity and vacuum feed. In the first, the gasoline storage tank must be placed above the carburetor float chamber level, and the gasoline runs into the carburetor from the effect of gravitation. The second system which may be represented by the Stewart vacuum feed system, consists of a large outer tank connected with the carburetor and a small inner tank connected with the main gasoline supply tank. The inner tank is connected with the intake manifold just above the carburetor by a small tube. While the engine is being operated, a certain amount of suction is caused in the intake manifold and consequently in the inner tank.

This suction draws the fuel from the main tank to the small vacuum chamber.

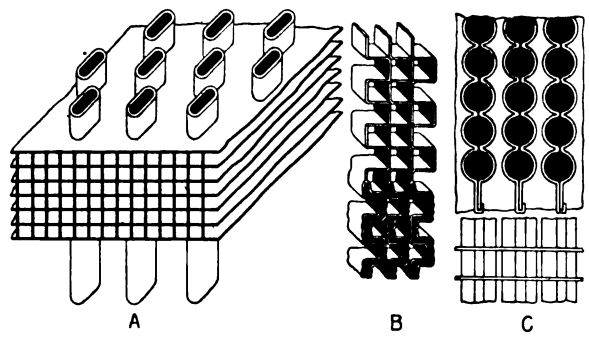


Fig. 13—Illustrating Types of Radiator Construction. A, Oval Tubular; B, Honeycomb; C, Round Tubular.

When the fuel has reached a certain height in this vacuum chamber, air is admitted to this chamber and the suction immediately ceases. As soon as this happens a valve at the lower end of the inner chamber drops open, permitting all of the gasoline to escape into the outer chamber. As soon as it has escaped the inner chamber valve closes and the center chamber fills again as before. From the outer chamber the gasoline runs by gravity into the carburetor.

For the purpose of starting, should all of the gasoline be exhausted from the tank, an air pump is arranged so as to cause a vacuum in the inner chamber, when it is operated.

There is a third system which is not so universally used as the two spoken of above, called the force feed. In this system a small tube connects the exhaust manifold with the fuel tank. The pressure caused by the explosions in the cylinders forces the gasoline from the tank into the carburetor float chamber.

(To be Continued.)

If you can't fight; buy a Liberty Bond—If you can't buy a Liberty Bond; buy a War Savings Stamp—If you can't buy a War Savings Stamp; buy a Thrift Stamp—If you can't buy a Thrift Stamp; be Patriotic and Boost America—If you can't be Patriotic—KEEP QUIET, and if you can't keep quiet, go to jail.

THE FIRST UPHOLSTERER.

A Short History of Leather Fabrics.

More than three thousand years ago, an Egyptian furniture maker conceived and executed a new idea. He made a folding chair and over its wooden frame he stretched for a seat the hide of a bullock. Thus, in the shadow of the Pyramids, was the art of leather upholstery born.

This founder of a new art soon had many followers, one of whom was gifted with more than average discernment and common sense. He saw that the full thickness of the hide made it stiff, unwieldy and uncomfortable for upholstery. He discovered that the grain, beauty, strength, resiliency and durability of leather lay entirely in the outer portion of the hide. Accordingly, he skived off the fleshy, pulpy inner portion and cast it on the refuse heap.

His fellow-craftsmen quickly adopted the new idea and prepared their leather for covering chairs and couches in the same way. In ancient Greece and Rome, in medieval Granada, Spain, France and England and down through all the ages until almost the dawn of the twentieth century, the practice of the Egyptians was closely followed. The upper half of the hide only was utilized. The lower half was discarded as waste.

Toward the latter end of the nineteenth century, a day arrived when it was no longer possible to continue this wasteful method. For a quarter of a century the world's cattle supply had been gradually diminishing. Growing population, the development of old industries and the founding of new ones and greater activity in the arts and trades all exacted their toll on leather until consumption had overtaken the supply. Then came the automobile with its demand for 75 to 100 square feet of leather for the upholstery of each car.

The leather manufacturer met this crisis by turning to his scrap heap. A marvelously ingenious machine was perfected which split a hide into as many sections as desired. First an outer thickness of good grain leather was removed. Then the under side of the hide, the fleshy, pulpous, loosely fibred part, was split into three sections, each one weaker than the last. These splits were treated to a coat of dressing to give them the required finish and then embossed with a grain. The resultant material looked like good grain leather but had a texture and tensile strength far inferior. These splits were foisted on the public as "genuine leather.' Once in use, they cracked, lost their attractiveness and gave unsatisfactory service in comparison with the price charged.

After a most trying experience with split leathers, car makers began to look for a dependable substitute for leather and science responded with a product made of woven cloth, coated with Pyroxylin and embossed in exact imitation of grain leather.

This new product had the appearance and soft, glovey feel characteristic of the best leather; it possessed much greater tensile strength and durability than split leather and retained its attractive appearance indefinitely. It had qualities that leather, because of its porosity, cannot have. It was absolutely sanitary, water, grease, dirt, stain and vermin proof. Water and vermin could not penetrate nor dirt and grease be absorbed by its Pyroxylin coating—soap and water cleanse it thoroughly.

Pyroxylin coated fabrics soon superseded leather splits for upholstery on most of the popular-priced cars. Their sanitary qualities also popularized them for upholstery uses in homes, theaters, hotels and other public buildings. They invaded many fields in which leather formerly enjoyed a monopoly and gave such satisfactory service that they can never be displaced.

Today, the United States Government specifies leather substitutes for marine upholstery, where they have proven more serviceable than leather because they do not mould nor mildew. The government also uses them for leggings, trucks, ambulances, passenger cars and ships. Leather substitutes are particularly adapted for use in

Digitized by Google

bookbinding, making suitcases and traveling bags. They are also used in the manufacture of hats and caps, in short, almost every place that leather was formerly employed.

Leather substitutes of the Pyroxylin type can be made in any color, any finish, or grain. They are made in varying widths, weights and qualities and have proven a blessing in these days of the scarcity and high cost of leather.

Continues Husband's Business.

Instances of where women have taken up the business of their husbands are not uncommon in many professions but it is not



This Woman Continues Business Left by Her Husband.

the rule in the blacksmith line. An accompanying illustration shows how a plucky woman continued the smithy after losing her husband. The picture was taken "Somewnere in America," and it is evident from the illustration that the real hard work is being performed by the helper at the anvil.

LIVE STOCK BY MOTOR TRUCK.

The highways leading to Cincinnati came into very wide use for motor-truck hauling of live stock to the stockyards of that city last year, says the Manufacturer's Record. This method of transportation is comparatively new and grew out of railway congestion, which compelled farmers to find other ways of reaching market. During the year there were hauled over highways from a radius of 30 miles 77,244 hogs, 23,618 sheep and 28,545 calves, with 27,721 head of cattle, about 40 per cent of which were driven in on the hoof and the rest hauled in motor trucks. The driving of cattle to market has not been found profitable, as they can not be driven any distance in cold weather, while in hot weather the trip causes overheating, deterioration of flesh, and a slow market with the packers. Cattle are being brought in in specially constructed auto trucks, and hogs and sheep are hauled in double-decked motor trucks. With good roads around Cincinnati it is reported that such transportation promises to be permanent, the stock being hauled more cheaply than by railway, arriving in better condition and in a shorter time.

THE GRADING OF EGGS.

"The grading of eggs is largely a matter for the expert," said F. G. Urner, editor of New York Produce Review, speaking before a gathering of farmers in the State College of Agriculture, at Cornell. The reason why egg grading can hardly be an exact science is that practically all the eggs arriving in the great egg markets are irregular goods; often in the same case will be found all possible grades, some absolutely worthless. If the grading could be done before eggs arrived at market by some fixed standard, distribution would become much more fair and economical. Mr. Urner suggests a differential of egg qualities, such as "Fancy," No. 1, "No. 2, Common," etc.

While Your Money Fights the Kaiser, Make it Work at Home.

The Scientific Heat Treatment And Hardening of Steel

Part I—How a Blacksmith Can Harden Steel With as Satisfactory Results as Can Be Obtained in a Large Shop

BY J. F. SPRINGER

There are probably a great many workers in steel who do not know that the hardening should not be done with the same heat as the forging. For example, suppose I have the job of forging and hardening a rock-drill bit. I heat up the end to a pretty good high heat and forge the cutting edges to their exact shape. By this time the steel has cooled down to about a red heat. As I have also to harden the edges, I now dip them carefully into water. Why is this wrong? Why shouldn't I do the job this way? Of what use would it be to let the bit cool down and then heat it up to the red?

Take another case. I weld together the two ends of a link to make a chain, and am positive I have gotten a fine weld. I then call the job done. Why should I heat up this link again after it has cooled off?

Consider still another case. I have a piece of tool steel which I want to put on the turning lathe and cut to a particular shape. I put it on the lathe and try to start in with my cutting. But it cuts unevenly. There are spots that are very hard and the steel as a whole is harder than I expected. I say to myself that I will anneal the whole piece. And so I heat it to an orange color, pack it in dry sand over night, and find on testing it again on the lathe that the steel in general is softer and that there are no hard spots. I go ahead now and complete my work on the lathe and finish the job finally by polishing the surface with an emery cloth. What is wrong about what I have done?

I think it would be safe to say that there are very many steel workers who would find nothing wrong in any one of the three examples of practice that I have cited. And yet, every one of them is wrong. Probably quite a big percentage of those who know there is something wrong and what the wrong thing is do not know why it is wrong.

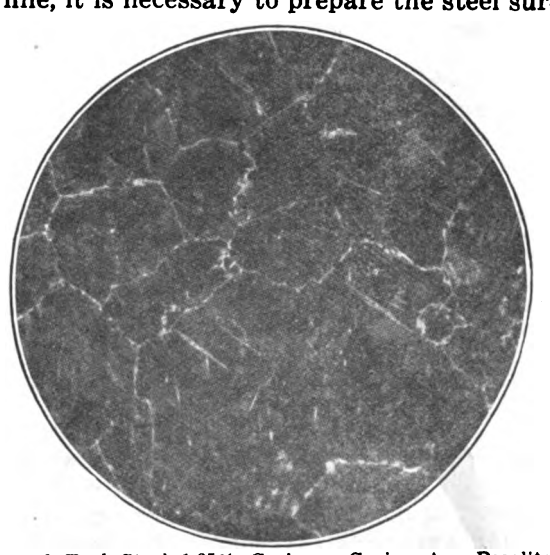
In this present article I want to give some information about steel that will help us to understand the foregoing questions and others in addition.

Steel Is a Mixture.

It has been known for a very long time that carbon and iron were joined together in some way to make steel. But people did not know just how they were joined. Gray cast iron is made of carbon and iron, too; but it is quite different from steel. During recent years a good deal of information on this subject has been gotten with the aid of the microscope. We have had microscopes a good long while, but no one seemed to bother much about applying them to steel or else they got side-tracked before they found out much.

Examining Steel.

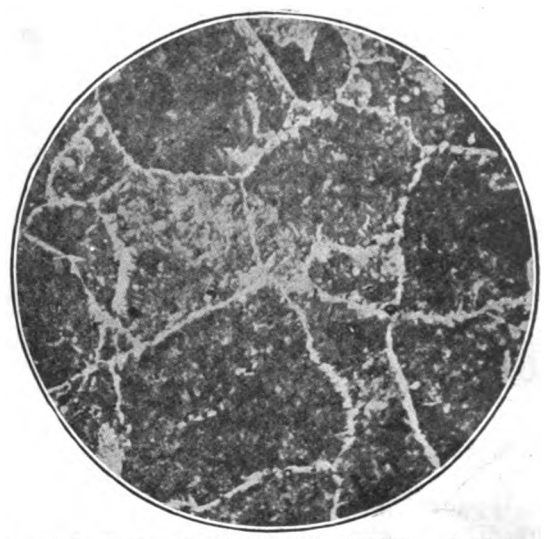
In order to accomplish anything worth while, it is necessary to prepare the steel surface so that the light will act differently according to any differences in the surface. For example, the surface may be smoothed off with a tool. Then by the use of acid and a cloth containing some fine abrasive, the surface can be rubbed carefully. If some spots are much harder than others they will resist the acid and the rubbing more than those others. The result after a time will be that there will be hard ridges and soft valleys.



Forged Tool Steel 1.25% Carbon. Grains Are Pearlite; the Veins Are Cementite.

When now we use the microscope, the conditions may be such that we can distinguish the ridges from the depressions. Or, it may be that instead of rubbing with an abrasive, we may treat the steel surface with a chemical in such a way that the soft and hard patches will look different from each other under the microscope. Skilled users of the microscope have been studying steel in much this way during recent years. They have found out that all the carbon in the steel is clustered together in little patches and little strips, and that the remainder of the metal is nothing else than pure iron. Where the carbon is that part is hard; where the pure iron is the portion is soft.

Sometimes the streaks of substance containing the carbon are exceedingly thin. The sheet of paper on which this is printed is perhaps .003 inch thick. The streaks are sometimes so thin that it would take 100 of them



Untreated Bessemer Steel .52% Carbon. Grains are Pearlite; the Veins Are Iron.

to give the thickness of this paper. So, you see, we are dealing with things that may be very small indeed.

Made Up in Layers.

There will be sometimes a layer, or a streak of pure iron, then one containing some carbon, then another of pure iron, and so on. If the steel happens to be a piece of unhardened tool steel containing about 0.9 per cent. of carbon, then the whole of the metal will be made up of grains or crystals each of which consists of layer upon layer or flake upon flake of the two things. The two things are iron and the substance containing carbon. This latter substance has two scientific names—carbide of iron and cementite. Let us make sure we understand.

If the unhardened tool steel contains just about 0.9 per cent. of carbon, then it is made up of grains which in turn are made up of flakes of cementite and pure iron. The grains are pretty small, but not as small as the streaks, or flakes, of the iron and cementite. This information does not come down from old times. Not at all. It was first discovered just a moderate number of years ago. Prof. Howe, a distinguished American metallurgist, gave the name of pearlite to the grains and particles of steel that are made up in the way described.

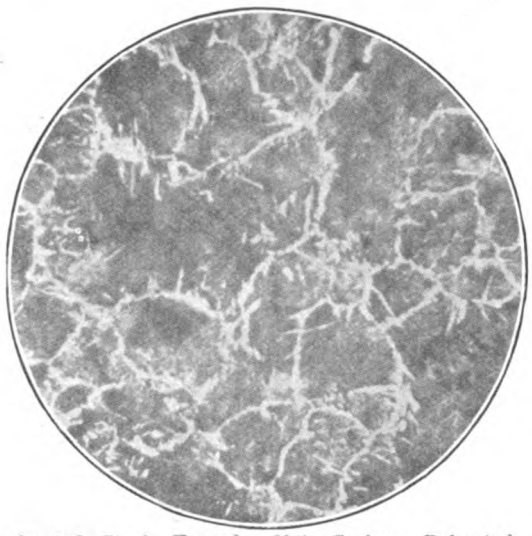
We are now ready to understand something more about steel. If any of my readers are not yet clear about the grains of pearlite and the streaks of cementite and pure iron, I urge them to go back and read again

Digitized by Google

the preceding account. Do this before taking the next step.

Composition of Steel.

Ordinary steel—that is, the steel we have been familiar with all our lives—consists of carbon and iron. Other things really occur, but they are to be regarded as impurities. Now it is surprising how small the amount of carbon really is. If we go by weight, 100 pounds of tool steel will contain only a pound or perhaps a pound and a half of carbon. Except for the impurities, all the rest is just iron. And yet this 1 or 1½ pounds of carbon have a big effect. Their presence makes it possible to harden the metal and give it a real cutting edge. Without this trifle of carbon, the metal would just be iron and we should be unable to make out of it a knife blade or an axe.



Overheated Steel, Forged. .60% Carbon, Reheated to 1800 Degrees Fahrenheit and Cooled in Air.

Many Varieties.

There are many varieties of common steel. Some have almost no carbon; others, more. It is usual to state how much in percentages. The percentage will always be two per cent. or less. We get into fractions of per cent. Thus a very soft steel may have only 0.20 per cent. of carbon. This means only one-fifth of 1 per cent. In a hundred-pound lump, the carbon would weigh a trifle over 3 ounces. Take a piece of machinery steel. This will contain, perhaps, 0.50 per cent. of carbon. This steel is strong and moderately hard. And yet, it is the 8 ounces of carbon (one-half of 1 per cent.) that gives it this additional strength and hardness.

It is a very good thing for a blacksmith or any worker in steel to get familiar with steel on the percentage basis. The manufacturer should be able to state just how much carbon is in a given piece. If the smith accustoms himself to know the carbon percentages of the steels with which he works, he will after a while get familiar with characteristics corresponding to various percentages. In general, the more carbon, the harder the steel will be in the unhardened condition and the stronger it will be also.

Remember that steel containing just about 0.9 per cent. of carbon consists entirely of pearlite grains. If there is less carbon, then in between the grains of pearlite will be films of pure iron. In other words, there will be a honeycomb of pure iron filled with grains of pearlite. But if the steel contains more carbon than 0.9 per cent., then there will still be a film between the grains, only now the film will be cementite—a honeycomb of cementite and a filling of pearlite grains.

Under the Microscope.

It will perhaps be understood that, if a piece of steel is cut across, the surface polished and treated, and a microscope applied, we shall see a surface cut up into irregular shapes. What we see will resemble a map. The irregular shapes will correspond to the countries on the map. Now these irregular shapes are grains. Naturally, they have been cut through and we see really grain sections. Further, between the grains will perhaps be thin or thick bands or lines. These will be pure iron or cementite, according as the steel has less or more carbon, respectively, than 0.9 per cent. For example, suppose we have a piece of steel containing 0.65 or 0.70 per cent. of carbon. The irregular shapes are grains of pearlite; the dividing lines between grains are pure iron.

We may illustrate this matter by means of concrete. If we cut it across with a saw, we shall have irregular shapes. These are sections of the pieces of rock in the concrete. In between, we have cement mortar. We can understand that the less cement mortar, the thinner the intervening lines or bands would be. Suppose it were possible to cut the cement mortar down to nothing at all. Then the rock pieces would fit each other exactly. This would correspond to the case where the steel consists of nothing but pearlite grains. Sometimes—and this is perhaps usual with concrete—the irregular shapes are no wider than the bands which separate them. This means a good deal of cement mortar in the concrete.

So, likewise, with steel. If, for example, the carbon percentage is a good deal less than 0.9, this means that the bands of pure iron between the grains of pearlite will be broad.

If the microscope is of very high power, then a printed reproduction of pearlite grains will often, or usually, show them as striped. Each stripe represents either cementite or pure iron.

Changes Under Treatment.

When steel is heated, it undergoes changes. We are all familiar with the variations in color—how the steel gets a dull red, then passes to a dark cherry, and so on. But there are other changes going on inside. When we heat the steel from 1,275 degrees, Fahrenheit (half way between dark cherry and full cherry) on up, the grains grow as the heat increases. This is a very notable thing. The grains do not begin to grow until we get to the medium cherry mentioned. Until then, they stay their proper size. But afterwards they grow and grow.

The blacksmith may say, "Well, what difference does that make?" My answer is that it makes a good deal of difference. The overgrown grains keep their big size when the steel cools off. And steel consisting of overgrown grains is damaged steel. It does not have its proper strength. Further it seems that the bigger the grains get, the weaker the steel becomes.

If the blacksmith stops now and thinks over what has been said, he will perhaps grant that the question of big and little grains is really very important, because the condition of the steel is affected by it. The grains can, fortunately, be made smaller again. But they do not get smaller by simply allowing the metal to cool off, nor by dipping it into water or oil.

Using the Magnet.

Let us go back to our steel and our heating. Suppose the piece of steel is a good tool steel containing, say, 1.25 per cent. of carbon. We begin to heat it. When the temperature gets up to the point where a little color begins to show—that is, to a dark red—we take a horseshoe magnet and apply it to the heated metal. We find that it clings. We go on heating the steel and trying the magnet from time to time. When we get to medium cherry and perhaps a trifle further on suddenly the magnet refuses to take hold. It loses its grip, as it were. If we go on heating up the steel, we will never again get to a point where the magnet will recover its grip. We may, if we like, try this experiment with other steels. If we confine ourselves to tool steels, we shall find that the magnet loses its grip at medium cherry for one and all of them.

Magnet Indicates Temperature.

This is quite important, because it gives the blacksmith a means of telling when he gets to the point where the grains start to grow. The magnet will warn him. Some smith may say, "Why can't I tell by the color? If the grains begin to grow with medium cherry, why won't the color do?" The color will do, and do first rate, provided we can always tell the color. But some days are cloudy and dark, others are bright and clear. Unless we go to some trouble and are rather expert besides, we will not be able to tell every day precisely when we get to medium cherry. Why not use the magnet instead? It works just about the same on one day as on another.

I come now to another important matter. It concerns the question of getting overgrown grains back to their proper size. Can it be done? Usually it can be done and done pretty perfectly too. There are two methods. Both are good; but one is uncertain, because it is difficult to tell how far it reaches. It is well known that forging improves the quality of steel. That is, the overgrown grains may be broken up by means of the blacksmith's hammer. As he hammers, the grains or crystals break up into smaller ones and all unite together.

A similar thing takes place, no doubt, in the rolling mill. Working the steel tends to break up the grains and restore the quality that had been damaged by the high heat. A fine illustration of the good effects of forging is often, no doubt, afforded when a smith welds on the anvil two ends of steel bars. Where the weld is located—that is to say, at the point where the smith has been hammering—the strength will probably be greater than at a short distance on either side. At these latter points, the heat has been high as well as in the weld. The steel has accordingly suffered in quality. As the hammering omitted these points, they remain in their damaged condition.

Forging Not Always Satisfactory.

If the thickness of the steel that is forged or otherwise worked for the purpose of restoring the grains to their proper size is considerable, then we can not expect the hammer blows to penetrate to the center. Further, if the shape is difficult, that may prevent a thorough forging. Under such conditions as the foregoing, we can not expect the steel to be restored altogether. This is not because forging is not a proper remedy wherever it can be used; but there are limits to its use. And it is well to bear them in mind.

There is a second method. This is really an annealing process. We begin by heating up the steel whose grains are overgrown, commencing at a point below the point where grains begin to grow. This point, we have learned, is 1,275 degrees, Fahrenheit (medium cherry). If we have been forging the steel or have heated it for any purpose, we must first let it cool below the point noted. It doesn't matter whether we let it cool a little, or a good deal below this point. If we try letting it cool only a little, however, we may make a mistake in the following way. Suppose we say to ourselves: Well, I've got to let this steel cool down below medium cherry, but I don't have to let it cool much below; I believe I'll stop at dark red. This idea would be all right, if we could look inside a piece of steel and see how things were.

(To be Continued.)

Teaching Horseshoeing.

Indicative of the tendency to give the horse that attention he deserves is the policy being pursued by the United States Government with regard to the animals used in the army. A service school has been opened at Fort Riley, Kansas, where the mounted officers are being given thorough instruction in the care of their mounts. The accompanying illustration shows one of the several classes of officers receiving instructions in horseshoeing, a part of the course. The men take a similar course which is compulsory.



Group of Army Officers Receiving Instruction in Horseshoeing at Fort Riley, Kansas.

Digitized by Google

THE TREE OF KNOWLEDGE.

The picture shown herewith represents the tree of knowledge and the people below it magazine and periodical subscribers. The greater part of the educational work done in



the United States among those people who have left institutions of learning is by the magazines and periodicals. The daily newspaper, it is true, helps to a certain extent, but its field is limited. The magazine is purely educational. It goes to the rich and poor alike, from Washington to Florida, and from Maine to California. At the present time magazines are distributed throughout the country. The postal rates have much to do with the low subscription prices. Few subscribers realize that their subscription hardly pays for the postage required to forward the magazine to them.

On July 1st of this year the new postage law goes into effect. This law provides for a zone classification of postage which means that magazines printed in New York and sold in New York can be distributed at a certain price, those going outside the first zone will cost considerably more and magazines sent from New York to Washington state will be taxed from 800 to 900 per cent more in postage than they are at the present time.

Upon the face of it, this seems like a tax on education. The fruit of knowledge may be within the easy reach of those living at the big publication centers, but those people who live away from the cities wherein the magazines are published will be obliged to reach higher for their fruits of knowledge, and in many cases the rates will be so prohibitive that it will not pay to forward the magazines to them, unless they pay considerably more in the subscription price.

We are sure that this magazine is educational. We know that every one of our subscribers finds many useful suggestions and hints in every issue and we want to keep all of our subscribers. We do not want to increase our subscription rates because we know that many of our subscribers cannot afford to pay any more, even if they really need the magazine. We want all of our readers to look at this picture and think it over.

Do you want to be obliged to reach higher for your knowledge than your brothers in the East? If you don't, sit down and write a letter to your congressman. Tell him just how you feel about this new postal law and just why you think it should be repealed. Do it now while you are thinking about it. for your letter will help the other subscribers as well as yourself. We don't object to paying taxes; this is not the reason for the picture. We object to YOUR paying a tax upon your knowledge.

RURAL EXPRESS ROUTES.

The National Automobile Chamber of Commerce, through the National Motor Truck Committee, have started a campaign to further the use of motor trucks in the country and to establish rural motor express routes. An investigation of the present truck lines has shown that they are of great utility to farmers, and both manufacturers and dealers have been asked to co-operate.

TECHNICAL SCHOOL DISCONTINUED.

Lack of Capital Prevents the Continuance of a Worthy Enterprise Which Has Been In New York for Many Years.

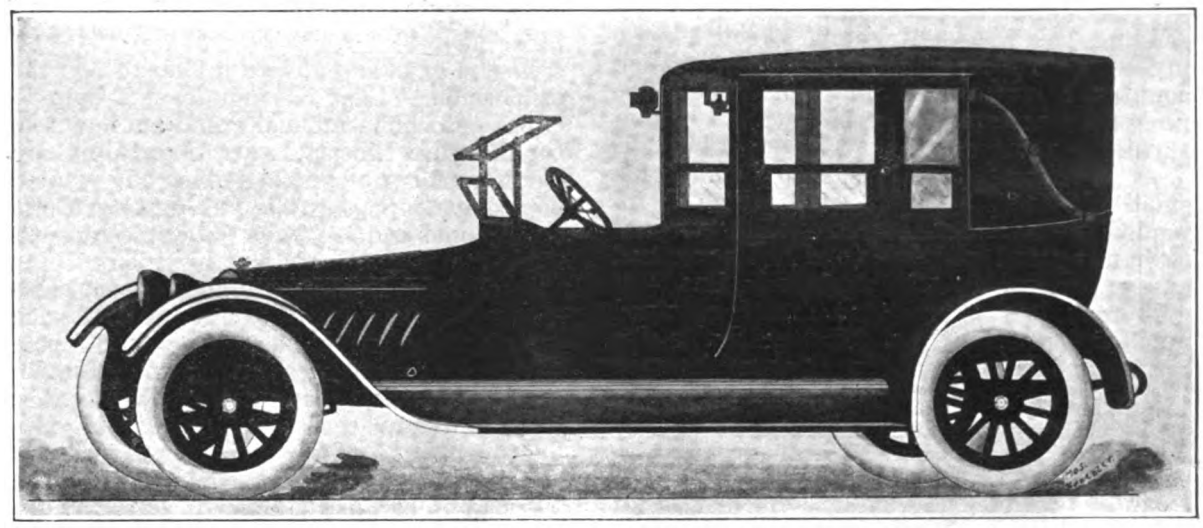
The Technical School, which for the past 38 years has been located in New York, has unfortunately closed. This school has been of infinite value to carriage and automobile body builders and its loss will be felt throughout the entire industry.

In the year 1880 a number of the carriage builders in the country, feeling the lack of trained men, got together and founded the Technical School for the purpose of training young men in carriage body design.

From the beginning the school was thorough in every particular. The young men were given a course in mechanical drawing and such mechanics as would be necessary in designing carriages. Carriage, coach and body building was taken up in all its branches and many of the graduates left the school, fully competent as carriage designers, to take big positions in various shops throughout the country.

As time went on, and the automobile began to enter the field, the work of the school was broadened and the students were able to get instruction in automobile body design.

Gradually the carriage and vehicle manufacturers began to turn toward automobile



One of the Automobile Bodies Designed by a Student of The Technical School.

body and automobile manufacture and the need for carriage designers lessened. With the increase in automobile manufacturing plants the students found employment in this branch of the trade and to-day we may find throughout the country graduates from the Technical School, employed in big positions.

About two years ago, the carriage industry felt that the Technical School should be carried on by the automobile interests, and the school would have been discontinued at that time had not the New York Automobile Chamber of Commerce, through the tireless efforts of the president of the school, Mr. Daniel T. Wilson, and the principal, Mr. A. F. Johnson, been influenced to see the value of the school.

The Chamber of Commerce, together with a few of the automobile and automobile body building interests, came forward with the necessary funds and the school was continued for two more years.

At the present time, however, the automobile and kindred interests, due to war conditions, do not seem to see the advisability of furnishing further capital and so the school is forced to close its doors.

The school at the present time occupies two large rooms at 18 West 44th street, which are furnished by the Mechanics Institute. In addition to the rooms, the Institute furnishes both light and heat, so that the automobile interests would need to furnish but little in order to carry on the school until after the war, when many men will be necessary to replace those now at the front.

The Correspondence Department will be continued as before, and all inquiries should be addressed to Andrew F. Johnson, 20 W. 44th street, New York City.

Buy, Buy Bonds—Bye, Bye, Kaiser.

SPEAKING OF SPRING.

BY WALT MASON.

The spring is here, with bees and birds, and so I raise my spiel; gee whiz, I simply can't find words to tell how good I feel. I always wheeze and sneeze and cough, when winter's blasts are sprung; the winter froze my sideboards off, and spoiled my larboard lung. The winter, long and dark and cold, puts crimps in any lad; the winter made me feel so old I seemed like Noah's dad.

The springtime brightens up the plains, rejuvenating men, and I can take my trusty Haynes and hit the road again.

The wise men say, "With war on deck, efficiency's the plan; and every man must sprain his neck, and do the best he can. And if a man would do his best, would get right down to tacks, and show some curves in vim and zest, he must at times relax. He can't keep up a winning gait, no prizes will be won, unless he keeps his head on straight, and has his share of fun."

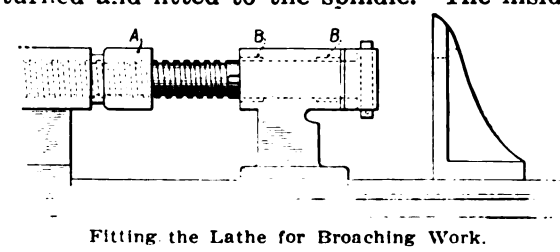
All day I work to beat the band, that I may buy Thrift Stamps; I'm sawing wood, I'm pounding sand, I'm cleaning coal oil lamps; I'm loading hay on creaking wains, I'm painting barn or gate; and then at dusk I take my Haynes, and ride nine miles or eight. And then I am no longer stale, the ride refreshes me: tomorrow I can earn more kale, and buy a stamp or three.

The springtime is a lovely thing, for then the flowers upshoot, and then the hens and robins sing, and lay all kinds of fruit. And that is when we ought to sow our prunes and nutmeg seeds, and slosh around with spade and hoe, and kill the growing weeds. It is a patriotic stunt to cultivate our greens, to feed the armies at the front, and can the submarines.

So we should keep our nerve and pep, we should not loaf or lag, or moon around with dragging step, like some old treadmill nag. And I prescribe the car named Haynes to keep the boys in trim, to drive away spring's aches and pains, and fill their breasts with vim.

The Lathe as a Broacher.

An old hollow-spindle type of lathe may be converted into a broaching machine in the following manner, says a writer in the American Machinist. The nosepiece A was turned and fitted to the spindle. The inside



Fitting the Lathe for Broaching Work.

of the nosepiece was threaded to take the lead screw, which carried the broaches. The bushings B in the tailstock supported the outer end of the lead screw. The carriage was tightened to the lathe bed, and behind it a heavy angle plate was fitted as a bolster for the work.

A Good Return on Your Money—A Quick Return for Our Men.

Digitized by Google

Not Much More Time Left For Entering Your Photograph in Contest

If you have not sent us a picture or sketch of your shop now is the time to do it because our prize contest ends with the June number of The Blacksmith and Wheelwright. All photographs received up to June 1st will be published in this department and, as we have many on hand now, it may be necessary to publish them later than the June number. Bear in mind, however, that though the pictures may continue to appear, none will be published unless they are received before June 1st.

As soon as all of the pictures have been published the prizes will be announced. Any sort of a photograph or pencil sketch can be entered in the contest, and we know that you want to see your picture in the magazine.

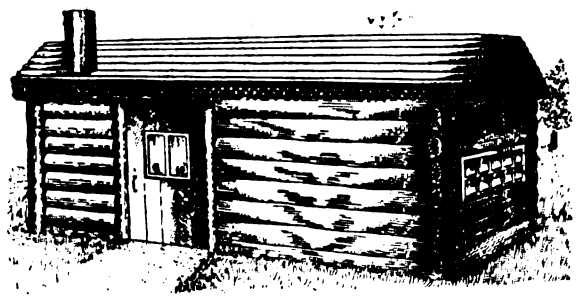
After the picture has been printed, the photograph will be returned, together with the cut itself. You can use the cut for your letterheads or on your bills, just as you choose, for any printer will be able to use it in his hand press. The cuts are usually three inches in width and in some cases where one or more views are shown they are grouped into a cut six inches in width.

Prize Photo No. 21.

From Judd Keyes, South Dakota.—I am sending you a pencil sketch, which I drew myself, showing my shop, which is in a ranch country, a long way from town. There are no kodaks or cameras here, so that I cannot furnish a photo of it.

After I had put up this shop I sent for a small blacksmith outfit, with which I intended to do just my own work. I was just a "handy man" with tools and had never had any experience in the blacksmith line.

It took lots of patience and I obtained much information from blacksmiths in the towns, and I find that the blacksmiths as a



A Sketch of Mr. Keyes' Shop.

rule are very free with their knowledge, which they have worked hard to get.

The Blacksmith and Wheelwright has helped me out many times, one paper is often worth the price of two years' subscription, and I have a large sack of them at home.

I had not been long in the business before people commenced to come to me with work, Indians and white men both, many of them from great distances, and I am now beginning to get a good lot of work.

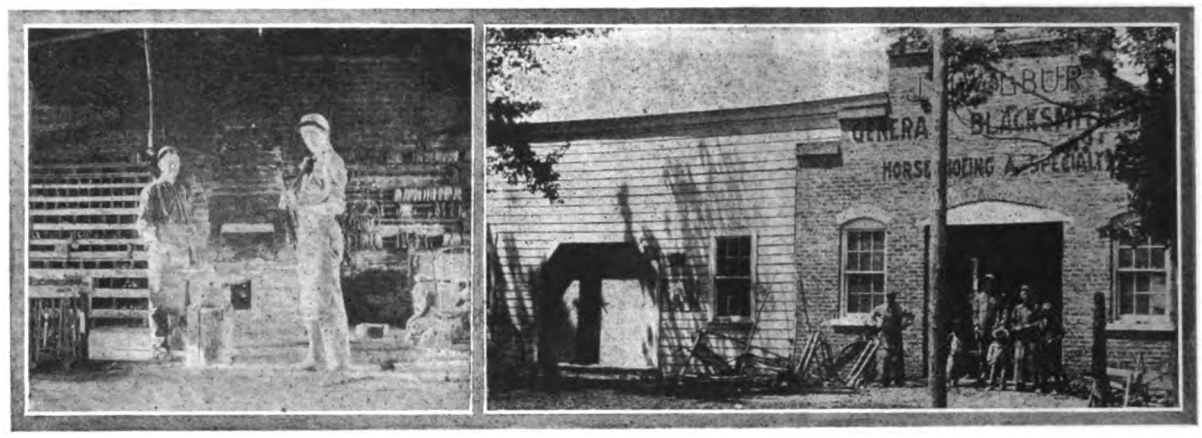
Prize Photo No. 22.

From J. M. Wilbur, Utah.—Herewith you will find two photos of my shop, one of the outside and one of the inside. The inside picture was taken some time ago when the old bellows were in use. These were later replaced with the hand blowers; and now I have electric blowers.

I have been in business here twenty-two years, have tried to keep up with the times and certainly have made a success of the blacksmith business. I do all kinds of work, but mostly on farm implements and horse shoeing. We tackle anything from a needle to a threshing machine. I am about fifteen miles from Ogden, Utah, which is our trading point.

The roads are through the mountains, and are all macadamized and wear the horseshoes out very quickly. There are three smiths in this valley and we are all the closest of friends and help each other whenever we can by lending tools or giving information. We also talk over our business and how we can do better work. We seldom pass one another's shops without dropping in. I have advanced my prices 25 per cent during the last year and expect I will be compelled to go still higher this spring if material and wages keep advancing.

Help is scarce at any price, the boys who could get away having joined the colors. I am behind the government in every way, having subscribed to the first and second Liberty Loans liberally. I also purchase the war stamps or baby bonds and pay an income tax; of course I observe the wheatless and



Showing One Corner of Mr. Wilbur's Shop, and How the Building Looks from the Outside.

meatless days and govern my meals as near.y as possible. Last but not least I help Red Cross and soldiers benefit, and am now ready for the third Liberty Loan. I certainly enjoy looking over the photos and reading what the boys have to say. It is like getting a letter from home and I always get something that helps me to make life worth while.

I sell farm implements and wagons, also a pretty complete line of extras for all the leading machines and implements, so the farmers seldom look elsewhere as they know I have it, and can fix their machines. I have also sold a few autos on the side. I seldom go out to get business but let them come in to talk while I work. I like the business and do not work at it because I have to, but I must do something to be contented so I just stick to it. The Blacksmith and Wheelwright has been arriving on time at my shop for the past eighteen or twenty years. Will write you again and tell you how I do a few odd jobs which may help some of the boys.

Prize Photo No. 23.

From J. A. Hulvey, Ills.—Because I have been a reader of The Blacksmith and Wheelwright for many years, and because of the many good tips one gets from it, I often have thought of trying to tell some of my own short cuts, but am waiting to see how this looks (should it get in print) and I may give same later.

One communication that I read a short time ago in The Blacksmith and Wheelwright routed me out of my slumber. It was from Stephen Lovejoy, who said that on November 8th he shod one horse new, with No. 4 shoes,



The Inside of Mr. Hulvey's Shop is as Neat as the Outside.

and one behind, with No. 5 shoes, in forty minutes; for which he received $2.40 for the short time. He says this was what he calls "going some." I say the same, but the $2.40 is the joke. I get $2.50 for that No. 4 job and for the No. 5 I would get $1.25, total $3.75. Don't try to show your good judgment and speed, but get paid for your labor and take the time it requires to do the job as it should be done, is my system. I do not doubt Mr. Lovejoy's speed, but I do hesitate to believe the jobs were complete. I have done those hurry-up orders many times, but I did what Lovejoy did.

Any time any one person puts on six shoes, dresses the foot as it should be dressed, one hour is fast enough. Suppose you went to a dentist to have a bridge or crown put in your mouth, and he "hopped" on you as one would be compelled to do on the poor old horse's foot,—"good night."

My best day's work this winter was November 26th. I have a young boy learning the art of shoeing and he is certainly learning fast, but I am not expecting him to stay on the job. They do not have the nerve to stay on the job long enough to harden their backs. On November 26th I fitted 64 shoes, dressed 36 feet, and put on 34 shoes in eight hours. The boy did the rest and for the eight hours I received $41.60, an average of 65 cents per shoe. I finished all that I drove.

I am enclosing two photos of my shop,



The Outside of Mr. Hulvey's Shop.

which looks a little topsy turvy, perhaps. The man with his hand on the anvil is the writer, the other is my wood-worker. The other picture is in the wood department, showing my help at that time, but today I only have the apprentice. It is impossible to secure help at any price. In conclusion I will say that I own this shop and have for twenty years. No "boozer" gets a job in this shop. No drinking by anyone and I make it a point to collect every penny for work that leaves this shop. Mr. Lovejoy had better not write back and say he will bet $1 he can out-general the writer; as I am a snow bird myself. Went behind the anvil October 17, 1883.

Prize Photo No. 24.

From G. W. Lawrence, Virginia.—As you request I will tell you about this section of country and my work. I am located on the Allegheny mountains on the C. and O. railroad in a small valley, which is well settled up. The principal industries are farming and lumbering. Several years ago there was an iron furnace here, but had been a long time idle. One year ago it was bought by the South Western Steel Company of Chicago, who repaired it and they began making iron last October.

They employ a large force of men and pay good wages, which puts some money in circulation. As to my work I do a great variety, repair almost everything, heavy wagons,

Digitized by Google

buggies, automobiles, farm machinery. I am now rebuilding a road machine. I refuse to do horse-shoeing, but am bothered a lot about shoeing as there is no good shoer in this section. My equipment consists of a gasoline engine, buggy plower, band saw, rip saw,



Inside View of Smith Shop Showing Mr. Lawrence and His Wife.

boring attachment for boring, and spoke tenioning, and fellow boring.

I also have a drill press for hand or power, emery wheel, Reynolds tire bolting machine, tire bender, tire shrinker, full mounted stock and dies, and all other tools necessary for my work. I always have more work than I can do and never need to advertise for work. I am enclosing a picture of my shop, showing myself and my wife.

Your Money or Their Lives—Save Both—Buy Bonds.

PLANT POTATOES.

Kansas is looking ahead and encouraging the planting of potatoes. The theory is that potatoes are so plentiful this season that people are beginning to turn their minds to other crops. This would be very unfortunate, indeed, as the growing of potatoes for next year would combine patriotism and profit. With respect to the potato, America can well learn from the food practices of Germany. In the last year before the war Germany produced almost 2,000,000,000 bushels of potatoes, as compared with about 332,000,000 bushels for France.

HELPING OUT THE FRENCH WITH HOARDED FLOUR.

Peter Birney, Federal Food Administrator for Brown County, Kans., got busy and furnished enough flour to provide the wheat rations of 8,700 Frenchmen for a month some time ago. Mr. Birney learned that some 300 families, mostly farmers, of his county had laid in a supply of wheat flour last fall sufficient to last them through the year. In ordinary times this would merely be an evidence of thrift, and would be highly commendable, but these are war times, and if every family in the country did as these farmers have done, America would be stripped of wheat in two days. Mr. Birney opened up negotiations with the farmers and secured the return of 5,290 pounds of flour and 790 pounds of sugar. No slackers were found. Every township willingly made its report and turned in its full refund of flour, keeping only enough to supply them under the 50-50 rule. A German farmer turned in eight sacks of flour, a Swiss turned in 18 sacks.

AMERICAN AND ENGLISH INCOME TAXES.

In comparison with the tax levied in England on incomes our own income taxes are moderate, indeed.

In England the tax on incomes of $1,000 is 4½ per cent, in America nothing.

In England the tax on incomes of $1,500 is 6¾ per cent; in America nothing for married men or heads of families, and 2 per cent on $500 for an unmarried man.

In England the tax on an income of $2,000 is 7⅞ per cent; in America nothing for a married man or head of a family, and 2 per cent on $1,000 for unmarried men.

The English income tax rate also increases more rapidly with the growth of the income than ours, a $3,000 income being taxed 14 per cent, $5,000 16 per cent, $10,000 20 per cent, and $15,000 25 per cent, while our corresponding taxes for married men are respectively two-thirds of 1 per cent, 1½ per cent, 3½ per cent and 5 per cent, and only slightly more for the unmarried, due to the smaller amount exempted, the rate being the same.

Coal Gas as a Fuel.

The Automobile Association of London is offering a prize of $5,000 for the most practical, inexpensive and convenient method or device for the utilization of coal gas as a fuel for automobile or other internal combustion engine.

The competition will close on December 31, 1918, and there are a number of conditions governing the device to be used. The gas must be stored in a container, which must not exceed 140 pounds in weight and carried on the car; at the same time this container must be of such a size as to permit the carrying of approximately 19 cubic feet of gas. A container of this size would carry enough gas to enable the user to run about 50 miles; an equivalent of between two and three gallons of gasoline. The cost of the whole apparatus must not exceed $100.

The fuel question has been one of the greatest problems which has confronted England during the present war and at present the gasoline supply in that country is controlled exclusively by the government.

There seems to be plenty of illuminating gas and as this fuel is just as explosive as gasoline it solves the problem, provided a small container can be carried.

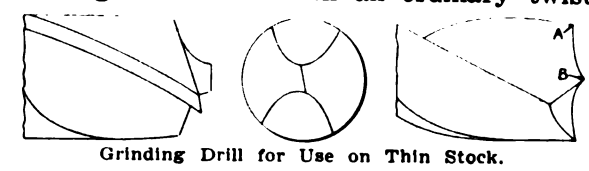
Throughout England trucks and taxicabs at the present time are using illuminating gas as a fuel and it is no uncommon sight to see a taxicab with a large gas bag on the roof, sometimes as large as the car itself. Naturally this size gas bag offers considerable resistance to the progress of the vehicle and were it possible to compress illuminating gas into a small space without danger of explosion, this fuel would be much cheaper than gasoline and probably used in this country also.

How to Drill Thin Stock.

Those who have occasion to drill thin stock frequently find that when the drill begins to break through the work it chatters. And it is not always easy to obtain a clean, perfect, round hole. The following suggestion is made in the American Machinist, one, it is said, that eliminates the need of an expensive drill plate for drilling.

Referring to the illustration, it will be seen that the drills are ground in such a manner that the outer edge A comes in contact with the stock. The center B, which is slightly in advance of the cutting edge of the drill, acts as a pilot to locate the drill in the center punch hole and also tends to keep the drill steady while it is cutting through the stock.

Those who have had much experience in drilling thin stock with an ordinary twist

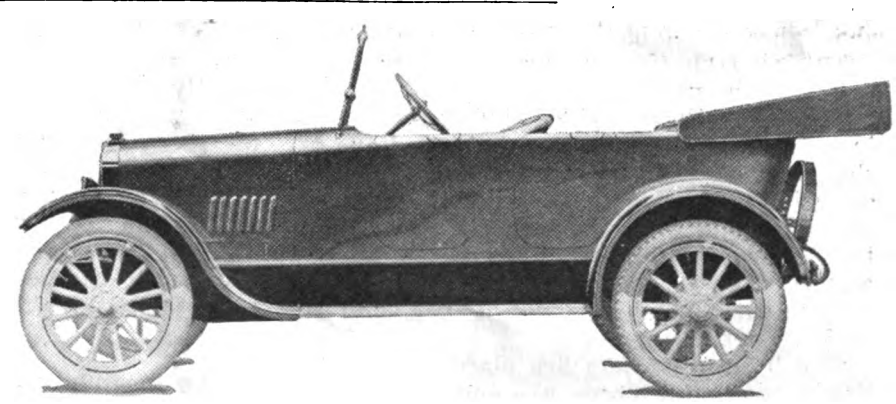


Grinding Drill for Use on Thin Stock.

drill have doubtless seen it go spinning round like a pinwheel, at the same time severely cutting their hand. They will be surprised to know that there is absolutely no need of holding the stock while it is being drilled. Again, contrary to the usual practice, it is not necessary to drill into a block or some other material in order to support the stock. It is really essential, to get the best results, to have no support whatever under the drill itself, only some means of supporting the stock; for instance, a V-block or a flat vise may be used. One of the good features of this drill is that very thin stock and even paper can be cut with equally satisfactory results and safety.

Car Agencies Offer Chances For Making More Money

The Birch Motor Cars Are Attractive and Seem to Be Worthy of Investigation by the Smith Who Intends to Sell Automobiles



Now that summer is coming many of the farmers will begin to get busy and do their spring plowing and planting. Now as never before the farmers need automobiles for the very reason that the farmers' produce is worthless unless it is disposed of and many of the farmers will be unable to dispose of their produce unless they can sell it directly themselves.

The blacksmith of today is gradually working into the automobile field and in many towns that are large enough to support both the blacksmith and an automobile repair man the blacksmith does all of the work. He is considered, usually, a reliable authority on mechanics and his neighbors get into the habit of calling upon him for every sort of mechanical work from shoeing horses to repairing watches. Doubtless many of the blacksmiths venture their opinions upon various automobiles which they prefer.

Mr. Jones or Mr. Smith, the blacksmith's neighbors, are very apt to have a friendly little talk with the blacksmith when they decide to buy a new car. Perhaps Mr. Thompson has brought his horse for the last time to the blacksmith and tells the blacksmith of the fact. He probably says that he is going to sell the horse and buy an automobile in its place and quite naturally the blacksmith and he "swap" opinions as to the merits of the various machines on the market.

Is it not logical then that the blacksmith take the agency for a more well-known automobile? There are many such agencies open and even if the blacksmith does not intend to make a regular business of selling automobiles the least he can do is to pick up a little money in the way of commissions.

The Birch Motor Car Company, 81 East Madison Street, Department 545, Chicago, Ill., are introducing their product, the Birch motor car, throughout the country and offering agency opportunities in various parts of the country.

The Birch super four, one of their popular models, is shown in the illustration and sells at $895.

This machine is equipped with a 36-hp. engine, electric starting and lighting system; slide gear transmission and a practical, comfortable body. Another very popular model is the Birch light four which sells at $795. This car is very similar to the one shown in the illustration, but is slightly smaller in size. The manufacturers claim to have sold over 85% of their output to farmers and claim that these cars are giving universal satisfaction wherever they are used.

Digitized by Google

Among Mississippi Smith Shops

A Number of Interesting Facts About How Smith Shops Are Conducted in the South

BY JAMES F. HOBART, M. E.

In a Vicksburg shop, perched on a clay bluff 200 feet or more above the big river, the writer found a smith making ready to shoe a man! Fact—he had a piece of a mule shoe in the fire, which he drew down to about three-eighths inch wide and one-eighth thick. Then he punched several small nail holes around the edge, bent the metal into the shape of a boot heel, and, when his customer came around, the small heels were nailed in place, regular horse fashion, the smith promptly turning his



Fig. 1.—Making the Shoe from a Piece of Scrap Stock.

customer bottom-side-up, over a chair, and then "straddling" each leg in succession and nailing on the shoes in true horse fashion.

Mule Stocks.

Mule shoeing comprises a large portion of the southern smith's work; a set of stocks is a necessity, and is to be found in all the larger shops. Some of the smaller shops do not have stocks and are content to let all the work of shoeing "bad mules" go to the larger shops which have stocks. The stocks in use in the south are somewhat different from those of the north, the latter being used almost entirely for shoeing oxen, while real stocks are now almost obsolete in northern smith shops.

The stocks used in the south consist of two heavy timbers on each side of the animal, and several lighter timbers which act as braces to the heavier ones. One heavy timber is bolted securely to the wall of the shop, another similar timber is located about three feet from the first and is also securely bolted to the wall.

To each of these vertical timbers, about 40 inches above the shop floor, is hinged one of the remaining heavy timbers. The stocks are usually erected in the middle of one of the shop side walls, in such a manner that the horizontal hinged timbers above described may be swung around against the side of the shop when not in use, and be entirely out of the way.

The lighter timbers are placed above the heavy horizontal pieces, one end of the light timber is also hinged to the top of the vertical timber, the other end being attached to the outer end of each horizontal timber, thus forming a pair of swinging cranes, about 36 inches apart.

When a mule is to be "caged" it is led to a stout halter which hangs upon the shop wall, midway between the two vertical timbers. As soon as the mule has been cajoled into letting the halter be put in place, the beast is helpless, for the halter has four ends, each one of which may be drawn tight in an opposite diagonal direction, thus making a "spread eagle," which certainly holds Mr. Mule just about where he is wanted!

The sides of the stocks, the horizontal timbers, are then swung out into the shop, against the mule on either side, and connected by a broad canvas belly-band, which is wound up over ratchet rollers until the mule is clear of the floor. There is also provided a long stout steel arm, made with a rack movement, operated by a handwheel on one of the horizontal timbers. A yoke at the end of the arm is buckled securely around one of the "business legs" of the mule, and by means of the handwheel that foot is drawn back and held securely where it cannot be used for kicking!

Using Up the Old Metal.

In Mississippi, Louisiana and Tennessee, the writer has noticed during the past few months that almost every smith, when he had the time to do so, made horseshoes out of old scrap metal, preferably old bolts and rods. The sizes preferred seemed to be 5/8, 3/4 and 7/8 inches for light, medium and heavy shoes, respectively. Other scrap was used, but not as long as the round rod metal was to be had.

For ironing wagons a good deal of scrap is also being worked up, but most of the old scrap is used for shoes, and the smiths are hunting desirable old metal from one end of the state to the other.

Horseshoes Made From Junk.

When the writer was a boy, it often used to be his lot to preside at the handle end of the sledge during the forging of many a set of horseshoes from black bar iron, and iron was not always of the proper size or shape either. It seems strange indeed, now-a-days, to see blacksmiths forging horseshoes from the bar, but recently the writer saw something stranger even than that, when he found two colored smiths busily forging good shoes from scrap metal in the shape of old machine bolts.

Fig. 4 shows one of the shoes which was turned out while the writer was present. Notice that there are five nail holes instead of three in each side of the shoe. The smith explained that often he had to put in five nails to prevent the shoes from being pulled by hard work from tender hoofs, and that these shoes were being made for some of those cases.

At the top of Fig. 2 is shown the material for one of these horseshoes. In this instance an entire bolt was used, head and thread, all being forged out. But many of the shoes were made from pieces cut to length, without head or thread. The head was left on in this case, because the metal therein was needed. Three-quarter-inch stock was being used, and as this material weighs almost exactly two pounds to the running foot, the smith can easily tell how much stock will be necessary to make a shoe of given weight.

The writer was advised that bolts of all diameters were used; sometimes shoes were made from 1/2-inch stock. A huge pile of old bolts and rods in a corner of the shop attested to the fact that "scrap-made shoes" were the regular thing in this shop.

The First Operation.

The forging was done almost entirely by the man back of the anvil. Fig. 2 shows the first operation as completed; about one-half or a little more of the blank having been

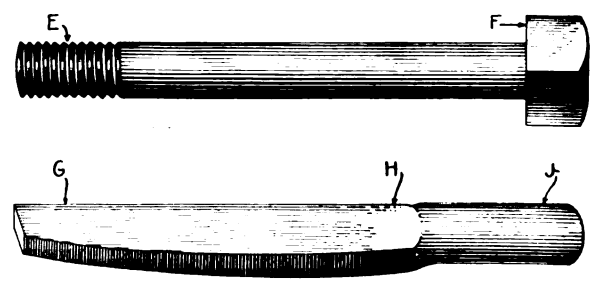


Fig. 2.—Bolt from Which Shoe Was Made and How It Looked After the First Operation.

drawn to size and tapered as required. The point H was a little more than half-way along the blank. The point G was tapered about as shown. The rest of the blank, at J, was not forged until after four ends for a set of shoes had been forged; then the other ends of the four blanks were forged.

A very peculiar hammer, C, was used by the "striker" in forging these shoes. Fig. 3 shows about how the tool looked. Apparently it was a cast steel hammer or else it had been turned in a lathe perfectly round and smooth. Its weight was eight pounds, and the handle, D, was only 11 1/2 inches from C, to the extreme outer end. The striker used this tool in a manner as peculiar as its appearance.

In the regular sledge stroke the striker usually gets in one blow to the smith's two, but here the helper struck blow for blow with the smith, and often struck several times while the smith only motioned with his hammer where the blows were to be placed.

The striker used from thirteen to fourteen blows in bringing the blank to the condition shown by Fig. 2, after which, and with the same heat, the shoe side was curved to approximate shape. The striker, for this purpose, placing his hammer as shown at J, Fig. 1, holding the tool there firmly, while the smith placed the partly forged blank in position at K, and with his own hammer delivered a few blows at L, which quickly gave the curve required.

Sometimes the nail holes are punched with the same heat used for forging, but the smith, if he has any idea that the metal is a bit poor, as is sometimes the case with old bolts, takes another heat for the hole punching, then spaces them with the tool shown at M, Fig. 5. This is a home-made tool, cut from a solid bit of tool steel, and so made that when used in a reversed position, N serves a guide and slips along the side of the shoe. A single blow from the eight-pound hammer is given to this tool for each nail hole, the punch, O, being driven in far enough to mark the hole, which is then worked with tool Q.

Nail Hole Tools.

Tool Q is also used in an inverted position. The point P, being placed in the indentions made by tool M, two blows are given to tool Q with the eight-pound hammer for each

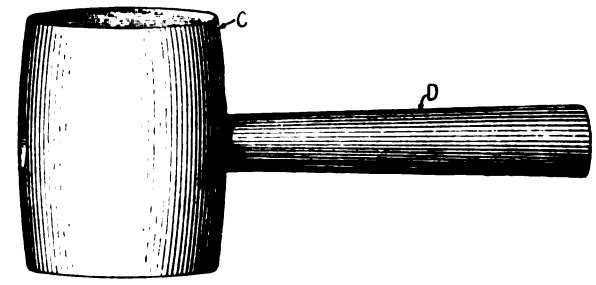


Fig. 3.—The Striker's Round Steel Hammer.

nail hole. All this is done with the shoe lying flat on the anvil, therefore no metal is lost, all of it being driven out from under the punch.

From nine to fifteen blows are expended in punching the holes, accordingly, as there are three holes or five; then the holes are finished with the usual thin, flat punch shown at R, which is the same as all smiths use for clearing out nail holes in shoes. While this tool is being used, the punching is done over the hardy-hole of the anvil.

A Busy Man.

The striker on this job is a mighty busy man. Besides doing about all the forging work with his eight-pound hammer, he also makes and mends the fire, does all the heating, and, as the electric blower is out of order, must also furnish the blast with a hand blower.

The smith finishes up the edges of the shoes after the punching has been done with his hand hammer. The striker jumps over behind the anvil to do the punching as soon as the heat is ready. He strikes just three blows for each hole, then goes back to the fire while the smith works down the edge of the shoe on the horn of the anvil, smoothing down where the punch has pushed the metal out sidewise.

Forging the Second End.

The forging of the second end of the shoe is done on the large end of the anvil horn, or, perhaps, on the soft pad surface of the anvil. Nineteen to twenty blows are struck in doing the second end, then the smith com-

Digitized by Google

pletes the curving of the shoe by placing the finished side on edge on the anvil and striking endwise against the second side of the shoe. Only three or four blows are needed to finish the curve, then the striker delivers thirteen more blows upon the second end of

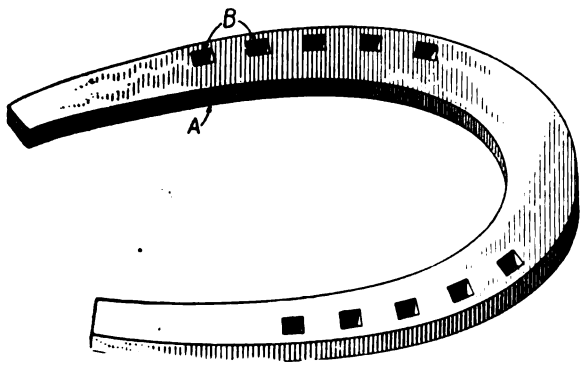


Fig. 4.—A Horseshoe Made from Round Scrap Stock.

the shoe, which finishes it, and draws the last heel to size.

Punching the second side is usually done with the same heat, and the smith is able sometimes to smooth down the edges without reheating.

It will be noted that no channel is cut along these holes for the nails. The punch Q, Fig. 5, does all that is needed in this direction. In fact, this punch makes a seat for the head of the nail, which makes it unnecessary to crease the shoe, which, as stated, is not done.

The smith stated that, with his helper, he usually turns out six dozen, or 72 shoes, in a day of ten hours, and if he should care to he could turn out more. The reader may figure costs, etc., for himself; calculating the cost of material at junk prices in his location, but not forgetting to charge for the finding, procuring and cutting of the scrap into blanks of the right length. Then, with "store" shoes costing seven to eight cents per pound, with freight, handling and storage added, the real worth of the hand-scrap-made shoes may be determined for the particular locality where you, Mr. Reader, may reside.

Arrangement of Pulleys and Shafting.

"Once in a while, and perhaps oftener," there is to be seen in a shop some arrangement of machinery which it is well to keep clear of. It may not seem quite the thing to tell about the bad things seen, but sometimes a bit of "negative information" may lead a smith to improve things in his own shop by rooting out the defective arrangements, once his attention has been called to them.

For this reason the following arrangements have been described. In one Mississippi shop, where power was used for wood and for iron working, the jointer, or "buzz-planer" had been placed at right angles to the regular surfacing planer, and this arrangement made it necessary to carry power "around a corner," i. e., to drive two shafts at right angles to each other, something

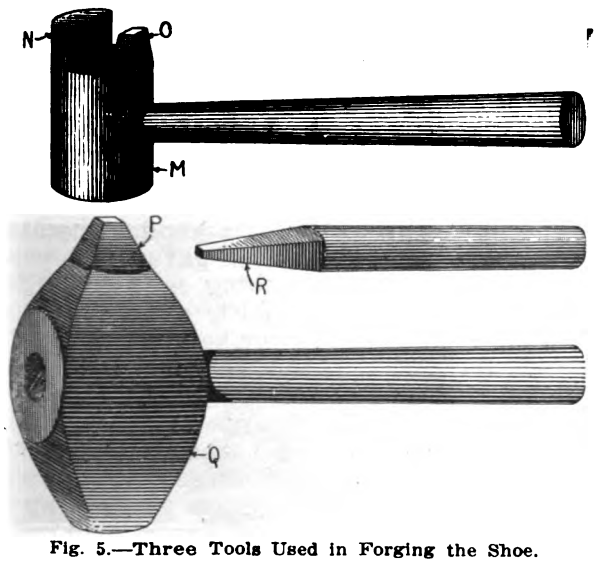


Fig. 5.—Three Tools Used in Forging the Shoe.

which should always be avoided in the shop, and, in a judicious arrangement of the machinery, will be found unnecessary.

In this shop it was accomplished by means of a quarter-turn or "reel" belt. The main shaft, motor-driven, was located near the ceiling. The shaft driving the jointer was placed on the floor—very much in the way—and connected with the main shaft by means of a belt.

By a very poor arrangement of the jointer shaft the pulleys both were located at some distance from a bearing—more than a foot, in fact—and, in addition, the shaft was far too light for the work it should do, being only one inch in diameter when it should have been at least 1 7/16 inch. The pulleys, being placed far from bearings on this light shaft, permitted great vibration.

In addition, the quarter-turn pulleys were not placed right, and a piece of fishpole—bamboo—about an inch in diameter, was fastened in place by means of cords, one at either end of the bit of pole, so as to prevent the belt from jumping off the lower pulley of the quarter turn. Don't ever permit such an unmechanical bit of apparatus in your shop. There is a certain place upon two crossed shafts where the pulleys may be located so the belt will run perfectly on each pulley.

The secret of thus placing the pulleys is to so locate the receiving pulley so that the belt from the other pulley will lead fair and square to the receiving side of that pulley—no matter how the belt may lead from the other pulley. Do this with both pulleys and the belt will "track" perfectly, and you will need neither level or plumb bob for locating the pulleys.

SHIP BUILDING GROWTH.

Our Progress Described by Shipping Board Chairman.

Among the most interesting features of the speech which Edward N. Hurley, chairman of the United States Shipping Board, delivered before the National Marine League were his statements as to what has been accomplished in the direction of output of vessels. According to Mr. Hurley there were 37 steel shipyards in America at the time of our entrance into the war. Since then 81 steel and wood yards have been located, while 18 other yards have been expanded.

We are building in the new and expanded steel yards 235 new steel ship ways, or 26 more than at present exist in all of the steel shipyards of England. As an evidence of our progress Mr. Hurley referred to the record made by a Seattle company, which launched an 8,800-ton vessel 64 days after the laying of the keel. This ship was delivered to the Fleet Corporation on Jan. 5 and started on her first voyage on Jan. 14.

An Oakland, Cal., concern, Mr. Hurley said, had launched successfully three 9,400-ton vessels in a single afternoon.

Total Construction on March 1

The total amount of our steel construction on March 1 was 8,205,708 deadweight tons, made up of 5,160,300 deadweight tons under contract with the Emergency Fleet Corporation and 3,045,408 deadweight tons of requisitioned vessels.

Approximately 28 per cent has been completed. In other words, the program for steel ships has advanced 28 per cent toward completion. Of the amount of steel ships under contract and under requisition approximately 8 per cent were actually completed on March 1. This amount of floating tonnage exceeds our total output in 1916, including steel, wooden and sailing vessels, by approximately 50 per cent.

Referring to the German ships in American ports which were taken over and found to be crippled by their enemy crews, Mr. Hurley said: "With the expenditure of a little less than $8,000,000 we have succeeded in placing in our war service and in the service of the Allies 112 first-class German and Austrian vessels, representing a carrying capacity of nearly 800,000 deadweight tons."

Development of Shipyards

As to the development of our shipyards, the 37 old steel yards now have 195 ways, as against 162 eight months ago. Other parts of their plants have increased proportionately. Thirty new additional steel shipyards are being erected with a total of 203 shipbuilding ways. Thus we now have, in the aggregate, 67 steel shipyards either wholly or partly engaged in Fleet Corporation work. These yards will have a total of 398 steel building ways.

Of these yards, 35, with 258 ways, are on the Atlantic and Gulf Coast; 19, with 66 ways, are on the Pacific Coast, and 13, with 74 ways, are on the Great Lakes.

Wooden Ship Facilities.

In addition, the capacity for wooden ship building has been increased until we now have 81 such yards with 332 ways completed or near completion. Mr. Hurley estimates that our output of wooden ships will approximate 2,300,000 dead-weight tons annually.

The 332 wooden shipbuilding ways added to the 398 steel building ways give a total of 730 berths on which to build steel and wooden vessels—an increase of 495 within a few months.

Causes of Delay.

The delays that have occurred in the turning out of ships Mr. Hurley attributed largely to the slowing up of railroad transportation, more especially as the method of producing ships to-day is one of assembling rather than of constructing all the parts at any one point.

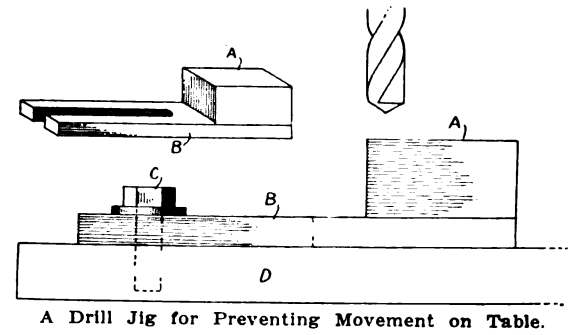
Delay has also arisen because of the unprepared condition of the turbine and engine manufacturers. Here, again, construction has been delayed by lack of transportation facilities. Mr. Hurley said, however, that the Board expects to make up for the shortage.

The first concrete steamship, recently launched, he stated, gave promise of being a success.

As to the number of employees in shipyards, Mr. Hurley stated that whereas in 1916 there were less than 45,000 men employed in all the shipyards of the country, on March 2, 1918, the number had increased to 236,000, of whom 170,589 were working on actual shipping construction. In addition, the Board has recruited a volunteer force of 250,000 highly skilled mechanics, who have agreed to hold themselves in readiness for a call.

Securing the Drill Jig.

When a number of holes are to be drilled and accuracy is required, the jig shown in the accompanying illustration will prove of



A Drill Jig for Preventing Movement on Table.

service. One of its advantages is that it cannot rotate, thereby avoiding the possibility of injuring the workman.

The jig proper is shown at A and the same in place at A. B consists of a slotted piece which can be a part of the jig or attached to it as best suits the work at hand. It must, however, lie flat with the jig on the drill table. The jig is secured by the bolt C, which must be threaded close up to its head and have a diameter equal to that of the slot, a snug fit. By loosening the nut the jig can be moved about as desired.

The bolt C is screwed into a hole tapped in the drill table D, and the jig slid to bring any hole directly under the drill. The bolt acts as a stop, preventing the jig from turning or working loose while drilling the work.

Price for Smith's Coal Fixed.

Because of the many complaints to the United States Fuel Commissioner, the price for smithing coal has been fixed at $2.70 per ton, f. o. b. at the mines. This price covers the loading upon cars of the open type and when coal is loaded upon box cars 75 cents additional is charged. A broker's commission may be quoted in addition to this price and amounts to 15 cents per ton. The total cost of a ton of smithing coal under this present ruling when purchased from a broker and stored in a box car is $3.05.

Digitized by Google

The Pioneer Journal of Its Class in the World.
Member of the Audit Bureau of Circulations.
PUBLISHED MONTHLY BY
M. T. RICHARDSON COMPANY,
71-73 MURRAY STREET, NEW YORK.
POST OFFICE BOX, 654. TELEPHONE—7377-7378 BARCLAY
CHICAGO OFFICE, 608 SOUTH DEARBORN STREET.

M. T. RICHARDSON, President and Treasurer
F. R. WHITTEN, Secretary
M. T. RICHARDSON, Editor
FRANK L. AVERY, Managing Editor

F. R. WHITTEN, Advertising Manager
H. F. LUDINGTON, Western Representative

AGENT FOR GREAT BRITAIN:
ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance..$1.00
One Copy, six months, in advance.....60 cents
Single Number .....10 cents
Canadian subscriptions .....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English money.
Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

COMMUNICATIONS.

Communications on subjects appropriate for our columns solicited from all quarters. We want practical information. If you KNOW something that will benefit our readers, we shall be glad to have you write it out and send it to us for publication. All communications of this nature should be addressed to the Editor of THE BLACKSMITH AND WHEELWRIGHT, P. O. Box 654, New York.

CHANGE OF ADDRESS.

Subscribers who desire the address of their paper changed will please send the old as well as the new address.
Newsdealers can obtain THE BLACKSMITH AND WHEELWRIGHT from the news companies with whom they deal regularly.

ADVERTISING RATES SUPPLIED ON APPLICATION.

Entered as second-class mail matter at the Post Office in New York City.

SPECIAL NOTICE.—When subscribers fail to receive THE BLACKSMITH AND WHEELWRIGHT regularly, we shall take it as a favor if they will notify us to that effect.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

The Blacksmith and Wheelwright in New Zealand.

Mr. R. Hill, Matlock House, Devonport, Auckland, New Zealand, is our accredited representative in New Zealand for obtaining new subscriptions.

☞ **When you change your place of residence always write to us and give your new address.**

MAY, 1918.

TABLE OF CONTENTS.

	PAGE
Classified Buyers' Guide	142
Index to Advertisers	142
Want Advertisements	144
Design, Construction, Operation and Repair of Motor Vehicles	129
Continues Husband's Business	131
Live Stock by Motor Truck	131
The Grading of Eggs	131
The Scientific Heat Treatment and Hardening of Steel	131
Teaching Horseshoeing	132
The Tree of Knowledge	133
Technical School Discontinued	133
The Lathe as a Broacher	133
Not Much More Time Left for Entering Your Photograph in Contest	134
How to Drill Thin Stock	135
Car Agencies Offer Chances for Making More Money	135
Among Mississippi Smith Shops	136
Ship Building Growth	137
Securing the Drill Jig	137
Price for Smith's Coal Fixed	137
Editorials	138
A Practical Produce Delivery Body for a Small Car	139
Workshop Experience	140
Sparks and Shavings	142

FILE YOUR MAGAZINES.

Do you keep your Blacksmith and Wheelwright magazines? A magazine like The Blacksmith and Wheelwright should be read through very carefully by every subscriber, and after it has been looked over, it should be kept where you can get it any time you want it.

One issue of this magazine contains, usually, fourteen pages of reading matter. If this information were published in book form, one year's subscription would amount to a 444-page book. If you had paid $1 for it, you would probably file it in your bookcase and refer to it very occasionally.

Surely it is worth while for you to do the same with The Blacksmith and Wheelwright. There is no book published which covers so many different topics as does this magazine. If you do not care to keep all of the magazine, why not remove the inside pages and put them in a binder with an index?

FIGHTING FOR FREEDOM.

We have endeavored to make this issue a "patriotic number" and as you read it through you will find many of the Liberty Loan slogans on the various pages.

For every sort of a man in this country today at least one slogan is applicable. For those who are warlike and patriotic the slogan "Buy, Buy Liberty Bonds—Bye-Bye Kaiser" is a good one. It is applicable not only to Liberty Bonds but to Thrift and War Saving Stamps as well. Do not consider your duty done just because you have purchased one or two Liberty Bonds. Your duty is to furnish the money now and in the future. Money is necessary, and if Germany furnishes more than we do we lose everything.

For the young man who cannot go to the other side because of physical disability, the slogan "Get into the Fight, Buy Liberty Bonds" should mean something. Just because you are exempt, your duty is not done, unless some of your money is used. The boys on the other side are giving their lives, why can't you give, at least, a part of your money.

If you don't believe in war, consider the slogan "Fight or Buy Bonds" which leaves no alternative. If you want peace, money is the only thing that will bring it. We will never have peace until Germany is beaten. Neither will any country on the face of the earth have peace until the warlike nation of the Hun is vanquished.

If you are a miser "Keep your Money, Invest It in Liberty Bonds." There is no better investment in the world than bonds. Don't let anyone tell you that the bonds are a poor investment. If you think they are, you had better go to South America because all of your paper money is just as valueless and we do not care to have you as a citizen.

If you find that it is hard to save money, buy a bond. You don't need a bank account, but you do need peace and freedom. Bonds will bring this. "Time Fights for Germany, Buy Bonds Now." It will do no good to come forward with your money ten years from today, after Germany has overwhelmed the earth.

Now is the time. "Don't put off until tomorrow the Bond that you can buy today." "Do your all, less will be too little, buy Liberty Bonds." As a final slogan "Remember Germany is Listening, Make Your Money Talk, Buy a Liberty Bond." This last slogan means much. If you do not approve of the administration, if you do not think that things are going as smoothly as you wish, keep your mouth shut and your pocketbook open. The contents of your pocketbook, invested in Liberty Bonds, will do more to help our cause than anything you can say.

Boost America, Save Your Homes, and Fight for Democracy and the Defeat of Autocracy.

A FRIENDLY TALK.

Let us have a friendly little talk about the reading matter of The Blacksmith and Wheelwright. Of course we know that you enjoy reading our magazine and perhaps you have never thought of the reason why you enjoy it so well. Let us tell you.

You enjoy it just because, as one of our brothers says, "it seems like reading a letter from home." We aim to keep up the spirit of our friendliness in the magazine and for this very reason we never intend to publish anything that will cause you to hunt up a dictionary so that you may understand it. That is the first reason why you like it.

The second reason is because you get acquainted and hear from your brothers all over the United States. Many of us get our knowledge from having seen how other people work. In fact, it is tne only way to learn. We feel that the most interesting part of our magazine is the department called "Workshop Experience" for the reason that this part is made up of letters from our brothers. We know that you will agree with us.

Of course it is impossible for us to write these letters ourselves. If we did, they would lose their value. Therefore, it is "up to you" to sit down as soon as you receive this magazine and write us an interesting letter. If you do not know of any practical little hint for doing work, just write us about the town you live in and tell us about your shop.

Suppose you were a blacksmith located in the State of Washington, way up in the northern part, away from the town, and with only a few neighbors around you. Don't you think that you would like to hear from your other brothers?—we know that you would and so we want you to send us a letter.

One of our subscribers wrote us not long ago that he read one letter from another subscriber that gave him a suggestion which saved him at least $2. It only costs you three cents to send us the letter and isn't this a good investment? By paying this three cents postage you will save someone of your brothers considerable money and undoubtedly that brother will do the same for you at some time or other. Don't forget to write the letter!

BUY BONDS OR STAMPS.

There is just one way to make the world safe for Democracy—for government by the people—that is, to crush militarism as represented by Germany—and crush it not for the moment, but for all time. Those who think we are safe, or at least not in much danger, are living in a fool's paradise. If the Central Powers (Germany and Austria) win the war in Europe, the United States will be the next victim and nothing can save us from the Kaiser's iron heel and mailed fist. Now is the time to bring to bear all our power of men and money. Every man should buy Liberty Bonds or Thrift Stamps.

THE BLACKSMITH AND THE AUTOMOBILE.

We have told our blacksmith readers repeatedly that there are big opportunities in the automobile repair field to-day. Although the horse probably will never be displaced entirely by the truck, tractor, or the automobile, his useful field is being diminished very steadily. We receive many letters from our brothers in the West and Middle West telling of the great increase in the number of tractors being used on the large farms in their localities.

Perhaps the average blacksmith does not feel that he is capable of learning a new trade. We dare say, however, that the average blacksmith is fully as good a mechanic as many of those found in garages throughout the country. Nothing is more logical than that the blacksmith should take up automobile repairing, for he is familiar with iron and steel.

In order to give as much assistance as possible to our blacksmith readers, we are running a series of stories which should make clear the operation and construction of automobile engines. In addition to that, we intend to carry a query department called "Truck and Tractor Troubles" devoted entirely to this subject. Any blacksmith who does not understand gasoline engines or who is confronted with engine problems, should feel free to use this department.

Buy Liberty Bonds—and Johnnie Comes Marching Home.

Digitized by Google

A Practical Produce Delivery Body For a Small Car

An Express Wagon Body Which May Be Used by the Farmer for Delivering of Green Stuff to the Nearby Towns

Owing to the present freight congestion many farmers will find themselves in rather serious circumstances, during the coming summer, unless they provide some means for getting rid of their produce throughout the season. The automobile is the logical solution of their problem, and if we are not mistaken many of the farmers will buy small cars and have them fitted with special bodies of their own design.

Assume for instance, that a farmer lives about five miles from a small town, of perhaps 800 inhabitants, owns ten or fifteen cows, and plants a rather large area of ground. Last year he might have been able to ship the milk by freight to some nearby city, but this year he finds he cannot adopt this procedure because of freight conditions. He can hardly afford to sell the cows for they represent to him a big investment and possibly a source of profit. If he has a small delivery car like the one shown in our illustration, he can do many things with it around the farm and the surrounding territory.

It is for this farmer that the body has been designed and the average blacksmith will find the body very easy to make. Of course, special conditions require slight alterations in the body, but in general it is very practical indeed.

A, shows how the body looks from the side, B from the top with the roof removed, C from the front with the dash removed and D from the rear. The body shown may be loaded with bulky articles such as bags of potatoes, crates of tomatoes, barrels of apples for shipment, or for cartage. On the other hand it is so arranged that it may be used for light produce and general delivery business. A sliding shelf with sides and ends as shown in views A and B by the dotted lines, can be used to distribute the load when necessary. This shelf slides upon cleats which are fastened to the side posts. In addition to these side supports the shelf is supported by one long, end cleat, which is fastened to the partition in back of the driver's seat. When in use this shelf, or tray, is held in place by a bolt F which passes through the center post and one side of the tray as shown in views A and D.

If one desires to carry milk bottles, the rack G may be made, which will hold 56 bottles. This rack is placed upon the floor in back of the driver's seat and fitted at the rear with two small iron braces which prevent it from slipping out. At the rear of the body there is room for six large cans of milk, as shown in H.

The body is constructed upon two runners 8 ft. 8 in. long by 3 in. wide, and the flooring is nailed to these braces. The two end sills of the floor are 4 in. wide, 3 ft. 1 in. long and 2 in. thick.

The side sills are 4 in. wide, 8½ ft. long and 2 in. thick. The center sill is 4 in. wide, 6 ft. 10 in. long, and 2 in. thick. The floor boards are laid lengthwise and measure 6 ft. 10 in. in length, 16 in. wide and 1½ in. in thickness. The two side panels extend from the front of the driver's cab back to the tail gate and are approximately 17 ft. long, 15 in. wide, and 1½ in. in thickness.

The two side panels which extend vertically from the body panels are 18 in. wide, 3 ft. 1 in. tall and 1½ in. thick. At the point where the cab panels join the side body panels, a strip of ¾ in. half round the molding is placed to cover the joint.

The two floor boards measure 5 ft. 7 in. in length, 6 in. wide and 1 inch in thickness, and are made secure by strap iron braces. There are eight upright posts used for supporting the top and these extend from the bottom of the body upward for 4 ft. 4 in. These posts are 3 in. wide and 1½ in. in thickness.

The cross cleat, which holds the seat on each side, is made of the same stock but only measures 12 in. in length. A partition 4 ft. 4 in. in height separates the driver's seat from the body of the car. To prevent the escape of articles in the body a tail gate is provided, 15 in. in width and made from 1½ in. stock.

As an addition, and for the sake of appearance as well as the driver's convenience, two side windows are provided, each measuring 1 ft. in width by 2 ft. in height.

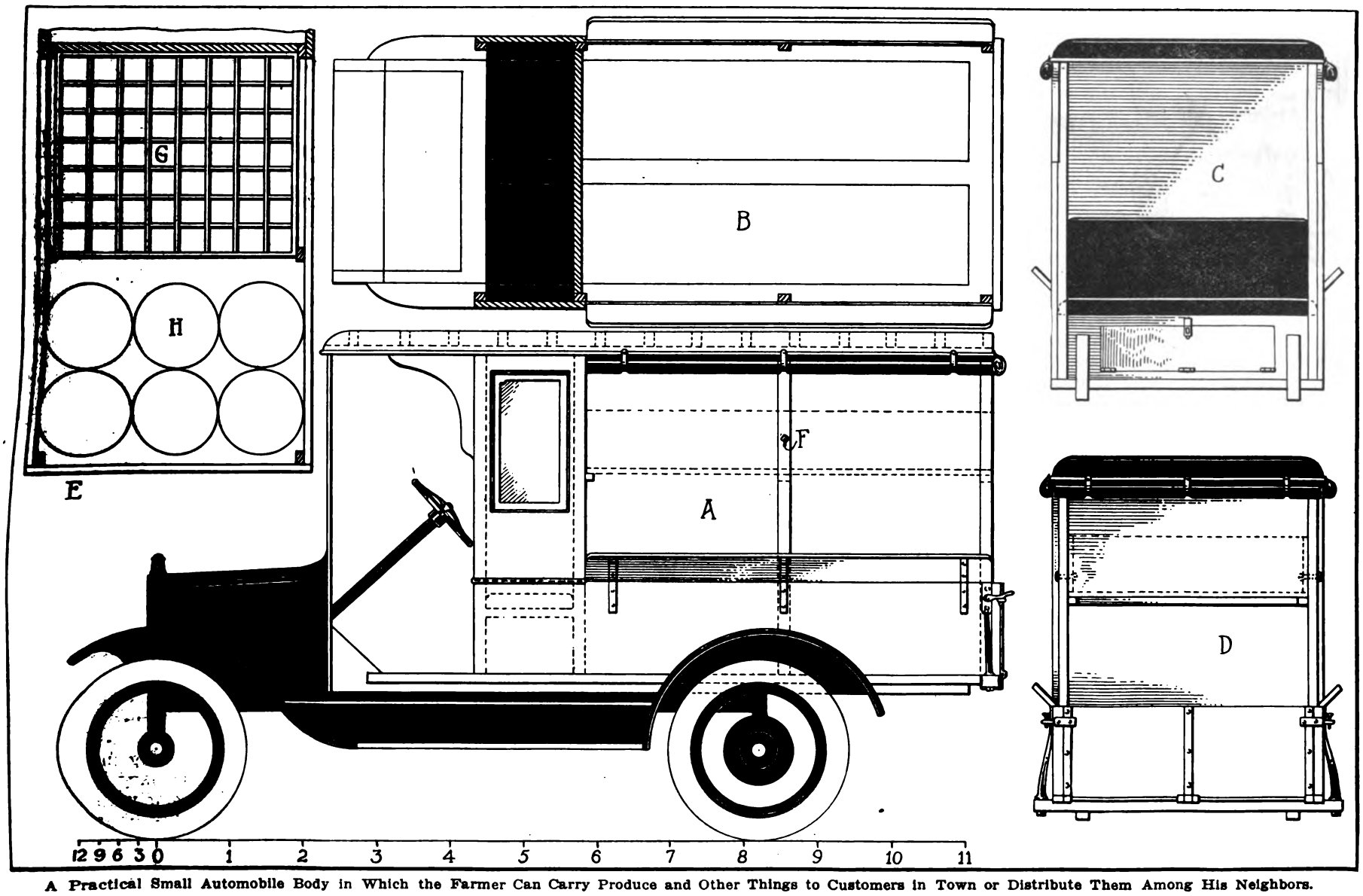
In all, there are 14 roof bows made from 1 by 1½ in. stock, and these are bent so as to bow out six inches in all. The outside dimensions of the body are as follows:—Length 9 ft., loading space in back of the driver's seat 5 ft. 6 in., width of the body outside 3 ft. 9 in., height from the floor to top of the rough bow 4 ft. 10 in.

When the body is used upon a Ford car as shown in the illustration, it overhangs the chassis frame about 3 ft. 3 in. and when built to the dimensions specified and fully loaded, the weight is evenly distributed on both sides of the axle.

QUESTION ABOUT SAVING IN WAR TIMES.

Is it worth while for me to save small amounts when I see those about me continuing large extravagances?

Yes, it is. Every yard of material, every day's labor you set free for the Government counts. Every bit you unnecessarily use tampers with the equipment of the Army. This is not a choice. It is a duty. America expects every woman to do her duty in the same spirit as we expect each soldier when the command comes to "go over the top" without turning to see if the next man has gone first!



A Practical Small Automobile Body in Which the Farmer Can Carry Produce and Other Things to Customers in Town or Distribute Them Among His Neighbors.

Digitized by Google



In this department our readers are invited to contribute articles explaining how they solve the various problems arising from day to day in the shop. You may have developed a method whereby a piece of work is finished quicker, easier and better than formerly, but when you have done so why not give your fellow-craftsman the benefit of your experience? No matter how simple the job may appear to you it may be one that is bothering the other fellow, so make a rough sketch of it, write a few words of explanation and send it to the editor of this department. He will have the sketch remade by an artist and fix up the article. We want every reader to join in making this department one of the features of our publication. Any suggestion for lightening one's labors in the shop will be welcomed and appreciated by your fellow-craftsman.

Welding Boiler Flues.

From W. Offer, Central America.—Will you please tell me how to weld boiler flues? The flues are 2¼ inches and I want to weld about one foot additional to them.

Reply.—First clean the flue thoroughly, if it has been in use, rapping it until all the scale is knocked out. Make a thorough examination to ascertain if the flue is in good condition.

Line up, with the flue, the portion you are to weld on, leaving the edges about one-eighth of an inch apart. Spot-weld or "tack" in three or four places to hold it in alignment. Use for a welding rod the best Norway iron, about one-eighth inch in diameter.

Beveling of the edges is not necessary, but be sure and penetrate to the bottom of the material in welding. After the weld is completed and cold, grind the material flush.

A Number of Good Suggestions.

From E. V. Rowley, Connecticut.—I am sending a few helpful hints which I hope will be useful. They are all practical, as I have made use of them myself. Here is the way

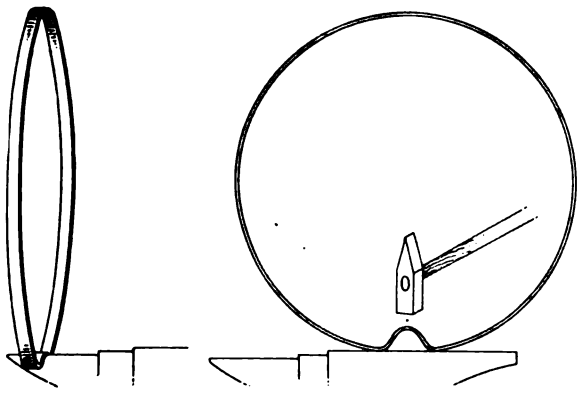


Fig. 1—How Mr. Rowley Upsets Small Tires.

that I upset a small tire, and I think the method is easier than using the upsetter. First I bend a U shape in the tire as shown in the sketch, Fig. 1, then I drive down upon the bend with the hammer. With very little practice the smith will find this easier than upsetting any light tire, and it works equally well on a thin tire that cannot be upset in an upsetter.

Some little time ago, perhaps two years, I wanted a power grindstone, and though I

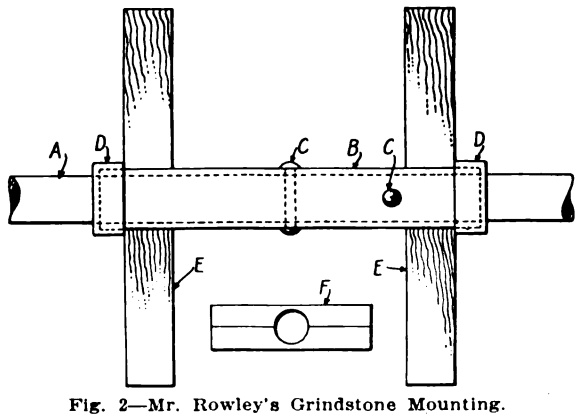


Fig. 2—Mr. Rowley's Grindstone Mounting.

owned the stone, I did not have a shaft. This is the way I made one, with but very little work and expense. I obtained a long piece of iron pipe, one inch size, and slipped a 1¼-inch piece, eight inches long, threaded at both ends, over it as shown at B, Figure 2. These two pipes I riveted together with two 5/16-inch rivets at right angles to each other, as shown at C. I then obtained a 1¼-inch pipe coupling and sawed it in half, using each half as a nut as shown at D. Two pieces of oak wood, shown at E, measuring five inches wide and one inch thick, I used as side plates for the stone.

For mounting I made two hardwood boxes, shown at F. These I made by taking two

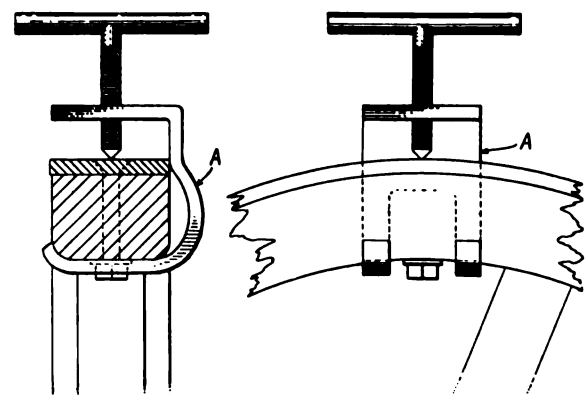


Fig. 3—A Handy Tire Bolt Clamp.

pieces of hardwood and boring the hole after the pieces had been clamped firmly together. For a driving pulley I used an old wooden polishing wheel.

I use a very handy tire bolt clamp which I made myself. I obtained a piece of 1¼ by 7/16-inch steel tire stock and split it to form claws, bending it in the shape shown at A, Fig. 3. I next cut a thread on a piece of T stock and after inserting it, had a clamp that could be used in a great many places for many different things.

An Old Timer.

From J. W. Porcher, Ohio.—I am enclosing my yearly subscription money and want to tell the readers that I am one of your oldest patrons. I have read The Blacksmith and Wheelwright ever since 1882, and as long as I stay in the business I want to read it, for it is a very helpful book.

Prices from Wyoming.

From J. P. Callahan, Wyoming.—Though I have been working on the horseshoeing game and doing general blacksmithing since October of 1876, I want to say for the benefit of some of my younger brothers that I have not as yet mastered the trade. Still I have been able to hold every job that I ever had and have found that work done "good enough" means "done poorly." Unless the smith puts his very best efforts, skill and personality into every job that comes into his shop or to his forge he cannot turn out real skilled work.

I do not think that the good blacksmiths are getting enough for their work. I have had considerable competition in my town, and in towns both east and west, and as I use none but the very best of materials I can manage to get pretty fair prices.

For shoeing with factory shoes, sizes 0 to 4, I get $3; 5 to 8, $3.50; for shoeing stallions, $5 to $7; for new lays, $5 to $7; for sharpening plow lays, 35c. to 75c. each; road or frost plows, $1.00 to $1.50; new wagon axles, $6 to $7; new wagon tongues, $6 to $6.50. For jobs done by time schedule I figure about one dollar per hour and add the cost of material, together with the overhead, which I figure at 25%. People around here call my shop "the busy nest." I think that any brother smith who does good work and uses good material can get his own prices.

Says Business Is Good.

From Country Blacksmith, Indiana.—I am located at a country crossroads shop and do all kinds of work, both repairing on agricultural machines and autos. My outfit consists of a gasoline engine, shafting, shop-made band saw, a grinding wheel stand that carries two wheels up to 16 inches diameter, also a hand-power drill that I rigged with pulley for power. I have a rubber tire machine, one portable Champion forge and one No. 400 blower and brick forge, also plenty of small tools, two blacksmith vises, bolt dies in standard and S. A. E. up to ¾-inch, pipe dies ⅛ to 2-inch, inclusive.

I make my tongs, punches, hammers and chisels, as well as any special tools that I need. I have an old gasoline engine that I intend to make an air compressor out of. Also think I shall make a disc harrow sharpener. I carry a stock of lumber, axles, rims, spokes, singletree woods, iron bolts, veterinary remedies. I do mowing machine repairs, such as knives, sections, guards, pitmans, pitman straps, knife heads, pinions, bolts, etc., for the Deering and McCormick.

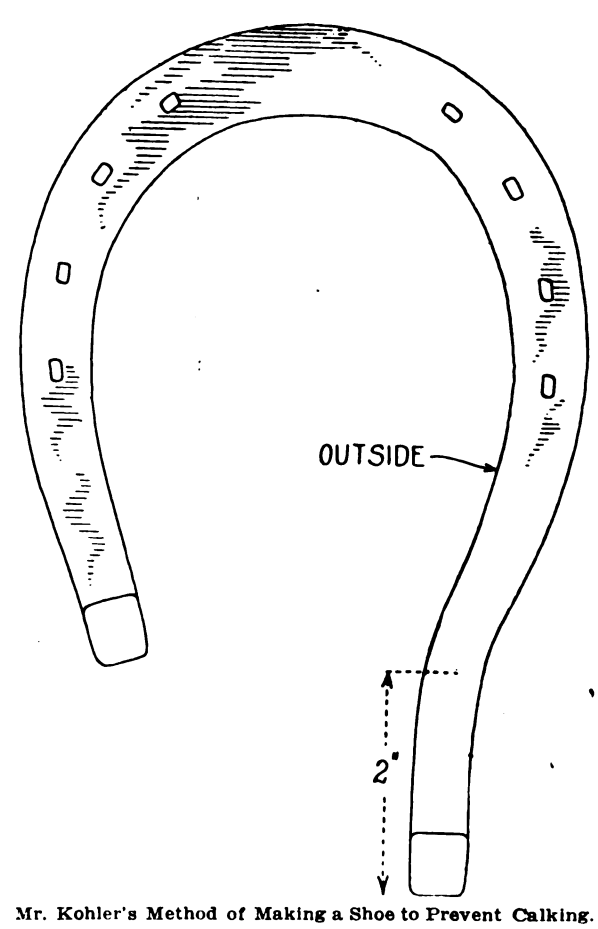
In the garage I keep a stock of tires and tubes and a small stock of Ford parts, etc. Expect to add to my stock of Ford parts. There never was a better time for the repairman than now if he will push his business. Tools and machines are so high that if the blacksmith will get in line with the different manufacturers of agricultural tools, be prepared to order parts for repairs, and let the farmers know that he can get parts, he can get quite a business worked up in a short time. I have been in the blacksmith business 15 years. When I started up the farmers would come in and ask if we could do so and so and were willing to wait until we could send and get the necessary material, but now everybody is in a hurry. "Can you repair this machine or wagon today?" they ask. "If you can I will leave it. If not, I will go to town, for I want to use it tomorrow." So we have to have enough material and help to do their work on short notice.

So it stands us in hand to get our prices up in proportion to what we have to pay for our material and then not forget to get after the slow pay and keep on his trail, until he comes through with the "kale."

New Year's is here, so resolve to do better work and get more for your labor than you have been getting.

To Prevent Calking.

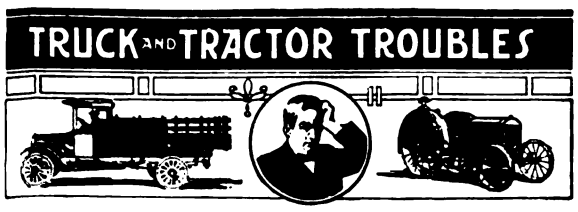
From Charles W. Kohler, New Jersey.—The horse that stands on one foot with the other foot against it so that he cuts the coronary band or punches a hole upon it in



Mr. Kohler's Method of Making a Shoe to Prevent Calking.

the flesh part of his hoof can be prevented from doing this by a horseshoe such as shown in the sketch. When he stands on one hoof and puts the other one against it he puts pressure on the upper one. When the pressure begins to hurt him, he tries to pull away the hoof underneath and in doing this injures himself. If he cuts the coronary band near the hoof it causes a split hoof which makes him lame. By using the shoe shown in the sketch the pressure on the upper hoof is thrown off by the long heel and there is no danger of cutting the lower foot.

Digitized by Google



Many of our blacksmith brothers are beginning to realize that a big line is open in the repairing of trucks, tractors and automobiles and so we have instituted our Truck and Tractor Trouble Department. In this department will be published all questions and answers dealing with automobiles, trucks and tractors. Don't hesitate to send in any questions that may be bothering you. Both the questions and answers will be published in the department and answers will be forwarded you by mail shortly after we have received your question.

Ford Engine Trouble.

From William H. Oetting, Illinois.—I have purchased a second-hand 1915 model Ford which is in fair condition and goes along very well with the exception of some trouble with the front spark plug.

Of course I have asked experienced garage men whom I have come in contact with what the cause of this is and also have asked them for a remedy for it and they all have different opinions. If I followed up their advice I would pay out more money than a new machine would cost. I have done several things which I thought were all right but they didn't remedy the trouble. Now I am going to tell you how it acts, after I put in a brand new spark plug. I may run for fifty miles all right, then the engine begins to miss and when I take out the plug to clean it according to instructions it will be all dirty and greasy. Now I would like to ask your opinion as to what causes the trouble and the remedy for it. If I get this problem solved I will hang out my shingle for an automobile repairer.

I enjoy reading The Blacksmith and Wheelwright and have got lots of good information out of it and I hope that you may be able to tell me how to overcome my trouble.

An Answer for Mr. Meyers.

From R. H. Reed, North Dakota.—I never did any piano playing on a Ford coil box but I believe I can give Mr. J. D. Meyers of Rhode Island what he is looking for. The firing order of the Ford motor is 1-2-4-3; No. 1 cylinder being the one directly back of the radiator. No. 1 coil is to the right of the coil box, as one sits in the seat. Start the engine and hold down the vibrators on the other three coils. This will show if No. 1 coil or plug is working, next hold down the two left and No. 1 vibrators, this shows up No. 2 cylinder. Next hold the three right vibrators. This gives you the required information on No. 4. Last but not least hold down two right and last left and you have No. 3. With a little practice I think Brother Meyers ought to run the scale perfectly.

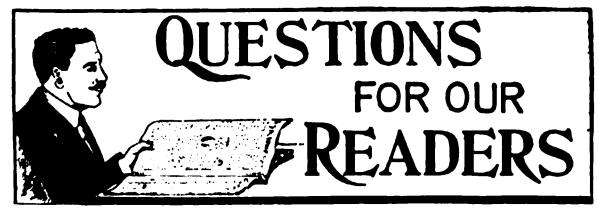
POTATOES FOR WHEAT.

America has fallen behind in its shipments of food to Europe. We must make up our obligations now by sending more cereals, especially wheat. Eating potatoes is one way to increase the supply of wheat.

We have the potatoes—millions of bushels are available now; they won't be as good three months from now. To conserve both wheat and potatoes eat potatoes now and get such an enthusiasm for potatoes that next year's production will beat this year's.

Germany gets 200 bushels of potatoes to the acre, the United States less than 100 bushels. Germany raises five times as many potatoes as the United States in less than one-tenth our area. We can and will do as well.

But that's for the future. For now, eat potatoes; save wheat—and redeem our obligations to the allies.



In this department our readers are invited to ask questions about anything concerning which they need information. There is no charge connected with it. It is as free as air. Questions require answers, and these often are as valuable to other readers as to the ones asking the questions. We urge all to make free use of this privilege. Fire all the questions at us you please. The more the better.

We want every one of our readers to take advantage of our Question Department. If you have any particularly difficult problem to solve, or if you want to know how to build or do some particular work, send us your question, and it will be printed in this department.

"Trading experiences" is the one best method for acquiring knowledge and your question may bother some of the other readers who will also be glad to see the answer in the magazine.

Wants Sketch of Boring Bar.

From J. A. Morrison, New York.—Will some brother smith please give me a sketch of a boring bar?

SPRING HEATING FURNACE.

A Handy Device for a Blacksmith Who Does Small Automobile Work.

Many smiths who have recently gone into the automobile repairing field find that there are many jobs to be done upon automobiles which are very similar to those done upon wagons. For instance, the matter of hardening and making of springs is one of the pieces of work which is practically the same as our forefathers did upon carriages.

To give good results, it is utterly essential that the spring leaf be properly tempered

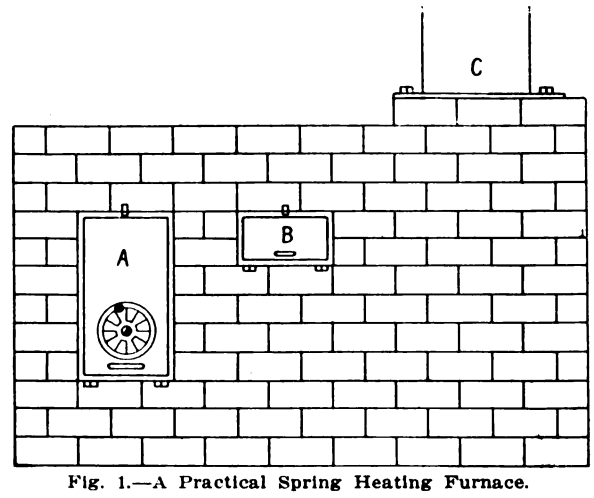


Fig. 1.—A Practical Spring Heating Furnace.

throughout its whole length. One soft place destroys the whole spring, for in order to function properly each leaf must bear its proportion of the load. In setting up the springs each leaf bears upon the ends of the leaf next to it. In other words, it is bowed slightly more than the one below it and should there be one soft place in its whole length, it will bend at this point and the rest of the spring naturally becomes inoperative. Should there be one point which happens to be brittle the leaf will drag at that point and then comes the work of replacement which is long and tedious.

Old Methods Not Satisfactory.

The old forge method of heating is not satisfactory unless performed by an expert workman. A spring may vary in length from 15 to 30 inches, and to heat up this whole length in a forge is rather a big proposition. Illustrated herewith is a specially designed heating furnace for heating springs of practically any length. Three views are given; the furnace as it looks from the outside in Figure 1; a cross-sectional view from the side, Figure 2; and a sectional view from the top, Figure 3. The forge is composed of fire brick or ordinary brick lined with fire clay and is a straightway construction having but three bendings; one at the side A, Figure 1, for stoking the fire and removing the ashes; B for inserting and removing the springs and an opening for the flue at C.

The openings at A and B are fitted with ordinary iron doors, one at A having a slide or circular draught arrangement so as to regulate the fire. The door B may be fitted with a small inspection hole and cover. Inside the furnace the fire grate D, Figure 2, is placed in a line with the fire chamber, leaving a large space beneath for ashes. The fire chamber has a line of bricks across it next to the grate at E, and a second line at F. The bricks at E should be raised slightly higher than those at F in order that the springs may be slanted slightly to conform with the shape of the fire chamber.

This method of construction permits the

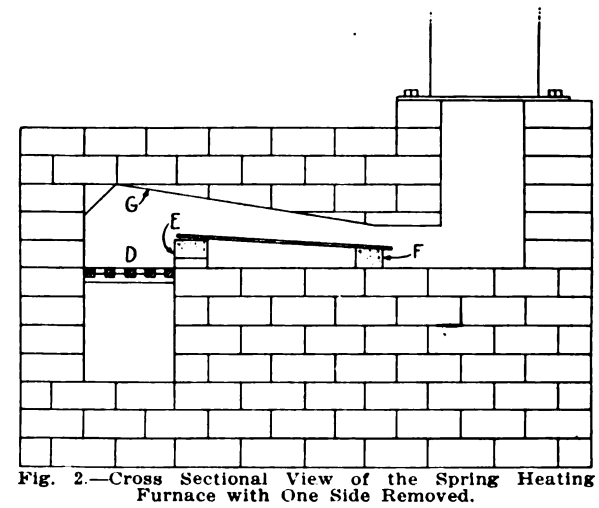


Fig. 2.—Cross Sectional View of the Spring Heating Furnace with One Side Removed.

springs to be placed in line with the flow of heat from the fire. In this way the fire at D may be regulated so as to produce an approximate even heat throughout the fire chamber. To secure a more even distribution of the heat, the bricks at E are channeled at their lower edges, admitting the fire beneath as well as above them. In the smaller furnaces used for heating springs up to 18 inches any provision for force draught is unnecessary. In larger furnaces, however, the chamber A may be fitted so as to connect with the regular forge air line.

To secure maximum strength, the furnace should be reinforced from the side with long iron bolts and the roof of the fire box should be reinforced at intervals with pieces of strap iron, bent to conform with the shape of the chamber and bolted through from the ends and top, the idea being to clamp all of the bricks so as to form a single cover.

Tempering the Springs.

After the spring leaves have been forged and set to the correct camber, they are heated uniformly to a cherry red heat, then taken out and plunged into a large trough of water from which the chill has been taken off. This water, however, should not be allowed to get too hot. The leaves are then placed into a furnace again and the temper drawn to the proper point which can be determined with a little experience. After they have been properly tempered they should be allowed to cool off in the air.

Not only may the furnace be used for tempering ordinary straight springs, but also for tempering coil springs. In the latter case

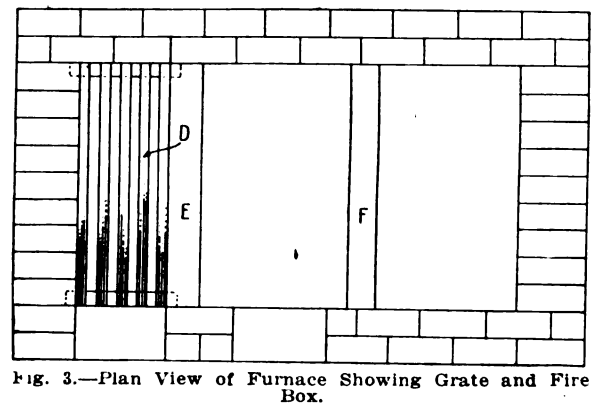


Fig. 3.—Plan View of Furnace Showing Grate and Fire Box.

they may be tempered upon the same mandrel as was used to coil them. If many short springs are to be tempered at one time they may all be threaded upon long iron rods, and if much of this sort of work is done the long rods should be fitted with large nuts and washers at each end. By this means 65 or 70 springs can be hardened at one time, without the neceessity of handling each individual spring.

Digitized by Google

Index to Advertisers

Aetna Nut Co., horseshoe calks ..Front cover
A. & J. Mfg. Co., brazing compound..4th cover
Akron-Selle Co., gears ..145
Akron Rubber Mold & Machine Co., tire repair outfits ..Front cover
American Calk Co, calks..Front cover
Anti-Borax Compound Co., welding compounds ..127
Armstrong Mfg. Co., bolt dies..145
Armstrong-Blum Mfg. Co., punches and shears ..Front cover
Barcus Mfg. Co., horse stocks..143
Barnett, G. & H., Co., files and rasps, Front cover
Batavia Rubber Co., rubber tire applying machines ..146
Bertschy-Bermo Co., welding plants..145
Bicknell Mfg. & Supply Co., dies..145
Birch Motor Cars, motor cars..147
Bradley, C. C., & Son, shaft coupler..147
Buffalo Forge Co., blacksmiths' tools..127
Burden Iron Works, horseshoes..3rd cover
Bush Motor Co., automobiles..128
Butterfield & Co., taps, dies and screw plates ..128
Campbell Iron Co., supplies..145
Canedy-Otto Mfg. Co., blacksmiths' tools..124
Capewell Horse Nail Co., horse nails, Front cover
Champion Blower & Forge Co, blowers..123
Champion Tool Co., blacksmiths' tools..126
Chandlee & Chandlee, patents..Front cover
Childs, S. D. & Co., steel stamps..Front cover
Columbus Forge & Iron Co., anvils..146
Columbian Hardware Co., vises..126
Corona Mfg. Co., veterinary remedies, Front cover
Cortland Welding Compound Co., welding compounds ..147
Cray Bros., blacksmiths' tools..145
Crescent Machine Co., woodworking machinery ..145
Diamond Calk Horseshoe Co., horseshoes, 2d cover
Electric Blower Co., blowers..148
Electric Wheel Co., wheels..Front cover
Empire Mfg. Co., wheels..145
Felton Sibley & Co., paints..121
Firestone Tire & Rubber Co., tires..121
Fisher & Norris, anvils and vises..128
Franklin Steel Works, toe calks..148
Gardner, R., Electric & Mfg. Works, blowers ..4th cover
General Welding Co., welding outfits..146
Gillette Clipping Machine Co., clipping machines ..146
Gogel Mfg. Co., tire heaters..145
Greenfield Tap & Die Corporation, screw plates and blacksmiths' machinery..143
Gwilliam Co., ball bearings..4th cover
Hart Mfg. Co., stocks and dies..4th cover
Harvey Spring & Forging Co., auto springs ..148
Hawkeye Mfg. Co., hammers..4th cover
Hay-Budden Mfg. Co., anvils..4th cover
Heller Bros., horse rasps, tools, etc..128
House Cold Tire Setter Co., tire setters, hollow and spoke augers..4th cover
Jenner, H. W. T., patents..144
Johnston, R. F., Paint Co, paints..2d cover
Kerrihard Co., hammers..3rd cover
Kimball Tire Case Co., tire protectors..128
Lemoine, N., Co., hoof packing..Front cover
Linde Air Products Co., oxygen..128
L. S. P. Calking Machine Co., calking machines ..4th cover
Macgowan & Finigan Cordage Co., hammers ..4th cover
Mayer Bros. Co., hammers..3rd cover
Mechanical Hammer Co., Ltd., hammers..122
Ness, Geo. M., Jr., steel stamps..Front cover
Nicholson File Co., files and rasps..2d cover
Oneida National Chuck Co., chucks..4th cover
Ottawa Mfg. Co., kerosene engines..145
Parker, C. L., attorney..Front cover
Parks Ball Bearing Machine Co., woodworking machinery ..143
Peck, Stow & Wilcox Co., pincers..148
Phoenix Horseshoe Co., horseshoes and toe calks ..125
Porter, H. K., bolt clipper..4th cover
Prentiss Vise Co., vises..4th cover
Rosewater Electric Co., blowers..128
Shaler, C. A., Co., vulcanizers..121
Sheldon Axle & Spring Co., axles..124
Schwarzkopf, S., tuyere irons..128
Standard Horse Nail Co., horseshoe nails, 4th cover
Standard Horseshoe Co., horseshoes 3rd cover
Star Mfg. Co., agricultural implements, 3d cover
Stokes Bros. Mfg. Co., rasps ..Front cover
Superior Oxy-Acetylene Machine Co., welding outfits ..Front cover
Thompson Tuyere Iron Co., tuyere iron, 4th cover
United States Horseshoe Co., horseshoes, 2d cover
Warner, R. P., Electric Co., blowers..126
West Tire Setter Co., tire setters, hammers ..145
Wheel, B Top & Hardware Co., supplies..144
Whisler Mfg. Co., nut splitters, jointer heads ..145
Witte Engine Works, engines ..147
Wolfe, Matt. L., tire coolers ..Front cover
Young, W. F., veterinary remedies ..128

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co. ..3d cover

Anvils
Columbus Forge & Iron Co..146
Fisher & Norris..128
Hay-Budden Mfg. Co..4th cover

Attorneys
Parker, C. L. ..Front cover

Automobiles
Bush Motor Co..128

Automobile Springs
Harvey Spring & Forging Co..148

Axles
Sheldon Axle & Spring Co..124

Ball Bearings
Gwilliam Co. ..4th cover

Blacksmiths' Machinery
Greenfield Tap & Die Corporation..143

Blacksmiths' Tools
Buffalo Forge Co..127
Butterfield & Co.,..128
Canedy-Otto Mfg. Co..124
Champion Blower & Forge Co..123
Champion Tool Co..126
Cray Bros..145
Heller Bros. Co. ..128
Nicholson File Co..2d cover
Peck, Stow & Wicox Co..148

Blowers
Buffalo Forge Co..127
Champion Blower & Forge Co..123
Champion Tool Co..126
Electric Blower Co..148
Gardner, R., Electric Mfg. Wks..4th cover
Rosewater Electric Co ..128
Warner, R. P., Electric Co..126

Bolt Dies
Armstrong Mfg. Co. ..145

Bolt and Rivet Clippers
Porter, H. K..4th cover

Brazing Compound
A. & J. Mfg. Co..4th cover

Calking Machines
L. S. P. Calking Machine Co..4th cover

Calks, Horseshoe
Aetna Nut Co..Front cover
American Calk Co..Front cover
Diamond Calk Horseshoe Co. ..2d cover

Calks, Toe
Franklin Steel Works..148

Chisels
Champion Tool Co..126
Peck, Stow & Wilcox Co..148

Chucks
Buffalo Forge Co ..127
Oneida National Chuck Co..4th cover

Clipping Machines
Gillette Clipping Machine Co..146

Dies
Bicknell Mfg. & Supply Co..145

Disc Sharpeners
Mayer Bros., Co..3rd cover

Drills
Buffalo Forge Co..127
Champion Blower & Forge Co..123

Engines
Ottawa Mfg. Co..145
Witte Engine Works..147

Farriers' Tools
Barnett, G. & H., Co..Front cover
Champion Tool Co..126
Heller Bros. Co..128
Peck, Stow & Wilcox Co..148

Files and Rasps
Barnett, G. & H., Co..Front cover
Nicholson File Co..2nd cover
Stokes Bros. Mfg. Co..Front cover

Forges
Buffalo Forge Co..127
Champion Blower & Forge Co..123

Gasoline Engines
Witte Engine Works..147

Gears
Akron-Selle Co. ..145

Hammers
Champion Tool Co..126
Hawkeye Mfg. Co..4th cover
Kerrihard Co. ..3rd cover
MacGowan & Finigan Cordage Co., 4th cover
Mechanical Hammer Co., Ltd..122
Peck, Stow & Wilcox Co..148
Mayer Bros. Co..3rd cover
West Tire Setter Co..145

Hollow Augers
House Cold Tire Setter Co..4th cover

Hoof Packing
Lemoine, N., Co..Front cover

Hoof Parers
Champion Tool Co..126

Hoof Nippers
Champion Tool Co..126

Hoof Shears
Champion Tool Co..126

Horseshoes
Burden Iron Works..3rd cover
Diamond Calk Horseshoe Co..2nd cover
Phoenix Horseshoe Co..125
Standard Horse Shoe Co..3rd cover
United States Horseshoe Co..2nd cover

Horseshoe Calks
Diamond Calk Horseshoe Co..2nd cover

Horseshoe Nails
Capewell Horse Nail Co..Front cover
Standard Horse Nail Co..4th cover
Union Horse Nail Co.

Horse Stocks
Barcus Mfg. Co..143

Kerosene Engines
Ottawa Mfg. Co..145
Witte Engine Works..147

Motor Cars
Birch Motor Cars..147

Nut Splitters
Whisler Mfg. Co..145

Oxygen
Linde Air Products Co..128

Paints and Varnishes
Felton, Sibley & Co..121
Johnston, R. F., Paint Co..2nd cover

Patents
Chandlee & Chandlee..Front cover
Jenner, H. W. T..144
Parker, C. L..Front cover

Pincers
Peck, Stow & Wilcox Co..148

Punches
Champion Blower & Forge Co..123

Punches and Shears
Armstrong-Blum Mfg. Co..Front cover
Peck, Stow & Wilcox Co..148

Rubber Tire Applying Machines
Batavia Rubber Co..146

Screw Plates
Butterfield & Co..128
Champion Blower & Forge Co..123
Greenfield Tap & Die Corporation..143

Shaft Coupling
Bradley, C. C., & Son..147

Spoke Augers
House Cold Tire Setter Co..4th cover

Steel Stamps
Childs, S. D., & Co..Front cover
Ness, George M., Jr..Front cover

Stocks and Dies
Butterfield & Co..128
Champion Blower & Forge Co..123
Hart Mfg. Co..4th cover

Supplies
Campbell Iron Co..145
Wheel, B. Top & Hardware Co..144

Swages
Champion Blower & Forge Co..123

Tires
Firestone Tire & Rubber Co..121

Tire Bending Machines
Buffalo Forge Co..127
Champion Blower & Forge Co..123

Tire Coolers
Wolfe, Matt. L..Front cover

Tire Heaters
Gogel Mfg. Co..145

Tire Protectors
Kimball Tire Case Co..128

Tire Repair Outfits
Akron Rubber Mold & Machine Co., Front cover

Tire Setters
Buffalo Forge Co..127
House Cold Tire Setter Co..4th cover
West Tire Setter Co..145

Tire Shrinkers
Buffalo Forge Co..127
Champion Blower & Forge Co..123

Tire Upsetters
Buffalo Forge Co..127
Champion Blower & Forge Co..123

Tongs
Champion Tool Co..126

Tool Grinders
Phoenix Horseshoe Co..125

Trucks
Akron-Selle Co. ..145

Tuyere Irons
Buffalo Forge Co..127
Champion Blower & Forge Co..123
Schwarzkopf, S. ..128
Thompson Tuyere Iron Co..4th cover

Veterinary Remedies
Corona Mfg. Co..Front cover
Young, W. F..128

Vises
Butterfield & Co..128
Columbian Hardware Co..126
Fisher & Norris..128
Prentiss Vise Co..4th cover

Vulcanizers
Shaler, C. A., Co..121

Wagons
Akron-Selle Co. ..145

Welding Compounds
Anti-Borax Compound Co..127
Cortland Welding Compound Co..147

Welding Outfits
General Welding Co..146
Superior Oxy-Acetylene Machine Co., Front cover

Welding Plants
Bertschy-Bermo Co. ..145

Welding Supplies
Linde Air Products Co..128

Wheel Dishers
House Cold Tire Setter Co..4th cover

Wheels
Electric Wheel Co..Front cover
Empire Mfg. Co..145

Woodworking Machinery
Buffalo Forge Co..127
Crescent Machine Co..145
Parks Ball Bearing Machine Co..143

Wrenches
Champion Tool Co..126

Wrenches (Knife Handle and Pipe)
Peck, Stow & Wilcox Co..148

SPARKS AND SHAVINGS



Leading Trainers Use Absorbine.

Liniments may come and liniments may go, but old reliable Absorbine continues to hold its place of supremacy in the stables of the leading trainers and breeders.

The secret of the success of Absorbine is not hard to find. Merit wins success and Absorbine has very decided merit. During the quarter of a century and over that it has been on the market, horse owners have come to recognize Absorbine as the liniment that will accomplish results even after other preparations and methods fail. It not only produces satisfactory results but it does its work in a clean, pleasant way—it does not blister or remove the hair and there is no need of laying up the horse while under treatment.

Here is what a few users write about Absorbine:

"I wish to tell you that I have had fine luck with Absorbine. It has taken the bog spavin off nice and clean."

"Absorbine is wonderful for bumped knees and I don't think I could train without a bottle in my barn."

"I have removed a great many bad cases of bog spavin, thoroughpins, etc., with Absorbine when all other things failed. It cannot be surpassed as a body and leg wash."

"I do not think that a training stable is complete without Absorbine in it. I use it on bad legs or large knees and there is nothing better."

"I have used a bottle of Absorbine on a shoe boil and it has removed it entirely."

"I removed a curb with Absorbine without laying up the horse and the leg is as clean as it ever was."

"Absorbine gives the quickest relief of any liniment I have ever used."

Absorbine can be strongly recommended for reducing bog spavins, thoroughpins, shoe boils, capped hocks, swollen glands, thickened tissues, rheumatic deposits, enlarged veins, painful swelling, strained, ruptured tendons, ligaments or muscles; to allay pain and stop lameness; to strengthen any part that needs it.

Absorbine is sold by most druggists at $2.50 a bottle or sent direct postpaid by the manufacturer, W. F. Young, P. D. F., 55 Temple Street, Springfield, Mass.

Do You Put on Rubber Tires?

Every country blacksmith who has not already done so should take up the business of applying rubber tires to carriages, wagons and automobiles. In considering this business, however, it is important to arrange for using standard and well advertised brands of tires because the familiarity of the public with such tires will assist materially in their sale. Firestone tires, manufactured by the Firestone Tire & Rubber Company of Akron, Ohio, are extensively advertised and well known wherever rubber tires are used throughout the world. Readers who are interested in this standard line of tires should write for interesting printed matter and full information direct to the main office of the company at Akron, Ohio.

Phoenix Horse Shoes and Calks.

The Phoenix Horse Shoe Co., with main offices at Chicago, Ill., and large rolling mills at Joliet, Ill., and Poughkeepsie, N. Y., manufactures a line of horse and mule shoes which is known all over the world. This company also manufactures the well known bull dog toe calks. If you have not already obtained samples of these shoes and calks it might be well to do so, or at least to write for free literature to the main office at Chicago.

Welding Plants.

Many of our readers have been investigating the oxy-acetylene process of welding. This is a business which can be taken up to great advantage by blacksmiths to increase their regular income. The Bertschy-Bermo Co. of Omaha, Nebr., manufactures a line of welding equipment and a complete plant can be purchased at prices ranging from $25.00 to $300.00. To make it easy for the blacksmith, these plants are sold with only small cash payments down, the balance being paid in from three to six months, thus putting the equipment within the reach of every small shop in the land. Readers who are interested should write to the Bertschy-Bermo Co. for free literature and full particulars, also for their special offer to blacksmiths.

Crescent Wood Working Machinery.

A large line of wood working machinery, including the Crescent Universal wood workers, is manufactured by the Crescent Machine Co., 203 Main Street, Leetonia, Ohio. These labor saving machines are very popular just now in carriage, wagon and automobile repair shops on account of the great shortage of labor. The Crescent line includes Universal wood workers, band saws, jointers, saw tables, planers, disk grinders, shapers, swing cut off saws, hollow chisel mortisers, borers and variety wood workers. If you have not already sent for the large illustrated free catalog issued by this company, you certainly ought to do so.

Nicholson Files.

The files and rasps made by the Nicholson File Co., Providence, R. I., are known for high quality throughout the world, wherever tools are used. The manufacturers justly state that when the word "Nicholson" is stamped on a file it absolutely guarantees selected steel—forged, annealed, ground and cut by expert workmen who have made the needs of the trade a lifetime study. If you will specify the particular needs of your shop the Nicholson File Co. will be glad to send you their literature.

The Batavia Rubber Tire Applying Machine.

Every blacksmith who is really up-to-date should have his shop equipped with a machine for applying rubber tires. The Batavia rubber tire applying machine is said to be an excellent one for this

Digitized by Google



PARKS WAGON SHOP SPECIAL

You may think you don't need this practical woodworker in your shop. Take advantage of our trial offer, and be convinced how much it will save you. **Machines sent on trial anywhere in United States and Canada.**

Machine is a combination of Circular, Rip and Cross Cut Saws,
22" Band Saw,
12" Jointer,
Rim Rounder,
Felloe Borer,
Spoke Tenoner,

All ready for instant use. No Changing.

Light size takes 2 to 3 H. P., heavy size 3 to 4 H. P.

Write for catalog and full information about how a woodworker should be arranged to be convenient to operate.

Parks Ball Bearing Machine Co.
North Side Station
Cincinnati, O.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

OF THE BLACKSMITH AND WHEELWRIGHT, published monthly at New York, N. Y., for April 1st, 1918.

STATE of New York } ss.
COUNTY of New York }

Before me, a notary public in and for the State and county aforesaid, personally appeared F. R. Whitten, who having been duly sworn according to law, deposes and says that he is the business manager of The Blacksmith and Wheelwright, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

NAME OF—
Publisher—M. T. Richardson Company, 71 Murray Street, New York City, N. Y.
Editor—M. T. Richardson, 71 Murray Street, New York City, N. Y.
Managing Editor—M. T. Richardson, 71 Murray Street, New York City, N. Y.
Business Managers—M. T. Richardson, 71 Murray Street, New York City, N. Y.; F. R. Whitten, 41 Pinehurst Avenue, New York City, N. Y.

2. That the owners are:

M. T. Richardson Company, 71 Murray Street, New York City, N. Y.
STOCKHOLDERS—M. T. Richardson, 71 Murray Street, New York City, N. Y.
A. J. Richardson, Ridgewood, N. J.
Mrs. A. Louise Girardeau, Jr., Monticello, Fla.
Mrs. Mildred Ulmer, Monticello, Fla.
Mrs. H. L. Johnston, New Rochelle, N. Y.
W. F. Etherington, 341 Fifth Ave., New York City, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding one per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

M. T. RICHARDSON CO., Publishers.
The Blacksmith & Wheelwright.
F. R. WHITTEN, Business Manager.

Sworn to and subscribed before me this 21st day of March, 1918.

ROBERT R. VELIE,
Notary Public.
SEAL
(My commission expires March 30th, 1918.)

purpose and the manufacturers of this machine have received thousands of letters of recommendation from the leading wheelwrights and carriage makers in the United States and Canada. The No. 1 Batavia machine will apply ¾" to 1¾" tires and the No. 2 will apply ¾" to 2" tires. Readers who are interested should write at once for free descriptive pamphlet and prices to the Batavia Rubber Co., Batavia, N. Y.

Steel Stamps.

A complete line of steel stamps, letters and figures for marking your tools or your product is manufactured by S. D. Childs & Company, 136 S. Clark Street, Chicago, Ill. This company also manufactures a full line of name plates of all kinds. Correspondence is invited.

Greyhound Electric Blowers.

An excellent line of electric blowers is manufactured by the R. Gardner Electric & Mfg. Works, 1714 Columbus Road, Cleveland, Ohio. The Greyhound electric blower made by this company retails at $27.50. The manufacturers state that their motors are variable in speed and that they are made from the very best material obtainable. They have a perfect lubricating system and are economical in the consumption of current. The price quoted includes the rheostat cord and plug. These electric blowers will be shipped to any blacksmith through his dealer on a thirty days' trial. Readers who are interested should write for free printed matter and full particulars direct to the manufacturers.

Northwestern Horse Nails.

The Northwestern brand of horse nails has been on the market a great many years and this brand is said to be of the highest quality, the best of material being used by the manufacturers. The Northwestern nail is perfect in form and finish and the manufacturers claim that it will hold a shoe longer than any other nail made. The reinforced point makes this an easy nail to drive and one of the safest to use. Readers who have not already obtained samples of this nail should write for such a sample and also for free literature direct to the manufacturers, the Union Horse Nail Co., Chicago, Ill.

The "Blacker" Belt-Driven Striker.

Great interest has been manifested by many of our readers in the full page announcement and technical description which appeared in the April issue of The Blacksmith and Wheelwright regarding the "Blacker" Belt-Driven Striker, which is manufactured by the Mechanical Hammer Co., Ltd., Stayley Iron Works, Stalybridge, England. This is an extremely useful tool in any blacksmith's shop. It does away with the smith's helper. This tool has many features which make it entirely different from any similar device in the world. It is patented in all countries and will be introduced extensively in this country. Readers who have not already investigated the merits of this machine should write for full particulars direct to the manufacturers in England.

The S. S. Tuyere Iron.

This Tuyere iron is manufactured by S. Schwarzkopf, Toledo, Ohio. The manufacturer states that one of the great advantages of this iron is that parts that burn out can be taken off the top. This iron will save coal and every blacksmith who gives it a trial is delighted with the way it works. The retail price of the Tuyere iron is $6.00. Send your orders direct to the manufacturer or write for full particulars in regard to this excellent Tuyere iron.

Gillette Clipping Machines.

The Gillette Clipping Machine Co., 129 West Thirty-first Street, New York City, has an experience of a quarter century in making flexible shaft hand and power machines for clipping horses, mules, dogs, cows and for shearing sheep. Gillette clipping machines and parts are guaranteed as to materials and workmanship. The Gillette cutters are unexcelled and can be used on any stated make of flexible shaft clipping machine. Grinding and repairing is their specialty and renewal and repair parts are constantly carried in stock. Write direct to this well-known company for their illustrated price list, which is free. These clipping machines can be ordered direct or through your dealer.



Your Most Useful Tools

An automobile screw plate made up for Ford cars, and that can be used on a lot of other work as well—that is what is shown here complete in a wooden case. This set is useful in your work every day, and at the same time puts you in position to take care of Ford repairs—and "every other car is a Ford!"

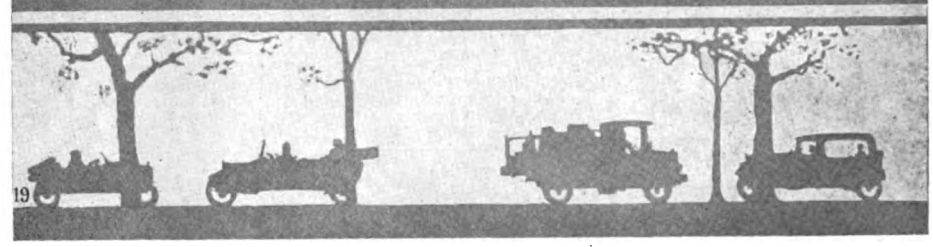
This screw plate is made up of standard Taps, Dies, Reamers, Stocks, Tap Wrenches in the proper sizes, all G. T. D. Standard tools.

Add to your business by having this No. 2501 Screw Plate in your shop.

Complete catalog on request

GREENFIELD TAP & DIE CORPORATION
GREENFIELD, MASSACHUSETTS, U. S. A.

GTD



Would You Sell Your Life For $65?

You wouldn't part with even an arm or a leg for that figure, would you?

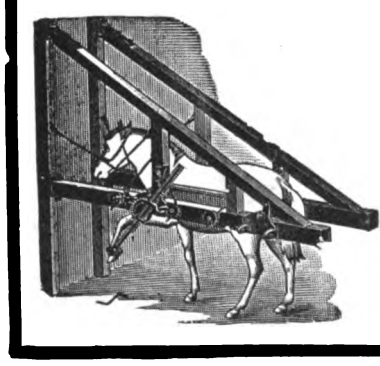
Yet every vicious horse you shoe is likely to do more damage in the twinkling of an eye than can be repaired at several times the cost of **Barcus Stocks.**

When you place a horse in a Barcus Stock, he is harmless—he cannot hurt either you or himself. Costing only $65 it is cheap insurance, indeed.

BARCUS STOCKS not only furnish the logical way to observe "Safety First," but they are also a positive aid to good shoeing. The BARCUS is a modern Stock—automatic working parts instead of the bothersome ropes, straps and blocks that made the old style stock almost more of a nuisance than a help.

If you don't know about **Barcus Stocks** you owe it to yourself and your family to write **at once** for the complete details.

The Barcus Mfg. Co.,
Wabash, Ind.



Please send me full particulars regarding your Horse Stocks without any obligation on my part.

Name.....

Town.....*State*.....

Digitized by Google

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

will be inserted under this head at 3 cents a word, including the address, for each insertion, payable in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York.

PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT.



We have LOW PRICES TODAY on WHEELS SHAFTS RIMS SPOKES BUGGY TOPS AUTO TOPS AUTO TIRES TOP COVERS INNER TUBES

Get our Catalogues

B WHEEL, TOP and HARDWARE COMPANY

128 E. 8th St.

CINCINNATI, OHIO U. S. A.

Patents

PATENTS FOR INVENTIONS.
H. W. T. JENNER, patent attorney and mechanical expert, 622 F Street, Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trade-marks registered.

PATENTS.
C. L. PARKER, attorney-at-law, and solicitor of patents. American and foreign patents secured promptly. Handbook for inventors sent free upon request. McGILL BUILDING, Washington, D. C.

Wanted

WANTED.
Second hand House Cold Tire Setter, with punch and shear, or with shear. Must be cheap. J. L. SCOTT, 4048 Laclede avenue, St. Louis, Mo.

WANTED.
Good all-around blacksmith. Young married man preferred. Top wages for right man. Address M. W. ABTS, Morrill, Nebr.

WANTED.
Salesman: Calling on quarries, mines, mills, factories and railroads to handle our Damascus Tempering Solution. Used by the largest railroads and steel industries. EMPIRE CHEMICAL CO., Huntington, W. Va.

WANTED.
Blacksmith and blacksmith helpers. FISCHER & DACKERMAN, East Broad and Chestnut Sts., Elizabeth, N. J.

WANTED.
To buy a good blacksmith stand with from ten to forty acres of land, with some fruit. Address with particulars to L. L., box 33, Prairie View, Ill.

WANTED.
Large screw-cutting lathe, shaper, trip hammers, planer, anvils, drill presses. J. A. LOFFELMACHER, Box 39, Fairfax, Minn.

WANTED.
Experienced carriage blacksmith helpers. Apply or write D. H. SCHMIDT CARRIAGE WORKS, St. Joseph, Mo.

For Sale

FOR SALE.
Gasoline tank and pump, 2" retreading moulds and cash register. VANDERPOOL CO., Springfield, O.

FOR SALE.
Make money easy. While business is good. Vulcanize tires. Our book tells you how. $1.00. VANDERPOOL CO., Springfield, Ohio.

FOR SALE.
First-class Blacksmith and Wagon Shop. Two-story brick building, 30 x 50. Wagon shop is 16 x 40. Have four fires, good tools and machinery and work for five men steadily. I will sell stock and tools and rent the shop. Have been in business twenty-five years and wish to retire. For further particulars address FRANZ NIEMANN, New Ulm, Minn.

FOR SALE.
On account of sickness, Horseshoeing and General Repair Shop, with stock and tools, house and lots, in live town; 1,100-1,500 population. On main line between Portland and Seattle and Pacific Highway. A1 chance for right man. OTTO WICHERT, Winlock, Wash.

For Sale

FOR SALE.
Heavy punch and shear, suitable for blacksmith and wheelwright work; price, $150.00. Send for photograph and description. J. L. LUCAS & SON, Inc., Bridgeport, Conn.

FOR SALE.
Blacksmith shop, tools and drilling, with one acre lot. Only shop in town. Owing to poor health am obliged to retire. Address MARTIN NEHRT, Frogtown, Illinois, P. O. Carlyle R. R. 2.

FOR SALE.
Horse-shoeing and blacksmith shop, complete with stock and tools, doing a good business; also nine-room house and barn, 1¼ acres of land with fruit trees. Will sell at a bargain. Terms to suit. Reason for selling, poor health. For further particulars write J. ALEXANDER, R. D. No. 2, Winsted, Conn.

FOR SALE.
Power blacksmith shop, 26 x 52, with complete set of tools, two forges, Little Giant trip hammer, cold tire setter, emery and saw stand, Brooks oxy-acetylene welding machine, eight horse-power gasoline engine. Will sell or trade for land. HARRY ATEN, Addington, Okla.

FOR SALE.
One No. 4 Brooks Cold Tire Setter; sets tires ¾ inch to 4 inch. One No. 1 Sweet Rubber Tiring Machine, complete. Address OTTO HASFURTER, Kent, Ind.

FOR SALE.
A good two-story dwelling and a large two-story shop and lots of tools, in a rich farming country. Work for two men all year around. Will sell at a bargain if taken at once. Write to J. M. RAGLAND, Lintner, Ill.

FOR SALE.
Blacksmith Shop; complete stock and tools. In good farming and new oil community. A. P. ANDERSON, Hamilton, Kans.

FOR SALE.
Blacksmith and woodworking shop, with necessary tools and machinery. Only shop in town of 1,000. All two men can do. Price $750. Address Box 135, Tonganoxie, Kans.

FOR SALE.
Blacksmith stock and iron and wood stock. Write to TORSTEIN SOLVBERG, Paullina, Iowa.

WHEELWRIGHTS

We have discontinued the vehicle business and have some good equipment at very reasonable prices.

1 West Tire Setter with oil pump complete.
1 Box Press.
2 Nut run up machines.
1 Bolt cut off machine.

We offer also at bargain prices—Auto Buggy Seats, Top Joints, Shifting Rails, Axle and Saddle Clips, and other buggy materials.

PARRY MFG. CO., INDIANAPOLIS

Tires

Double Tread Tires

Notice Our Prices Before Going Elsewhere

PRICE LIST

Size	Plain	Size	Plain
30x3	$5.00	35x4	$9.00
30x3½	5.50	36x4	9.50
32x3½	6.50	36x4½	10.00
32x4	7.00	36x5	10.00
33x4	7.50	37x4½	10.00
34x4	8.00	37x5	10.50
34x4½	8.50		

For Non-Skid, 50 cents more on all sizes.

We Carry a Full Line of New and Used Tires & Tubes

GINSBERG & BERKOWITZ, Inc.
236 WEST 48th STREET, NEW YORK

DOUBLE TREAD TIRES

GUARANTEED

SPECIAL OFFER TO AGENTS. Write for Catalogue

Get our special price on new tires

M. LIBEN & CO.
205-AK West 48th St. New York City

Employees Wanted

WANTED

Machinists, Blacksmiths, Punch and Shear Men and Wood Machine Hands

APPLY

KENTUCKY WAGON MFG. CO.
LOUISVILLE, KENTUCKY

Miscellaneous

QUICK COLLECTIONS.
Send your accounts to-day to a live wire firm and get your money NOW! Established 25 years; collections made everywhere. WILLIAM H. DODD, 87 Nassau St., New York. Phone 6231 Cortland.

AUTOMOBILE REPAIRS.
Blacksmiths who own automobiles or repair automobiles in their shops should subscribe for the AUTOMOBILE DEALER AND REPAIRER: 100-page illustrated monthly devoted exclusively to the care and repair of the car. It is the only magazine in the world devoted to the practical side of motoring. Many garages and repair shops subscribe for no other automobile magazine. The "Trouble Department" contains five pages of numbered questions each month from car owners and repairmen which are answered by experts on gasoline engine repairs. $1 per year; 15 cents per copy. Postals not answered. CHARLES D. SHERMAN, 52 Windsor Avenue, Hartford, Conn.

AUTO TIRE VULCANIZING PLANTS.
We buy, sell or exchange. Catalog is free—you save 30%. Instruction book on Vulcanizing, 75c. EQUIPMENT CO., 360 Eighth St., Cincinnati, O.

PRINTING FOR BLACKSMITHS.
Write for prices on printed letter heads, envelopes, statements, etc. NEWS PRINTING CO., Stockton, Ill.

Personal

PERSONAL.
Rheumatism cripples and tortures. Why suffer? Send address for immediate help. G. S. STOKES, Mohawk, Florida.

Gears

GEARS & SHAFTS

Transmission gears and shafts, differential gears and axle shafts in stock for over 125 makes (500 models) of pleasure cars and trucks. Obsolete, Orphan and Current models.

Dealers and repairmen, send for our 125-page price list and make a good profit on your repair work.

AUTO GEAR CO., Inc.
844 Eighth Avenue, New York, N. Y. **1461 S. Michigan Ave., Chicago**
275 Marietta St., Atlanta, Ga.
NO SECOND-HAND PARTS OR JUNK

Tires

BUY EARLY AND SAVE MONEY

Double Tread Tires and Tubes

GUARANTEED

Come to the Tire Clearing House—here are prices—clear cut and plain as daylight. We buy wholesale the best "try out" Tires—and you get the benefit—you want truthful tires, and truth is never crushed to earth if given a square deal—real truth is puncture proof—

SO ARE OUR TIRES.

Size	Plain	Non-Skid	Tubes
28x3	$4.40	$4.95	$2.00
30x3	5.50	6.05	2.00
30x3½	6.60	7.15	2.50
32x3½	7.15	7.70	2.75
34x3½	8.25	8.80	3.00
30x4	7.70	8.25	2.75
32x4	8.80	9.35	3.00
33x4	8.80	9.90	3.50
34x4	8.80	9.90	3.50
35x4	9.90	11.00	3.60

Get your order in quick for goods listed here—by all means get in touch with us for further information about our special process—it means money in your pocket. Get in right—write today—yes—today.

Look up rating in Dunn's or Bradstreet's.

Size	Plain	Non-Skid	Tubes
36x4	$9.90	$11.00	$3.60
32x4½	9.90	11.00	3.75
34x4½	11.00	12.10	4.00
35x4½	11.00	12.10	4.10
36x4½	11.00	12.10	4.25
37x4½	12.10	13.20	4.35
34x5	11.00	12.10	4.50
35x5	13.20	14.30	5.00
36x5	13.20	14.30	5.00
37x5	13.75	14.85	5.00

For (non-skid) sizes up to 32x4, 50c extra; all other sizes $1.00 extra.
For rebuilding your old tires we charge you 60% of the above prices.

B. LIBEN & COMPANY
261-A West 54th Street NEW YORK CITY 112-A East 110th Street
THE HOME OF DOUBLE TREAD TIRES

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Get It Patented.

Many of our readers have doubtless tried their hand at inventing some useful tool or machine. Sometimes a mechanic may produce some valuable new idea and in such cases the wisest way is to get it patented promptly, especially as the expense is not very great. Chandlee & Chandlee, well-known patent attorneys of 587 Seventh Street, Washington, D. C., make a specialty of assisting mechanics in obtaining and selling patents. This firm has been established for twenty-one years and it is an entirely reliable organization. If you will send a rough sketch of your new idea Chandlee & Chandlee will be glad to send you a free report regarding the patentability of your invention. Correspondence from our readers is earnestly solicited.

Digitized by Google

The closer you keep to whitewashed walls and cornmeal the more account you'll be.—*Lincoln.*

Let's **PULL** Together

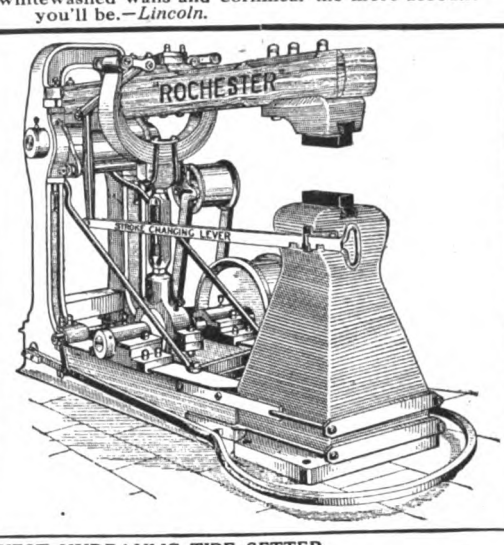
It isn't a very long pull to ask for our literature.

The Big Secret

"How to Save," by installing a "ROCHESTER" HELVE HAMMER is included.

This is the real 75 mile gun behind the trenches, but this one is for the general good of the Blacksmith and Wheelwright.

6 SIZES
2 Styles of Frames



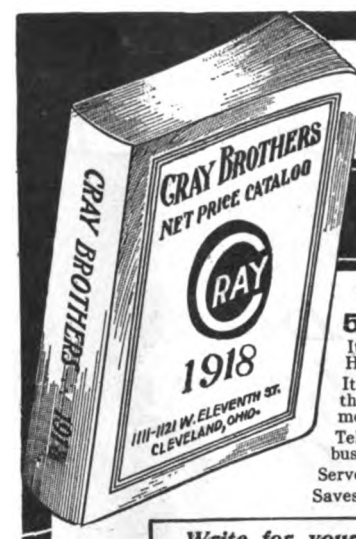
THE ROCHESTER HELVE HAMMER

WEST HYDRAULIC SHELL BANDING MACHINES

THE WEST HYDRAULIC TIRE SETTER

SEND A CARD TO THIS ADDRESS FOR OUR CATALOGUE AND PRICES.

WEST TIRE SETTER CO.
ROCHESTER, NEW YORK



Free 512 PAGES OF BARGAINS

POST PAID

WE WANT TO SEND YOU THIS 512 PAGE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

Tells how you can work up a profitable auto supply and repair business.

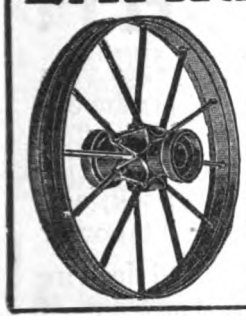
Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories
1117 W. 11th Street, Cleveland, Ohio, U. S. A.

EMPIRE STEEL WHEELS



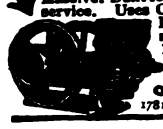
Plain or Grooved Tire
To Fit Any Wagon.

FARM TRUCKS
All Standard Types

Write today for Proposition to Blacksmiths

EMPIRE MFG. CO.
P. O. B. 208
QUINCY, ILL.

OTTAWA KEROSENE ENGINES



Latest design. Durable, Powerful, Reliable. Massive. Built to do hard, heavy work—to give lasting service. Uses Cheapest Fuel. Pulls 25 to 50% more H-P. than rated. Shipped on three months' trial. Easy terms. Sizes 1½ to 22 H-P. 10-Year Guarantee. Book free—postal gets it.

FREE BOOK

OTTAWA MFG. CO.
178 King St., Ottawa, Kans.

The Campbell Iron Company

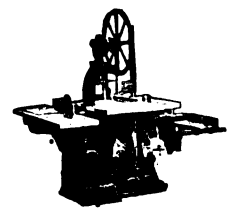
Wholesale Automobile, Garage, Machinists, Blacksmith and Implement Supplies, Hardware Specialties. Duplicate Parts for Fords carried in stock.
Write for new catalog for equipment and tools for the Garage
817 Cass Ave., St. Louis, Mo.

"GEARS AND WAGONS"

Selle Gears Forty years of success has placed "Selle Gears" and Wagons in the hands of the largest wagon users in the world. Express and Transfer Companies, Department Stores, etc., specify "Selle Gears" and will take no other after once tried. 230 Page Catalog Free.

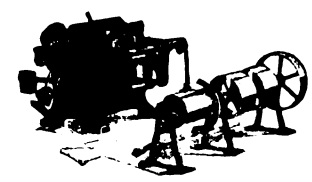
THE AKRON-SELLE CO. Akron, Ohio

Do you want anything? Is your shop for sale, or do you want to buy a shop or hire a man? If so, a "Want" advertisement in THE BLACKSMITH AND WHEELWRIGHT will bring you good results. See terms at the head of the "Want" Department on another page.



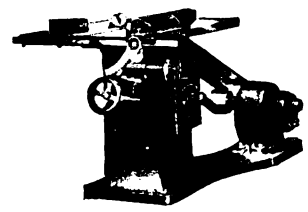
CRESCENT

UNIVERSAL WOOD WORKERS

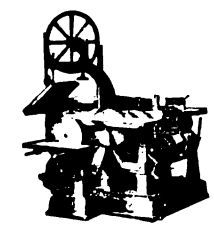


are very popular right now as shortage of labor will soon be general, but there will be more work than ever to be done. The best solution to this vexatious problem is for you to install labor saving equipment such as may be had in the CRESCENT line of Universal wood workers, band saws, jointers, saw tables, planers, disk grinders, shapers, swing cut off saws, hollow chisel mortisers, borers, variety wood workers.

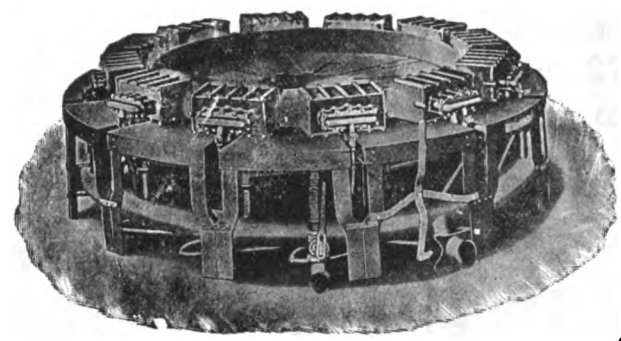
Today is the time for you to investigate the CRESCENT line.



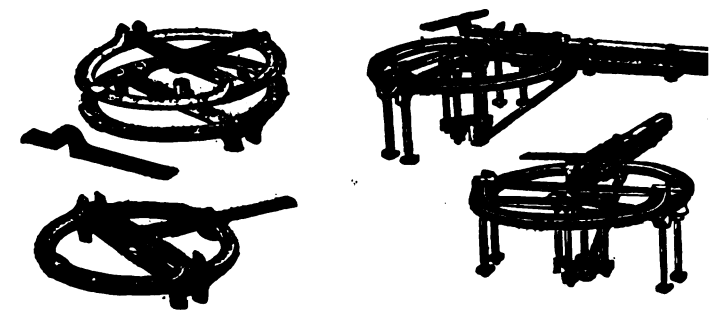
SEND FOR OUR CATALOG.



THE CRESCENT MACHINE CO.
203 MAIN STREET LEETONIA, OHIO



TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.
OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.



Center and Rear King Bolt Fifth Wheels. E Gate Springs, Flare Board Irons, Body Brac Heating Furnaces, Blow Pipes, etc.

THE COGEL MFG. CO., TOLEDO, OH



THE WOOD WORKER'S FRIEND
Get directions for building table and operating our Jointers. This information is valuable to wood workers. We manufacture 20 styles and sizes. Try a Jointer Head 30 days, if you are not pleased, return at our expense. Get prices.
Manufactured by WHISLER MFG. COMPANY, Gibson, Iowa

WELDING PLANTS, $25.00 to $300.00

Designed for all purposes. Small cash payment; balance, three to six months. Every mechanic and shop should have one.

BERTSCHY-BERMO CO. OMAHA, U. S. A

BICKNELL'S DRILL PRESS VISE

Holds Rounds, Squares and Flats



Drill Vise

Saves its cost every year in drills alone.
Base, bed and jaws fully machined.
Swivels to any position on Drill Table, or can be used as a Bench Vise.

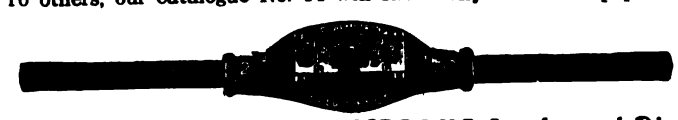
For sale by the jobbing trade.
Write for circular.

BICKNELL MFG. & SUPPLY CO., JANESVILLE, WIS.

THE ARMSTRONG MFG. COMPANY

BRIDGEPORT CONN., U.S.A.
NEW YORK OFFICE 248 CANAL STREET

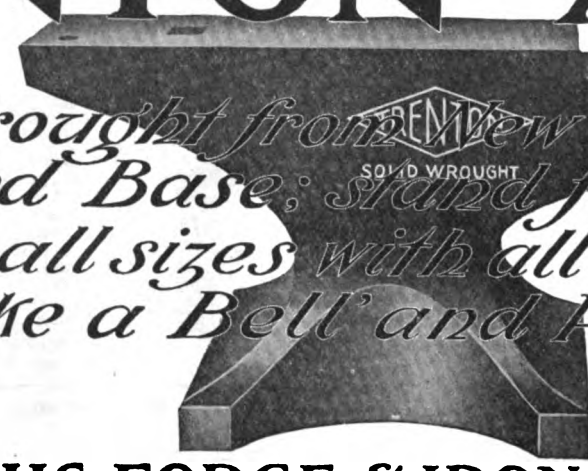
like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



"Makers of the Genuine ARMSTRONG Stocks and Dies."

Digitized by Google

TRENTON ANVILS



Solid Wrought from New Steel; not cast.
Recessed Base; stand firmly on the block
Made in all sizes with all desirable Clips.
Ring like a Bell and Perfect in Shape.

BOKER CUTLERY & HARDWARE CO., Inc., Sole Sales Agents,
101-103 Duane Street, New York City

THE COLUMBUS FORGE & IRON CO. COLUMBUS, O.

THE SCREW-CUTTING LATHE

How to select, set up, adjust and operate

By JAMES F. HOBART, M. E.

THIS book is a concise and exhaustive treatise on everything pertaining to the SCREW-CUTTING LATHE, including costs, erection, operation and adaptability. It is written by one who thoroughly understands his subject in all its details, and is so copiously illustrated that everything in it will be readily understood.

It will be found invaluable to those desiring to know just how a Screw-Cutting Lathe should be run.

There are ***92 illustrations,*** and the book is substantially bound in cloth. ***Price, $2.00.*** A copy will be sent postage prepaid to any address on receipt of price.

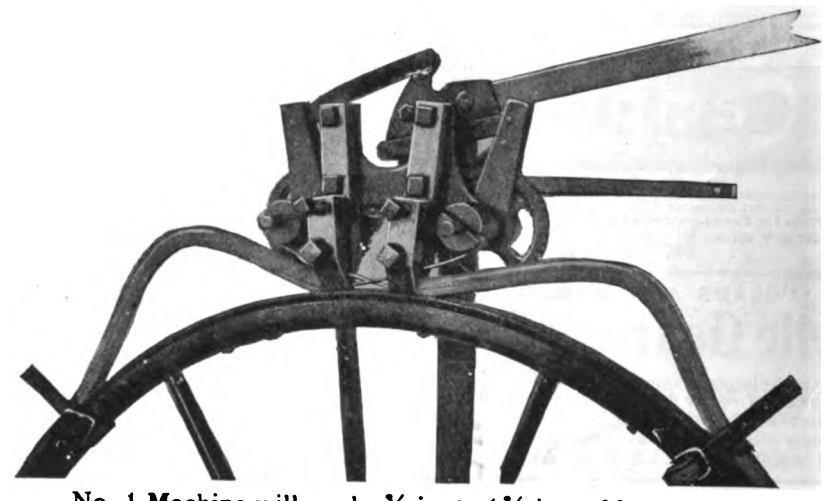
M. T. RICHARDSON CO.
PUBLISHERS
71-73 Murray St., New York

Mr. WHEELWRIGHT!

If someone were to show you a sure way to increase your profits, and at the same time enable you to produce a better grade of work, you would take advantage of the offer. Then let us call your attention to the **Batavia Rubber Tire Applying Machine,** whose operation is simplicity itself, and whose construction is of the very best material and labor.

It is universally acknowledged as the last word in Tire Applying Machines, and we are the proud possessor of thousands of letters of recommendation from the leading wheelwrights and carriage-makers in the United States and Canada.

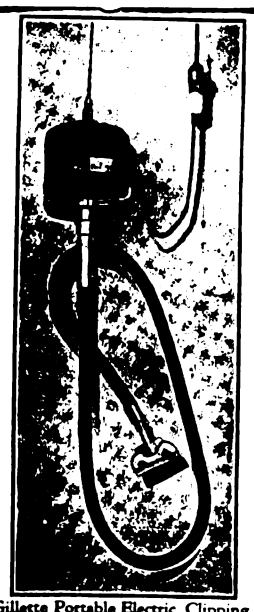
Below is a cut of the No. 1 Machine, showing loops in rubber for compression and arrangement of wire for brazing.



No. 1 Machine will apply ¾ in. to 1¾ in. rubber tire, and
No. 2 Machine will apply ¾ in. to 2 in. rubber tire.

Write us for descriptive pamphlet and prices AT ONCE.

THE BATAVIA RUBBER CO., BATAVIA, N.Y.
Manufacturers Pneumatic and Solid Truck Tires



Gillette Portable Electric Clipping, Shearing and Grooming Machine for Direct or Alternating Currents.

"Gillette" Clipping, Grooming and Sheep Shearing Machines

Experience of a quarter-century in making flexible shaft Hand and Power Machines for Clipping Horses, Mules, Dogs, Cows and for shearing Sheep, Etc., has given us an expert knowledge of this art.

"GILLETTE" Clipping machines and parts are guaranteed as to materials and workmanship.

"GILLETTE" cutters are unexcelled and can be used on any stated make of flexible shaft clipping machine. Efficiency is our aim.

Grinding and repairing is our specialty.

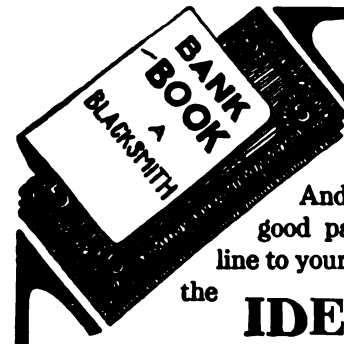
Renewal and repair parts carried on hand.



"Gillette" Cutter and Handle.

Gillette Clipping Machine Co.
129-131 West 31st Street
NEW YORK, N. Y.

Illustrated Price List Free.
Order Direct or Through Your Dealer



IF YOU WANT A FAT BANK ACCOUNT

And an extra good paying side line to your business, the

IDEAL Welding Outfit

Will do the trick.

Cold weather causes more breaks in metals than any other cause, so if you are equipped with our "IDEAL" welding outfit to repair breaks in axles, gear cases, chassis, cylinders, and other parts, you will reap the cream of business.

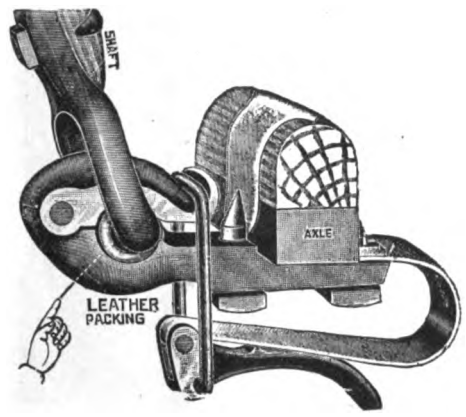
Come in *now* and beat the other fellow to it.
Write *today* for full particulars



General Welding Company
363 14th St., Hoboken, N. J.

Digitized by Google

BRADLEY

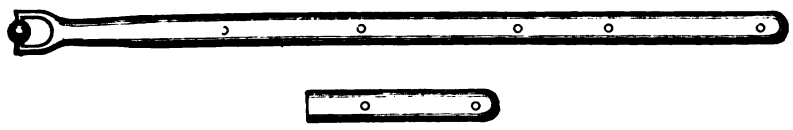


Ball-Bearing

Carriage Couplers and Long Shaft Irons

BEAR IN MIND

That we furnish both "Ball Bearing" and "Holdfast" in short or stub lengths and in full length Shaft Irons to your pattern.



An illustration (greatly reduced) of a full length Shaft Iron and T Piece

Write for Free Booklet

C. C. BRADLEY & SON, Inc.
SYRACUSE, N. Y.

FREE SAMPLE OF FLUX



WELD TRADE A MARK CAST

A SUPERIOR FLUX FOR

OXY-ACETYLENE WELDING

"WELD-A-CAST" Flux No. 1 for Welding Cast Iron.

Eliminates pin holes and blow holes, leaving the metal soft.

"WELD-A-CAST" Flux No. 3 for Welding Brass, Bronze, High Speed Steel, and all High Carbon Steel.

Prove it! Write for Sample.

CORTLAND WELDING COMPOUND CO.
CORTLAND, N. Y.



I Have To Build BETTER Engines

Because I Build Nothing Else

What better proof of engine quality and engine reliability could you ask than **31** years of continuous success in making and selling only the one thing—**WITTE Engines;** growing larger each year until now I own the largest exclusive engine factory in the world selling **direct to the user.** If I were making and selling a variety of implements I couldn't give the time and attention that I do now to building **the best engine I know how to make for my customers.** I build what power users demand—a reliable engine at a favorable price. If I did not build **better engines,** I could not continue to be successful year after year. You know that—and you know **"it's what you get for your money that counts."**

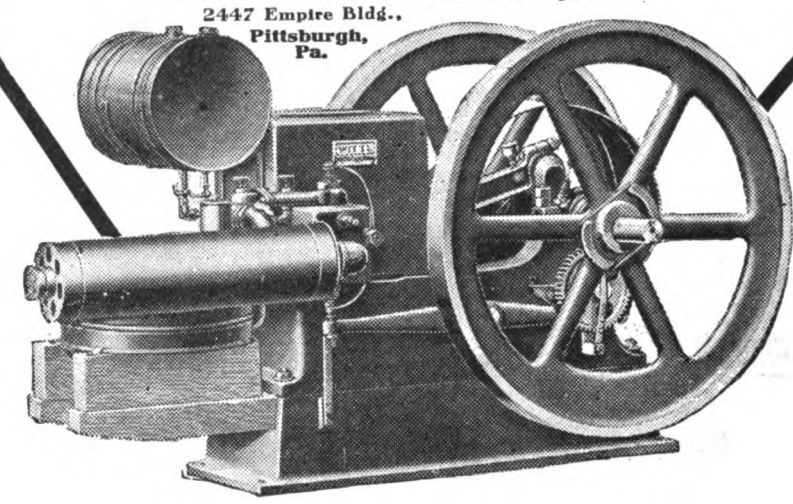
WITTE HIGH GRADE ENGINES

are Standardized, Semi-steel Construction. Parts Interchangeable. Surplus Power. Stationary, Portable or Saw-Rig. For Kerosene, Gasoline, Naphtha, Distillate and Gas. 2 to 22 H-P.
90-Day Trial—5-Year Guarantee—Cash or Easy Terms.

Before you decide on any type of engine I want you to write for my new copyrighted book, **"How to Judge Engines."** It's all about **engines**—nothing else. It tells you about engine materials, why WITTE Engines are easier to operate, require less fuel, develop more power. It explains how my wonderful factory system and special engine building machinery enables me to build a high-grade carefully-finished engine, and sell it direct to you **at a saving of $15 to $200,** depending on the size you want.

This is a wonderful saving, possible only because of perfect factory system, **standardized** construction, and **exclusive** attention to building **one single product**—ENGINES. Write for the complete story today—my latest offers, lowest prices for immediate factory shipment, and easy terms.—ED. H. WITTE, Pres.

WITTE ENGINE WORKS
2447 Oakland Ave., **Kansas City, Mo.**
2447 Empire Bldg., **Pittsburgh, Pa.**



ROBERGE'S GREAT BOOK

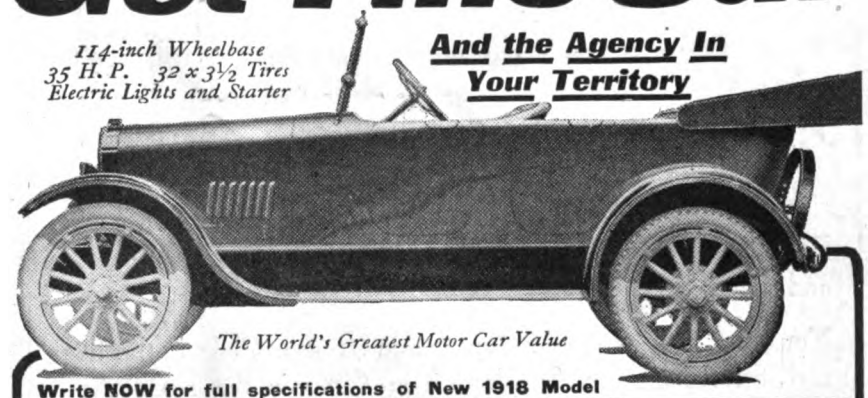
"THE FOOT OF THE HORSE"
By DAVID ROBERGE

The author of this book for many years enjoyed the entire confidence of Robert Bonner, who, in his day, owned many of the fastest trotters the world has ever seen. Bonner and Roberge worked together in shoeing the former's horses. Many believe that David Roberge was the ablest horseshoer this country has ever seen. His book is filled with plates and illustrations showing proper methods of shoeing horses for every kind of lameness. We have sold large numbers of these books and they have always given entire satisfaction. The work represents the life experience of its author. Sent to any address, postage prepaid, on receipt of price, $5.00. Address
M. T. RICHARDSON CO., Publishers, 71-73 Murray Street, New York.

Get This Car

114-inch Wheelbase
35 H. P. 32 x 3½ Tires
Electric Lights and Starter

And the Agency In Your Territory



The World's Greatest Motor Car Value

Write NOW for full specifications of New 1918 Model

BIRCH SUPER-FOUR

FIND out how you can get one of these superb cars for yourself and make money selling them to others. A big opportunity is open to ambitious men who are willing to train themselves and then get out and hustle. We pay big commissions for selling Birch Cars. Send the coupon now for full information.

Previous Experience Not Necessary We require all our agents to take a brief but thorough course of training in Automobile Driving, Repairing and Selling. We have trained hundreds of others for success in this way, and we believe this is one of the reasons for the splendid success Birch Agents are enjoying.

But the BIG REASON is the cars themselves. 80 per cent of all Birch Cars are in use by farmers and in small towns, and get the hardest kind of service. Mud, sand, rocks, hills and rough going have no terrors for these sturdy cars.

Send Coupon for *Big Free Book* and Full Information

You will be astonished at the liberality of our offer. Let us put all the facts before you at once. It costs nothing to investigate, so tear off the coupon right now. **Sign it and mail it to us today.**

BIRCH MOTOR CARS Dept. 545 61 East Madison Street Chicago, Illinois
Member of Chicago Association of Commerce

Birch Agents Prosper
One of our Texas Agents sold two carloads of Birch Cars within 60 days after he received his first demonstrating car. Whether you own a car or not get full details of our great offer.

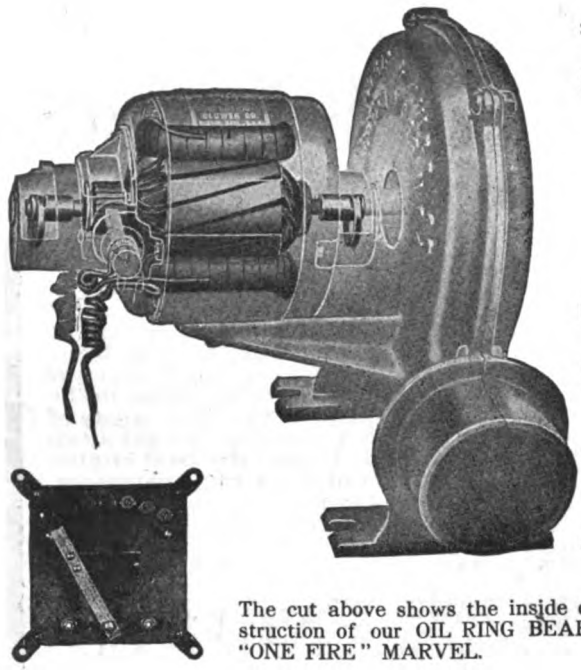
BIRCH MOTOR CARS, Dept. 545
81 E. Madison St., Chicago

Please send free book and full particulars as to Birch Light Six and Agency.

Name.....

Address.....

Digitized by Google



"ONE FIRE"

"MARVEL" $35.00

A. C. or D. C.
or
UNIVERSAL MOTORS

Extra **Large**
Ring Oil Bearings

Case **Hardened**
Armature Shaft

The cut above shows the inside design and mechanical construction of our OIL RING BEARING MOTORS used on our "ONE FIRE" MARVEL.

With the enlarged oil wells and CASE HARDENED SHAFT, you get long wearing qualities and ruggedness found only in a MARVEL BLOWER. As long as there is ANY oil in the oil-well, the RING revolving on the CASE-HARDENED SHAFT keeps a STREAM OF OIL on the bearings.

This prevents OLD AGE.

Show this cut to the best mechanical engineer you can find, and ask him his opinion regarding our claims.

You naturally want the BEST and the MOST that your money will buy, and in a Forge Blower you will find those qualities in a MARVEL.

Any of the LEADING HARDWARE FIRMS will ship you any one of our MARVEL BLOWERS on 30 days' trial.

NOW is the time to improve your shop equipment.

Ask YOUR Dealer to have us send you one on 30 days' free trial. Unless you get a RING OIL BEARING "MARVEL" Blower, you are not getting the MOST your money will buy.

15 Different Sizes. *Descriptive Circular Mailed on Request.*

ASK YOUR DEALER.

ELECTRIC BLOWER CO.,

352 Atlantic Avenue, BOSTON, MASS.

Service

CAR owners will generally estimate the quality of your service by the quality of the product you sell.

Satisfaction to car owners—satisfaction and profit to dealers—that is the ultimate aim of Harvey Service.

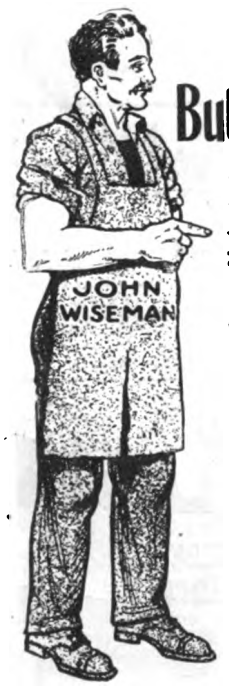


THERE'S A HARVEY JOBBER NEAR YOU
Our new catalogue giving complete measurements of over 900 styles of Springs is yours on request

HARVEY SPRING & FORGING CO.

919 - 17th Street, RACINE, WIS.

Higher Prices But Bigger Cash Saving





If you're John Wiseman, you used STANDARD Toe Calks last year and copped the saving.

If you're Bill from Missouri, now is the time to admit that you have been shown.

You make about *twice* the *cash saving* this year that John Wiseman made last year by using STANDARD Toe Calks.

Prices are up on steel products—hence the greater cash saving and the added necessity for saving every cent.

You don't buy the Calk Box. You buy the Calks in the box and there are more Standard Toe Calks in the box. And there's just one quality—THE BEST.



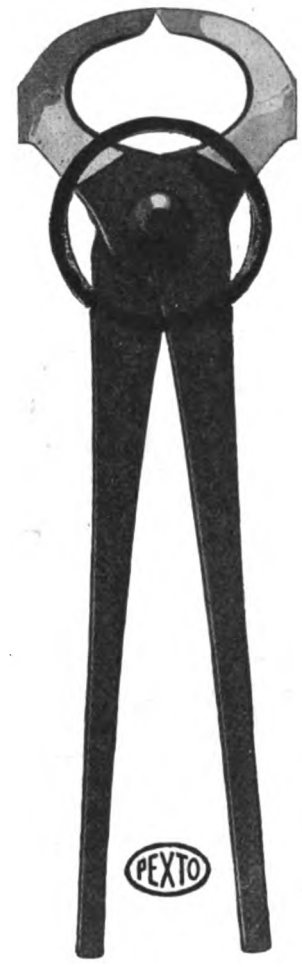
STANDARD TOE CALKS

Buy from your dealer. He can get STANDARD CALKS for you

NO. 1

FRANKLIN STEEL WORKS

Joliet, Ill. Cambridge, Mass.
Hamilton, Ont.



The Secret's in the Circle

Put into a pair of Blacksmith's Shoeing Pincers the finest of steel, balance them with painstaking care, design the jaws with the utmost precision and you may still be a long way from making a thoroughly satisfactory tool.

How a pair of Shoeing Pincers performs depends largely upon how accurately the jaws are centered and fitted together.

Pexto Pincers not only meet all other requirements but also this exceedingly important one. That's why they always open easily and open wide. There's no binding or sticking with Pexto Pincers.

One hundred years of tool-making experience are back of every Pexto Blacksmith's Tool. Ask for them by name. If your dealer can't supply you, write us.

The Peck, Stow & Wilcox Co.

Manufacturers Mechanics' Hand Tools, Tinsmiths' and Sheet Metal Workers' Tools and Machines, Builders' and General Hardware.

Southington, Conn. Cleveland, O.

Address all correspondence to 209 W. Center Street, Southington, Conn.

PEXTO

BLACKSMITHS' TOOLS

Digitized by Google

ESTABLISHED 1880

The Pioneer Journal of its Class

THE BLACKSMITH & WHEELWRIGHT

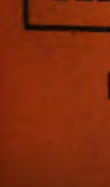
Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U. S. Patent Office.

Vol. LXXVII. No. 6 NEW YORK, JUNE, 1918 TERMS: One Dollar a Year. Foreign, $1.50. (6s. 3d.)

STEEL STAMPS
BURNING BRANDS
RUBBER STAMPS
STENCILS
GEO. M. NESS, JR.
61 FULTON ST. NEW YORK
Send for price list.

STEEL STAMPS
LETTERS and FIGURES
For Marking Your Tools and Your Product
NAME PLATES OF ALL KINDS
S. D. CHILDS & CO.
DEPT. 2
136 S. CLARK ST. CHICAGO



SUREGRIP CALKS
American Calk Co.
DETROIT, - - MICH.



The S. S. TUYERE IRON
Can't Be Beat. Parts that burn out can be taken off the top. Give this iron a trial. It saves coal. Ask your dealer for them, if he can't supply you send to
S. SCHWARZKOPF,
Toledo, Ohio. Price $6.00

Safe, Reliable Horse Nails
"Capewell"



To get the greatest satisfaction from the horse nails you buy, have the order read—CAPEWELL.

It's certainly annoying to try to drive a nail that buckles because the blade is weak—or snaps off when you attempt to make a clinch.

The material from which Capewell nails are made is the very best that can be bought. It's subjected to the very closest inspection too. Capewell nails do not buckle, or break at the clinch.

Not the cheapest nail regardless of quality but the world's best at a fair price. The most dependable and economical nail on the market, so many horseshoers say.



The Capewell Horse Nail Co.
Hartford, Conn.
Largest Manufacturers of Horse Nails in the World

HORSESHOERS
It pays to pack the horse's hoofs with Lemoine's hoof packing. It has no equal for dry, hard, contracted hoofs, quarter cracks, corns and thrush. It never fails to do the work.
N. LEMOINE COMPANY
P. O. Box 88 FRAMINGHAM, MASS.

SEND US YOUR NAME
and Address and you'll get information worth while regarding this splendid Shear and Punch.



THE MARVEL
A Double Lever Machine.
One man does all the machine is capable of and he faces his work all the time.
ARMSTRONG-BLUM MFG. CO.
340 N. FRANCISCO AVE., CHICAGO, ILL.

Get This Car
And The AGENCY For Your Territory
Drive a new 1918 Model Birch Motor Car. Pay for it out of your commissions and make big money on sales. Special offer now. Write quick for Big Free Book and full information. Address Ralph Birchard, Pres.
BIRCH MOTOR CARS, Dept. 548 81 E. Madison St., Chicago



THE WOOD WORKER'S FRIEND
Get directions for building table and operating our Jointers. This information is valuable to wood workers. We manufacture 20 styles and sizes. Try a Jointer Head 30 days, if you are not pleased, return at our expense. Get prices.
Manufactured by WHISLER MFG. COMPANY, Gibson, Iowa



COLUMBIAN
VISES AND ANVILS



Standard Blacksmith's Anvil. The only all-steel one-piece anvil made.

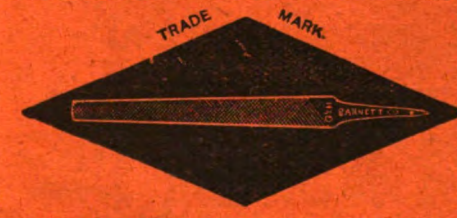
Forged Steel Solid Box LegVise Series "X"

If your jobber does not carry Columbian Tools, write us for catalog and prices.

THE COLUMBIAN HARDWARE CO.,
Manufacturers CLEVELAND, OHIO

THE TEETH IN
BLACK DIAMOND RASPS
ARE MINGLED
So as to Cut Clean and Free and Leave no Furrows In the Work

Twelve Medals of Award by Jurors



At International Expositions

C. & H. BARNETT COMPANY
Black Diamond File Works, PHILADELPHIA, PA.
Owned and Operated by NICHOLSON FILE CO.
Copy of Catalog sent Free to any interested file users upon application.

Stokes Bros.' Improved Horse Rasps
Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A.

AETNA STEEL TOE CALKS
Made by THE AETNA NUT CO., Southington, Conn.
BLACK HORSE BRAND
BEST SHAPE
BEST SPUR
TO DRIVE
BEST STEEL



TOE AND HEEL CALKS
SOLD BY ALL DEALERS

"GEARS AND WAGONS"
Selle Gears
Forty years of success has placed "Selle Gears" and Wagons in the hands of the largest wagon users in the world. Express and Transfer Companies, Department Stores, etc., specify "Selle Gears" and will take no other after once tried. 230 Page Catalog Free.
THE AKRON-SELLE CO. Akron, Ohio

OTTAWA KEROSENE ENGINES
Latest design. Durable, Powerful, Reliable, Massive. Built to do hard, heavy work—to give lasting service. Uses Cheapest Fuel. Pulls 25 to 50% more H-P. than rated. Shipped on three months' trial. Easy terms. Sizes 1½ to 22 H-P. 10-Year Guarantee. Book free—postal gets it.



OTTAWA MFG. CO.
178 King St., Ottawa, Kans.
FREE BOOK

BUYERS' GUIDE AND INDEX TO ADVERTISEMENTS, PAGE 169

Digitized by Google

THE BRADLEY BALL-BEARING Carriage Coupler



All-Steel, Noiseless, Quick Shifting, Ball Bearing

The ONLY Carriage Shaft Coupler that is furnished with a

One-Piece Moulded Leather Packing

A packing that will outwear any other packing ever made. It fits the ball and socket. It is held in place by a spring steel retaining ring. It may be put on and taken off in a jiffy, and it stays where it is put.

MADE IN FIVE SIZES.

Pony—Buggy—Surrey—Delivery—Express

To fit axles 3-4 inch to 2 1-4 inch

Your Jobber Can Supply You.

C. C. BRADLEY & SON, Syracuse, N. Y.

Extract from page 324 of the June, 1917, issue of The Horseshoers' Journal.

Horseshoeing business in Albany opened very quietly this spring. In fact, we still feel the harmful effect that the drive calks has done the business, but strikes in the building line has also effected trade, a large number of horses owned by contractors are remaining unshod, and are still carrying (to May 10th) their winter shoes of drive calk variety.

CHARLES W. KIRK.

ARE YOU *in this boat?*



John Wiseman Says to Bill from Missouri:



"It's time for a lot of you fellows to wake up. Ram your hand down into your pocket and see if the cash jingles with the merry sound as of yore.

"If not, why not?

"There's a Reason, of course. And that reason is that you've been using calks that the owner can replace himself. Naturally his horses come less frequently to your shop. You have less business—less cash to jingle in your jeans.

"Do you get the idea?"



Every set of welded calks you put on helps to keep your shop full because the horses must be brought to you to have the worn calks replaced. And the users are satisfied users, too.

Use SWEET'S TOE CALKS—"The Cold Cut Dreadnaught."

Franklin Steel Works, JOLIET, ILL. CAMBRIDGE, MASS. HAMILTON, ONTARIO.

No. 2.

"E-Z" WELDING COMPOUND

is the best **BECAUSE**

It works Equally good on all Kinds of steel.

It welds at **lower heat** than any other.

It **sticks** to metal at a **very low** heat.

It leaves **no scale.**

FOR ALL GRADES OF STEEL — E-Z — WELDING COMPOUND — TRADE MARK — PAT. MAY 27, 1902

USE IT ONCE AND YOU WILL ALWAYS WANT IT

Crescent Welding Compound

MAKES SMOOTHER WELDS THAN ANY OTHER

It is fine for plow work or where parts are fastened together before welding, or for making split welds, finishing heats, or for welding under dies, etc., etc.

CRESCENT WELDING COMPOUND TRADE MARK

It insures smooth finish and perfect welds on Toe Calks.

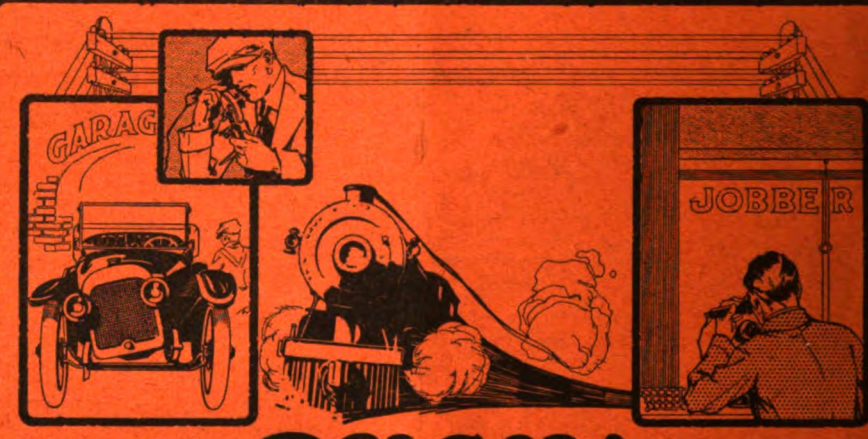
"Money back" from any jobber if "E-Z" or Crescent does not give perfect results.

We will send samples free of charge.

MADE ONLY BY

Anti-Borax Compound Co.

FT. WAYNE, IND.



RUSH!

When the hurry-up order comes—when an excited customer rushes in and wants a new spring *at once*—when every minute counts—when you are placed on your mettle by a demand that seems almost out of reason— How will you meet it? Will you simply hold up your hands and say "It can't be done?" Or will you

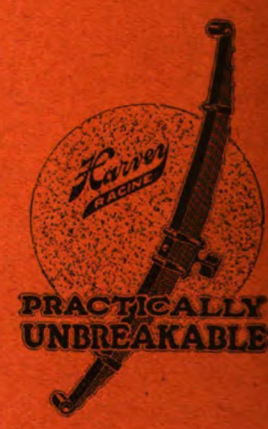
Get The Nearest Harvey Jobber On The Wire—

tell him your needs, and send the customer away pleased at the knowledge that his car will be on the road again, in better shape than ever before, within a few hours?

Make use of Harvey Service. It is designed to help you in emergencies.

There's a Harvey Jobber Near You

Drop us a card and we will send you his name and our catalog giving measurements, weights and sizes of over 900 different styles of Springs and other valuable information that you should have. Write today—you may need Harvey Help tomorrow.



Harvey Spring & Forging Co.

919 - 17th St. **Racine, Wis.**

Digitized by Google

"F-S" PAINTS

"FS"

Time Deals Lightly With "F-S" Products

Use "F-S" Ground Rough Stuff for close-grained, level surfaces on cars and coaches. It wears well. Is uniform in body and working quality—it is easily rubbed. It dries hard.

FELTON, SIBLEY & CO., Inc.

Manufacturers of Colors, Paints, Varnishes since 1863

136-140 North Fourth Street, Philadelphia

(150)



The files which do the best, "longest," are the ones for you to use on your work.

You will always find that

NICHOLSON FILES
Give Best Service

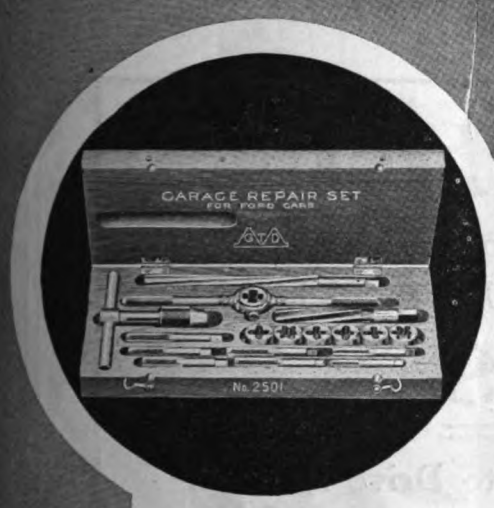
NICHOLSON
U.S.A.
(TRADE MARK)

BY INVITATION MEMBER OF
NEW YORK, U.S.A.

"NICHOLSON" stamped on a file, absolutely guarantees selected steel—forged, annealed, ground and cut by expert workmen who have made your needs a lifetime study.

SPECIFY "NICHOLSON"—AT ALL LEADING DEALERS

Nicholson File Co., Providence, R. I.



Your Most Useful Tools

An automobile screw plate made up for Ford cars, and that can be used on a lot of other work as well—that is what is shown here complete in a wooden case. This set is useful in your work every day, and at the same time puts you in position to take care of Ford repairs—and "every other car is a Ford!"

This screw plate is made up of standard Taps, Dies, Reamers, Stocks, Tap Wrenches in the proper sizes, all G. T. D. Standard tools.

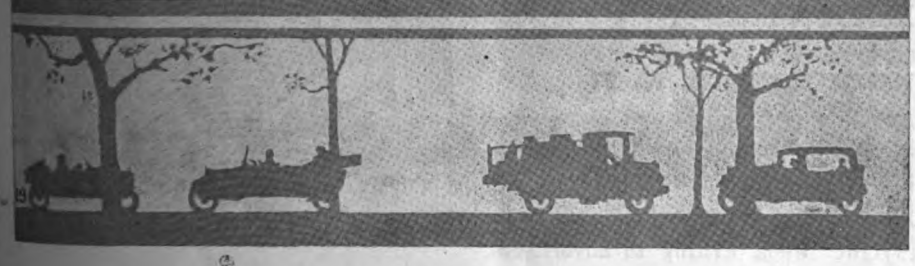
Add to your business by having this No. 2501 Screw Plate in your shop.

Complete catalog on request

GREENFIELD TAP & DIE CORPORATION

GREENFIELD, MASSACHUSETTS, U. S. A.

GTD



Would You Sell Your Life For $65?

You wouldn't part with even an arm or a leg for that figure, would you?

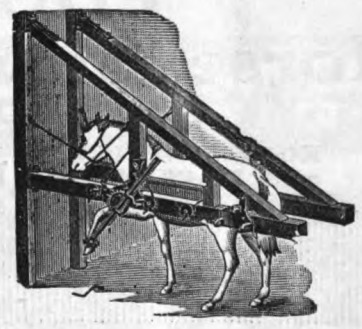
Yet every vicious horse you shoe is likely to do more damage in the twinkling of an eye than can be repaired at several times the cost of **Barcus Stocks.**

When you place a horse in a Barcus Stock, he is harmless—he cannot hurt either you or himself. Costing only $65 it is cheap insurance, indeed.

BARCUS STOCKS not only furnish the logical way to observe "Safety First," but they are also a positive aid to good shoeing. The BARCUS is a modern Stock—automatic working parts instead of the bothersome ropes, straps and blocks that made the old style stock almost more of a nuisance than a help.

If you don't know about **Barcus Stocks** you owe it to yourself and your family to write **at once** for the complete details.

The Barcus Mfg. Co.,
Wabash, Ind.



Please send me full particulars regarding your Horse Stocks without any obligation on my part.

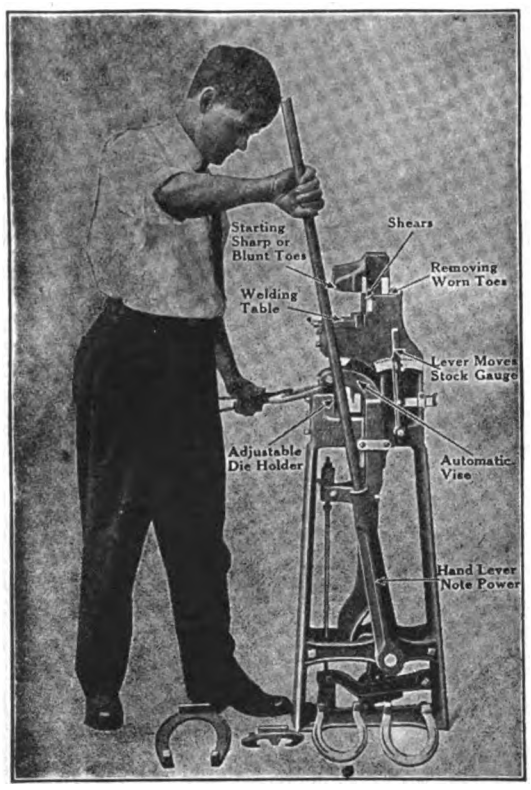
Name.....

Town..... *State*.....

Digitized by Google

1918 MODEL
THE L. S. P. CALKING MACHINE

The Greatest Time and Labor Saving Machine On Earth



1918 MODEL—Fully covered with Patents

OUR 1918 Model is the same as our 1917 Model with the exception that we have eliminated the steel plugger attachment and strengthened some of the parts.

Do not mistake this for a machine which makes toe calks or a foot vise. This machine is for turning heel calks, both Blunt and Sharp, sticking and welding toe calks, clipping and trimming ends of shoes. IT CALKS SHOES, doing the work just the same as you do by hand with the hammer, only it is done much better and easier, and in a fraction of the time.

In turning heels, you can turn up just as much stock as you wish, upset or stoveup to make as heavy as you like and square up the calks without use of hammer. There is no losing of toes when you weld on the L. S. P.

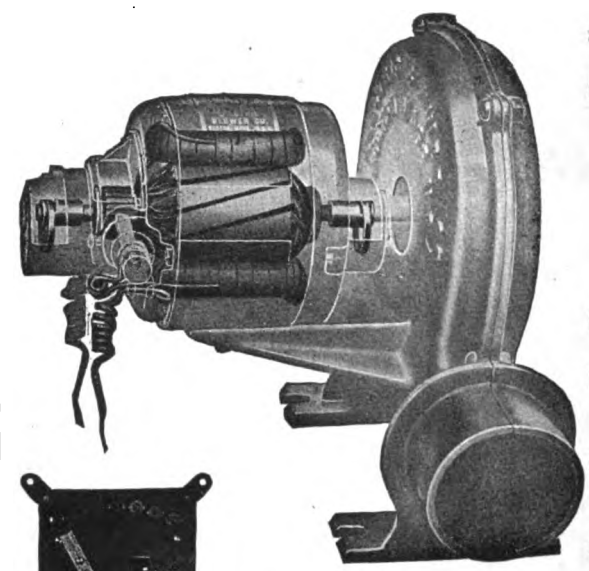
It is a strong, handsome, well made machine and will last, as you might say, a life time, fully warranted for one year. It is in use in the best shops in the United States, users claiming more for it than we do.

Write at once for full information and prices.

L. S. P. CALKING MACHINE CO.

P. O. Box 225 WYALUSING, PA., U. S. A.

NATIONAL MACHINE CO., Brighton, Ontario, Canada



"ONE FIRE"

"MARVEL" $35.00

A. C. or D. C.
or
UNIVERSAL MOTORS

Extra Large Ring Oil Bearings

Case Hardened Armature Shaft

The cut above shows the inside design and mechanical construction of our OIL RING BEARING MOTORS used on our "ONE FIRE" MARVEL.

With the enlarged oil wells and CASE HARDENED SHAFT, you get long wearing qualities and ruggedness found only in a MARVEL BLOWER. As long as there is ANY oil in the oil-well, the RING revolving on the CASE-HARDENED SHAFT keeps a STREAM OF OIL on the bearings.

This prevents OLD AGE.

Show this cut to the best mechanical engineer you can find, and ask him his opinion regarding our claims.

You naturally want the BEST and the MOST that your money will buy, and in a Forge Blower you will find those qualities in a MARVEL.

Any of the LEADING HARDWARE FIRMS will ship you any one of our MARVEL BLOWERS on 30 days' trial.

NOW is the time to improve your shop equipment.

Ask YOUR Dealer to have us send you one on 30 days' free trial. Unless you get a RING OIL BEARING "MARVEL" Blower, you are not getting the MOST your money will buy.

15 Different Sizes. Descriptive Circular Mailed on Request.

ASK YOUR DEALER.

ELECTRIC BLOWER CO.,

352 Atlantic Avenue, BOSTON, MASS.

PHOENIX HORSE SHOES

Constant Demand is the Best Proof of Their Superiority.

Practical to the Highest Degree. Made of Unexcelled Material.

BULL DOG CALKS

Hold Firmly to the Shoe. Never Jump Out When Set. Easy to Drive in Shoe.
Perfect in Every Detail.

FOR SALE BY ALL DEALERS. WRITE FOR SAMPLES.

WE ARE THE LARGEST HORSE SHOE MANUFACTURERS IN THE WORLD.



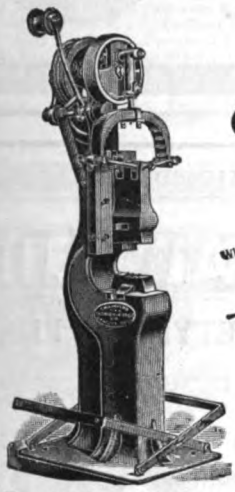


PHOENIX
Horse Shoe Company
CHICAGO, ILLINOIS

ROLLING MILLS and FACTORIES } JOLIET, ILLINOIS / POUGHKEEPSIE, N. Y.

Digitized by Google

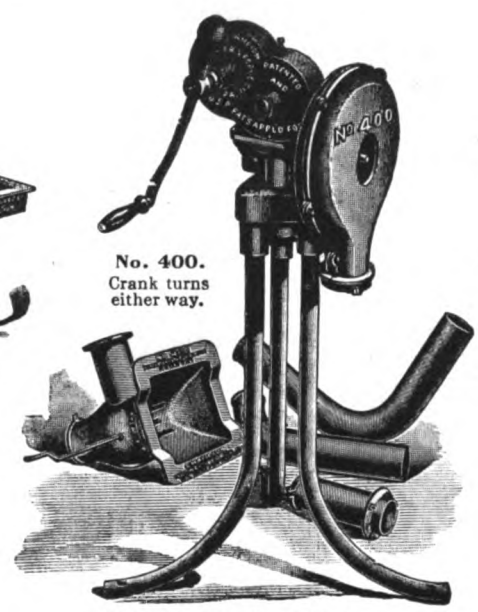
THE FAMOUS CHAMPION BLACKSMITH TOOLS



Hercules Patented Power Hammer. Weight of ram, 65 pounds.



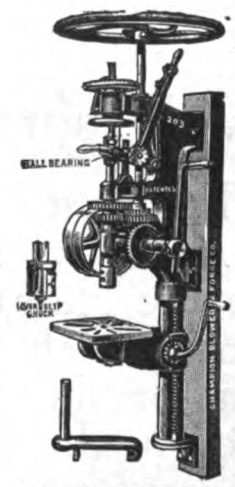
No. 402, Steel Blacksmith's Forge.



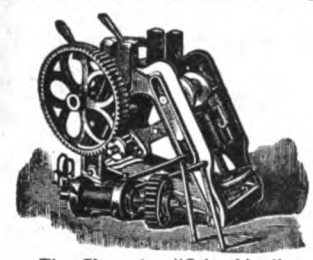
No. 400. Crank turns either way.



No. 433. Cast Iron Blacksmith's Forge.



No. 203. Self-Feed and Double Compound Lever Feed Drill.

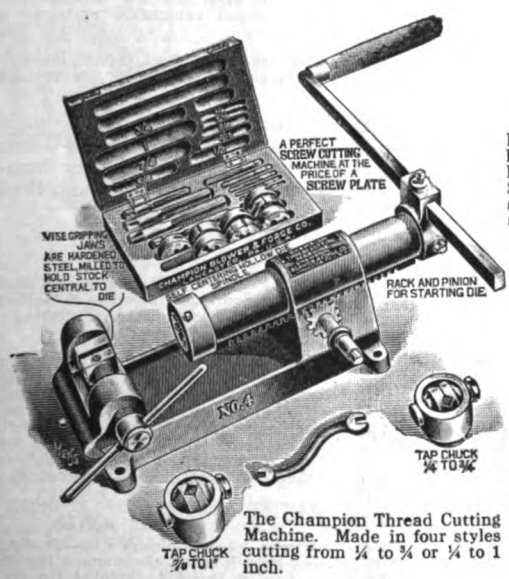


The Champion "Columbian" Tire Bender. Made in 3 sizes.

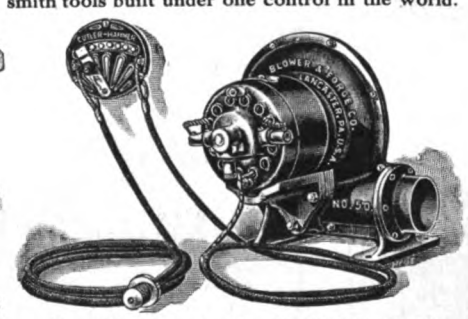
FAMOUS 400

Don't Fail to Get 1918 Catalog

Before purchasing a Hand Blower, Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



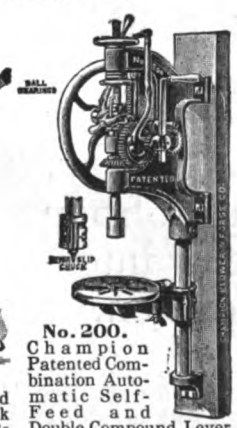
The Champion Thread Cutting Machine. Made in four styles cutting from ¼ to ¾ or ¼ to 1 inch.



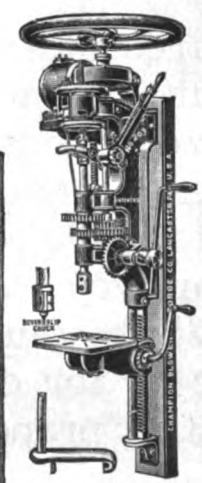
No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower.



No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



No. 200. Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

F.M.

Digitized by Google



Tie Up to Firestone

—*because* vehicle owners all know that Firestone Carriage Tires give Most Miles per Dollar. Such is the equipment for you to offer now, particularly when people demand better service than ever and are buying with more care.

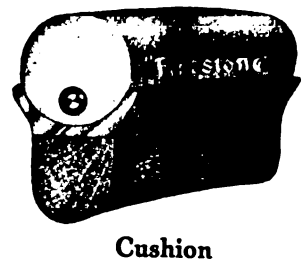
The quality of Firestone Carriage Tire makes it wear evenly down to the channel. It does not chip, crack and break. It wears down slowly and gives easy, resilient riding.



Internal Wire



Side Wire



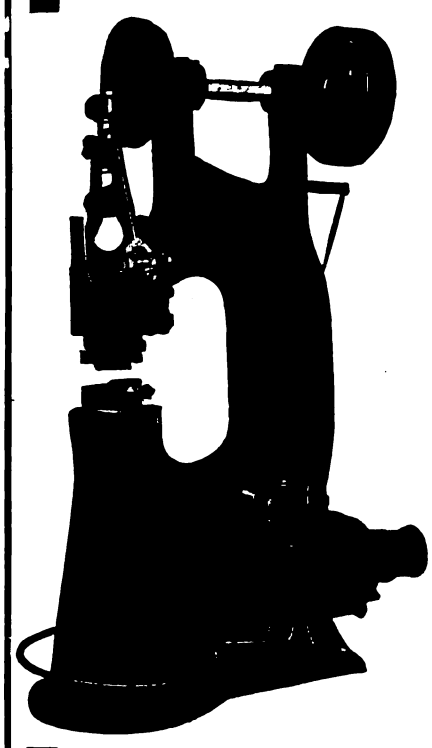
Cushion

Firestone carriage rubber combines full size with the lightness which makes it profitable equipment for you to apply. Write your jobber or us for our interesting proposition.

FIRESTONE TIRE & RUBBER COMPANY
FIRESTONE PARK, AKRON, O.
Branches and Dealers Everywhere

Carriage Tire

JOB WANTED



An able bodied workman seeks a position in some good blacksmith or machine shop.

He is an old acquaintance and friend of the Editor of the Blacksmith and Wheelwright, to whom he is permitted to refer.

He is not particular as to what locality he works in, provided he has plenty of good hard work to do, and his employer honest and careful.

With such a boss, he agrees to never touch intoxicants or indulge in other dissipation. He agrees to be on hand ready for work at seven o'clock in the morning, or any earlier hour the shop opens. He will work overtime without grumbling, even to twenty-four hours daily for as long a period as may be necessary.

He will agree never to strike, ask for higher wages, or even want to go fishing or take a holiday.

He will board himself and remain in perfect health indefinitely. He has no family cares to worry about. He and his brothers, older and younger, are of the well known L. G. P. HAMMER clan, world renowned for skill, integrity and ability.

He is willing to work for twenty cents a day and agrees to do more work than any six skilled men at $3.00 per day. After his wages have been paid for twenty months, he agrees to work for nothing during the remainder of his natural life, which he estimates at fifty years.

He agrees to come on trial, and after thirty days' work, if his boss is not satisfied he will return home without any charge for his services.

He guarantees that he will relieve his employer from all drudgery, so he can spend more time with his family, and not be so eternally tired that he can get no enjoyment out of life.

He will treat all customers so pleasantly and do their work so skillfully that they will always bring their work to his shop, and advise their friends to do likewise.

He is not subject to enlistment or draft, and is ready to leave at once and begin work immediately on arrival.

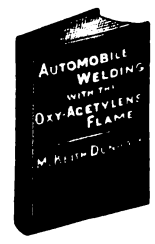
ADDRESS:

LITTLE GIANT

103 Rock Street

MANKATO, MINN., U. S. A.

JUST PUBLISHED



AUTOMOBILE WELDING

WITH THE OXY-ACETYLENE FLAME

By M. KEITH DUNHAM

167 Pages **Price $1.00** Fully Illustrated

Sent Postpaid to Any Part of the World.

This is the only complete book on the "Why" and "How" of Welding.

EXPLAINS in a simple manner apparatus to be used, its care, and how to construct necessary shop equipment. Proceeds then to the actual welding of all automobile parts, in a manner understandable by everyone.

Gives principles never to be forgotten. Aluminum, cast iron, steel, copper, brass, bronze and malleable iron are fully treated, as well as a clear explanation of the proper manner to burn the carbon out of the combustion head.

AUTOMOBILE OWNERS, GARAGE AND SERVICE STATIONS, BLACKSMITHS AND MACHINE SHOPS, as well as industries using the oxy-acetylene flame, will find this book of the utmost value, since the perplexing problems arising when metal is heated to a melting point are fully explained and the proper methods to overcome them shown.

CONTENTS

CHAPTER I.—APPARATUS KNOWLEDGE.
Oxygen Supply—Care of Oxygen Cylinder—Acetylene Generator—Care of Generator—Regulators—Care of Regulators—Creeping Regulators—Gauges—Care of Gauges—Welding Torch—Care of Welding Torch—Effects of Heat—Hose and Goggles.

CHAPTER II.—SHOP EQUIPMENT AND INITIAL PROCEDURE.
Preheating Agencies—Welding Table—Location of Welding Outfit—Starting the Welding Outfit—Adjustment of Flame—Principle of Welding—General Welding Knowledge—Welding Rods and Fluxes—Choice of Tip—Expansion and Contraction.

CHAPTER III.—CAST IRON.
Simple Welding—How to Hold the Flame—Hard Cast Iron—Pin Holes and Blow Holes—Lug on Cylinder—Water Outlet—Cylinder Welding—Compression Head—Finishing and Testing—Scored Cylinders—Cylinder Parts—Fly Wheels—Pistons—Crank Cases—Babbitted Bearings—Valve Guides—Preserving Threads—Conclusion of Cast Iron.

CHAPTER IV.—ALUMINUM.
Use of—Welding Knowledge—Puddle System—Flux System—Comparison of Systems Welding Rod—Preparation of the Weld—Inlet Manifold—Arm of Crank Case—Welding the Arm Without Taking Out the Motor—Break in the Body of Case—Welding Cold—Wrong Method of Setting Up—Lug or Boss Welding—Preheating the Case—Gas Preheating Flame—One Side or Both—Collapse of Weld—Broken Bearings—Direction of Welding—Shrinkage Cracks—Missing Parts—Finishing—Die Mould Castings—Body—Other Parts.

CHAPTER V.—STEEL.
Welding Knowledge—What the Flame Does to Steel—The Welding Rod—Simple Welding—Position of Flame—Reinforcing the Weld—Frame Welding—Lengthening the Chassis—Tube Housings—Worn Parts—Gear Welding—Case Hardening—Light Metal Welding—Gasoline Tank—Welding Adjacent to Rivets—Shaft Welding—Construction of Parts.

CHAPTER VI.—MALLEABLE IRON COPPER, BRASS, BRONZE.
How to Detect Malleable Iron—Brazing Malleable Iron—Rear Housing—Reinforcing the Braze—Brazing Tube to Housing—Building Up Worn Parts—Copper—Brass and Bronze—Silver Soldering.

CHAPTER VII.—CARBON BURNING AND OTHER USES OF OXYGEN AND ACETYLENE.
Principle of Carbon Burning—Method of Operation—Lead Burning—Soldering—Case Hardening—Heating Uses.

CHAPTER VIII.—HOW TO FIGURE COST OF WELDING.
Oxygen Consumption—Dissolved Acetylene Consumption—Torch Consumption Test—Acetylene Generator Consumption—Cost Card—Conclusion.

ADDRESS ALL ORDERS TO

M. T. RICHARDSON COMPANY, 71-73 Murray St., NEW YORK

Digitized by Google

WAGON BUILDING

"Build me a wagon that will last forever."

"Sorry, Sir, but 'axle troubles' (due to wear—wear on the spindle, or on the box, or both) make it impossible."

You've often received a specification like that and been obliged to give that answer—haven't you?

The Sheldon "TON-DON"—an axle that will not wear, run hot or break—allows your meeting the requirements of the man who wants a wagon to last forever, **and we have told him so.**

The Sheldon "TON-DON" was originally made for buggies and carriages. Its success was so instantaneous and pronounced that we were deluged with requests for an axle embodying the same principle for use on Delivery, on Business and on Express Wagons.

Hence, the "TON-DON" CONCORD EXPRESS.
In EFFICIENCY—The HIGHEST.
In CONSTRUCTION—The SIMPLEST.
In SERVICE—The MOST SATISFACTORY.

The Spindle of the Sheldon Ton-Don Axle

Ordinary axles wear flat on the bottom of the spindle because the bottom side is the point of contact and where the wear of the spindle is concentrated. It takes a spindle of unusual hardness to resist this wear—greater hardness than any ordinary axle affords. The spindle of the "TON-DON" is hardened by a special process, producing a wearing surface of such hardness that a fine file makes no impression on it—yet the center remains soft or "natural."

The Phosphor-Bronze Lined Box

The peculiarity of this box lining is that while somewhat softer than the spindle, there is no perceptible wear after thousands of miles of running, but becomes harder and more wear-resisting with use.

Phosphor-Bronze (of a mixture which increases its toughness, smoothness under friction, and wear-resisting qualities) is a metal used for making the propellers of ocean steamships, bearings for locomotives, crank-shaft bearings for automobiles and other fine machinery. Imagine what a metal must be to meet such conditions, and you will grasp the advantages of applying such metal to axle purposes.

THESE AXLES CARRIED IN STOCK BY THE FOLLOWING JOBBERS AND CAN BE OBTAINED AT MANUFACTURERS' PRICES.

Baltimore, Md. ..... E. Scott Payne Co.	Providence, R. I. ... Congdon & Carpenter Co.
Boston, Mass. ..... E. P. Sanderson Co.	Rochester, N. Y. ..... Burke Iron & Steel Co.
Buffalo, N. Y. ..... H. D. Taylor Co.	San Francisco, Cal. ... Waterhouse & Lester Co.
Chicago, Ill. ..... E. D. Kimball Co.	Scranton, Pa. ..... Bittenbender & Co.
Cincinnati, O. ..... G. B. Schulte Sons Co.	Seattle, Wash. ..... Gray Bros. Co.
Indianapolis, Ind. ..... W. J. Holliday & Co.	Springfield, Mass. ..... Chas. C. Lewis & Co.
Los Angeles, Cal. ..... Percival Iron Co.	St. Louis, Mo. ..... Sligo Iron Store Co.
Milwaukee, Wis. ... Shadbolt & Boyd Iron Co.	Washington, D. C. ..... Louis Hartig
Pittsburgh, Pa. ..... McLean & McGinness	Wilmington, Del. .... Delaware Hardware Co.
Portland, Oregon ..... J. E. Haseltine & Co.	Bridgeport, Conn. ..... Chapman & Bangs Co.
Ft. Wayne, Ind. ..... Moseman, Yarnelle & Co.	San Antonio, Texas Heusinger Hardware Co.
New Orleans, La. ..... Jos. Schwartz & Co.	

SHELDON

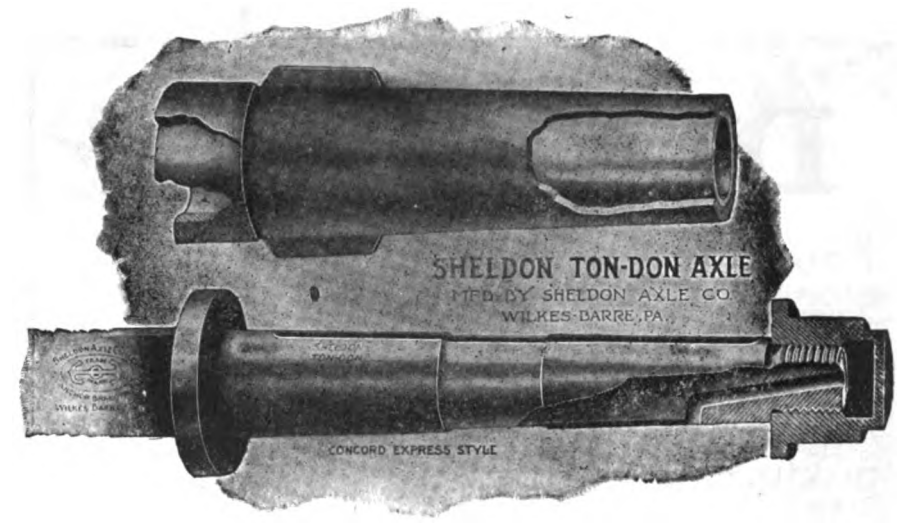
"TON-DON"

CONCORD EXPRESS STYLE

NOT A BALL OR ROLLER BEARING—BUT

ANTI-FRICTION—EVERLASTING—INTERCHANGEABLE

IT WILL NOT CUT, HEAT OR STICK



NOTICE THE PATENTED OILING DEVICE
HAS ALL THE ADVANTAGES OF FRICTION AND ANTI-FRICTION AXLES WITHOUT THEIR DISADVANTAGES
"TON-DON" MEANS KNOWN QUALITY WITHOUT FANCY PRICE
MADE ALSO FOR BUGGIES AND SURRIES

SHELDON AXLE & SPRING CO.,
WILKES-BARRE, PA.

LARGEST AXLE FACTORY IN THE WORLD.

FREE SAMPLE OF FLUX



WELD TRADE A MARK CAST

A SUPERIOR FLUX FOR

OXY-ACETYLENE WELDING

"WELD-A-CAST" Flux No. 1 for Welding Cast Iron.

Eliminates pin holes and blow holes, leaving the metal soft.

"WELD-A-CAST" Flux No. 3 for Welding Brass, Bronze, High Speed Steel, and all High Carbon Steel.

Prove it! Write for Sample.

CORTLAND WELDING COMPOUND CO.

CORTLAND, N. Y.

There's Plenty of Work to Do

You don't know how much you can accomplish until you get acquainted with

The Kerrihard Power Hammer

It means an immediate relief from dull business—a better handling of live business and the assurance of four fold future benefits.

The Kerrihard Power Hammer demonstrates a very important truth—that you can do more business—if you want to—do you?

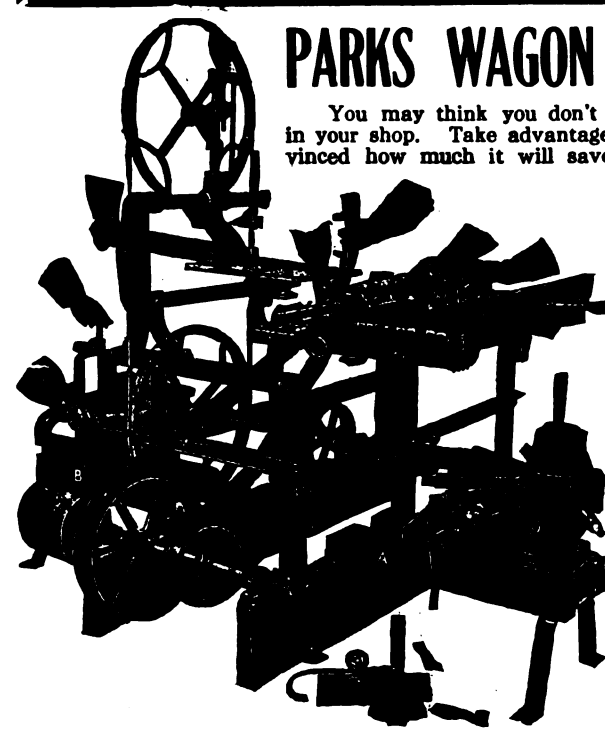
Write for Full Information



THE KERRIHARD COMPANY
Kerrihard Station **Red Oak, Iowa, U. S. A.**

PARKS WAGON SHOP SPECIAL

You may think you don't need this practical woodworker in your shop. Take advantage of our trial offer, and be convinced how much it will save you. **Machines sent on trial anywhere in United States and Canada.**



Machine is a combination of Circular, Rip and Cross Cut Saws,
22" Band Saw,
12" Jointer,
Rim Rounder,
Felloe Borer,
Spoke Tenoner,
All ready for instant use.
No Changing.

Light size takes 2 to 3 H. P., heavy size 3 to 4 H. P.

Write for catalog and full information about how a woodworker should be arranged to be convenient to operate.

Parks Ball Bearing Machine Co.
North Side Station
Cincinnati, O.

Digitized by Google



DIAMOND Calks

are as nearly perfect for wearing purposes as money and science can produce.

Better ones simply do not exist.

There is a Diamond Calk for every hoof purpose.

DIAMOND CALK HORSESHOE CO.

DULUTH, MINN.

FOR ALL  VEHICLES

Johnston's "Krakno"

is elastic, non-corrosive, heat-resisting, impervious to moisture, an inhibitive coating which prevents rust and scale—and is the ideal filler and surfacer.

"KRAKNO" On Old Work

"KRAKNO" saves you all the time and trouble of burning off and repriming and gives you a perfect job besides. You know what a surfacer and filler that will do what we claim "KRAKNO" does, will mean on all refinishing jobs.

Check up the evidence by using "KRAKNO" in your shop. Test it thoroughly. Don't wait for a special job to come along, but try "KRAKNO" on your next regular job if you want the most beautiful, durable and economical finish.

Order one gallon or more on trial.

Mail us a post card for a trial gallon. We will tell you how to use it. If "KRAKNO" makes good for you, you will have made a valuable discovery.

"KRAKNO" is made in the following shades:
Red, Slate, Yellow, White, Blue, Green, Maroon, Gray and Blue Black.

The R. F. Johnston Paint Company
Makers of Paints to Meet Every Need
S. E. Cor. Main and Pearl Sts.
CINCINNATI, O.

SEND FOR ONE GALLON ON TRIAL

SEND FOR ONE GALLON ON TRIAL

INDIAN CHIEF VISES

Black-smiths' Horse-shoers'



BOKER CUTLERY & HARDWARE CO., Inc.
Sole Sales Agents
101-103 Duane Street, New York City

Solid Box — Solid steel drop forged jaws faced with crucible tool steel. Improved screw of one piece of forged steel. Built right throughout.

THE COLUMBUS FORGE & IRON CO., COLUMBUS, OHIO.

THE SCREW-CUTTING LATHE

How to select, set up, adjust and operate

By JAMES F. HOBART, M. E.

THIS book is a concise and exhaustive treatise on everything pertaining to the SCREW-CUTTING LATHE, including costs, erection, operation and adaptability. It is written by one who thoroughly understands his subject in all its details, and is so copiously illustrated that everything in it will be readily understood.

It will be found invaluable to those desiring to know just how a Screw-Cutting Lathe should be run.

There are ***92 illustrations,*** and the book is substantially bound in cloth. ***Price, $2.00.*** A copy will be sent postage prepaid to any address on receipt of price.

M. T. RICHARDSON CO.
PUBLISHERS
71-73 Murray St., New York

Digitized by Google



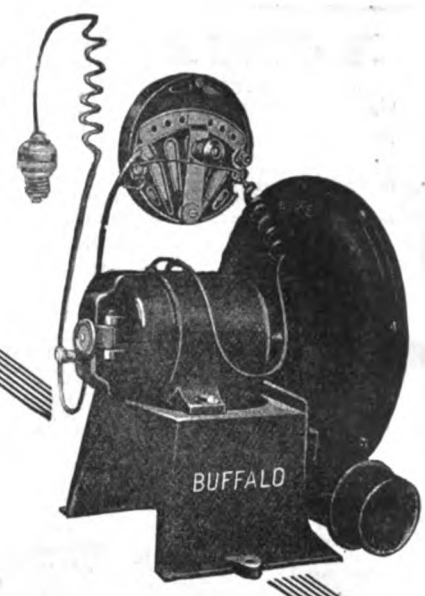
No. 228-E Forge

32 x 44 in. hearth. Suitable for practically all blacksmithing work.

Forty years of experience and knowledge of Blacksmith Shop requirements has placed Buffalo Tools so far ahead of any others, that once you see them you'll say "good-bye" to the other kind.

No. 2-E Electric Blower

Can be installed in any blacksmith shop—saves hand blowing.



"Buffalo"

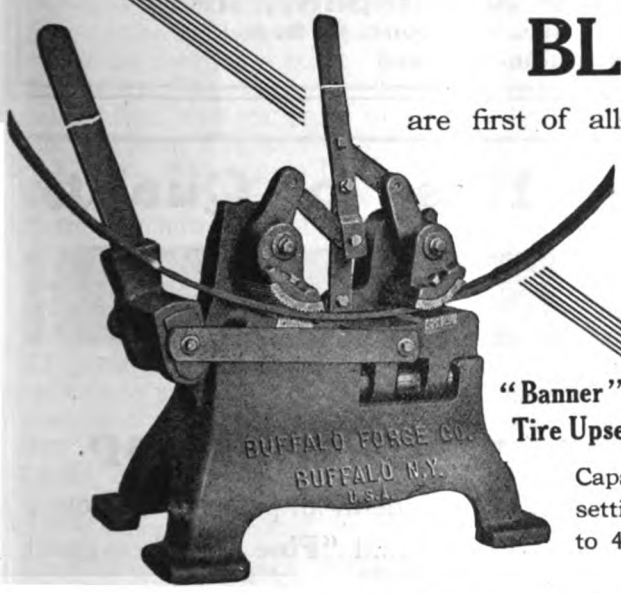
BLACKSMITH TOOLS

are first of all—dependable. They will stand up under continuous service—and hard service, too.
They are constructed of good material, by skilled workmen.

These are facts you should keep in mind, when buying Blacksmith Shop Equipment.

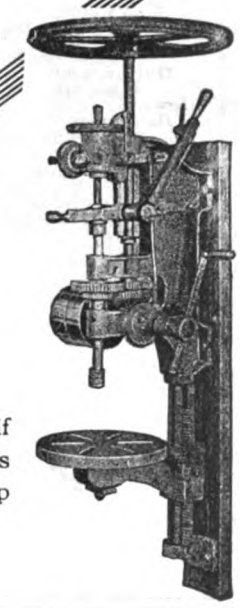
We'll be glad to mail you a copy of Catalog 179-6

Buffalo Forge Co.
Buffalo, N. Y.



"Banner" Tire Upsetter

Capable of setting tires up to 4 x 1 in.



No. 221

Multi-compound automatic self and lever feed, 22 in. swing, drills to 1½ in. hole. Fitted with Suregrip chuck.

The Perfect Power Hammer



Note the difference in construction over other makes:

Extra Long Guides, insuring a direct movement of the ram without any side motion, which causes guides and springs to break on other Hammers.

The only Hammer made with a disk attachment with special anvil for sharpening harrow and plow disks.

A recently invented **Friction Clutch** fitted with **Ball Bearings,** absolutely controls the operation of the Hammer by foot pressure from the lightest tap to the heaviest blow. This ease of operation makes the Hammer particularly well adapted for plow work, as you can get as light a stroke as you desire.

Will ship to any responsible party on approval. If not as represented, no sale.

Made in two sizes:

3 inch square, 40 lb. ram—shipping weight, 1,150 lbs.
4 " " 80 " " " " 1,800 "

Write any jobber for prices, or

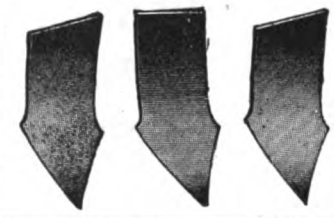
Macgowan & Finigan Cordage Co.,
204 North Third St., ST. LOUIS, MO.

STAR STEEL SHAPES



Plowshares
Listershares
Moldboards
Landside Plates
Landside Points
Shovel Points
Plow Points
Seeder Points
Drill Points
Subsoilers
Cultivator Shovels

Soft Center Solid Cast Crucible Steel



STAR MFG. CO.
Carpentersville, Ill.

"GREYHOUND"

$27.50

Variable Speed only



These motors are made from the very best materials obtainable. Have a perfect lubricating system. Economical in the consumption of current. Complete with rheostat cord and plug.

Shipped to you through Your Dealer on a 30 days' trial

R. GARDNER ELECTRIC & MFG. WORKS
1714 COLUMBUS ROAD CLEVELAND, OHIO

Make Automobile Profits

START REPAIRING AUTO TIRES



BLACKSMITHS — Keep pace with the times, and do the auto tire repairing as well as the horseshoeing in your locality.

Investigate the New-Type-F Equipment illustrated at the right. Write today for free booklet, "Tire Repairing the Business of the Times."

WE make a complete line of Tire Repair Equipment. Complete catalog on request.

THE AKRON RUBBER MOLD & MACHINE CO.
937 Sweitzer Avenue : : : Akron, Ohio



New-Type-F Equipment

Big Capacity Vulcanizer With Self-Contained Boiler

Only $180

TIP-TOP OF AKRON TI-RE-PAIR OUTFIT

Pacific Coast Distributors:
Geo. W. Eno Rubber Co.,
280 Golden Gate Ave., San Francisco;
1026 S. Los Angeles St., Los Angeles

Please send full particulars regarding your Ti-Re-Pair Equipment, and copy of Free Booklet. (B. & W.)
Name .....
Address .....

Digitized by Google

LINDE OXYGEN

From Coast to Coast 65 Producing Plants and Distributing Stations provide an unlimited supply of Linde Oxygen for users everywhere.

LINDE SERVICE means no investment except for oxygen actually received—no expensive overhead or upkeep charges.

Linde Oxygen may be obtained from any of the following Linde Plants and Distributing Stations where a large suppply of charged 100 to 200 cu. ft. cylinders is kept on hand constantly to insure immediate shipments.

Mail or telephone your order to THE LINDE AIR PRODUCTS CO., at the nearest point. **Shipments will be made on day order is received.**

PRODUCING PLANTS AND WAREHOUSES

Alabama
*Birmingham
10th Ave. & 28th St.
California
*Emeryville, Oakland
*Los Angeles
1405 Mission Road
Colorado
*Denver
S. B'way & Exposition Ave.
Connecticut
Hartford
1095 Main Street
District of Columbia
Washington
9th & Maryland Ave., S. W.
Georgia
*Alanta
Plyant St. & Southern R. R.
Savannah
OgeecheeCanal,So.of BaySt.
Illinois
*Chicago
3633 Wall Street
East St. Louis
6th & Walnut Ave.
Peoria
721-731 So. Washington St.
Indiana
*East Chicago
S.E.Cor. Kennedy& 145th St.
Fort Wayne
414 E. Columbia Street
*Indianapolis
2819 Roosevelt Ave.
Iowa
Davenport
118 Harrison Street
Des Moines
117 W. 5th Street
Kansas
Wichita
Rock Island Ave. & 2nd St.
Kentucky
Louisville
126 East Main St.
Louisiana
New Orleans
881 Fulton Street
Maryland
*Baltimore
25th & Montebello Ave.
Massachusetts
Cambridge
25 Waverly Street
Springfield
Napier Street
*Worcester
961 Southbridge St.
Michigan
*Detroit
St. Aubin Ave. & Newton St.
Grand Rapids
Pearl Street by the Bridge
Minnesota
Duluth
Seventh Ave., West
*Minneapolis
1809 Hennepin Ave.
Missouri
*North Kansas City
14th & Charlotte St.
*St. Louis
4218 Forest Park Blvd.
Nebraska
Omaha
1007 Jones Street
New Jersey
*Elizabeth
Linden Ave.
Newark
354 Plane Street
New York
Albany
Montgomery & Colonie Sts.
*Brooklyn
475 Driggs Ave.
*Buffalo
155-183 Chandler St.
*Utica
Walnut & Schuyler Sts.
Ohio
*Cleveland
802 East 72nd Street
*Cincinnati
Stanton & Mellish Aves.
Columbus
310 Dublin Ave.
Dayton
521 E. First Street
Lima
338 East High Street
Ohio
Toledo
441 South Erie Street
*Youngstown
601-621 Jones Street
Oklahoma
Oklahoma City
27 E. Grand Ave.
Tulsa
1 North Boulder St
Oregon
Portland
15th & Hoyt Streets
Pennsylvania
Erie
1502 Sassafras Street
*Norristown
*No. Philadelphia
18th & Cambria Streets
Pittsburgh
16th &Pike Streets
*Trafford
Tennessee
Chattanooga
212-238 King Street
Memphis
203 Washington St.
Texas
*Dallas
Harwood and Coombs St.
Houston
Cedar & Baker Sts.
San Antonio
512 Dolorosa St.
Utah
Salt Lake City
112 West Second St., South
Virginia
Richmond
1709 E. Carey Street
Washington
*Seattle
Henrietta St. & 8th Ave., So.
Spokane
121-123 S. Madison St.
Wisconsin
Manitowoc
810 Quay Street
*Milwaukee
36th St. & National Ave.

(Star) * Designates Plants.

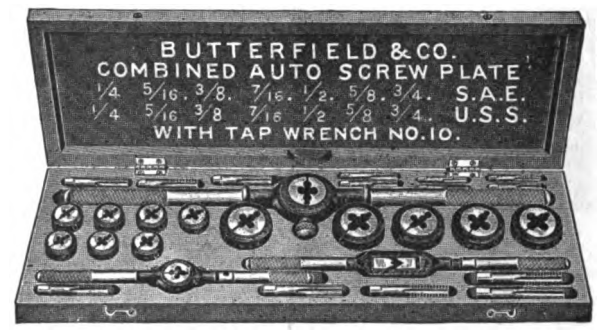
Other Plants and Distributing Stations are planned for other industrial centers throughout the country and will be established as fast as and wherever the local demand for oxygen warrants.

THE LINDE AIR PRODUCTS COMPANY

Largest Producers of Pure Oxygen in America

Forty-Second St. Building **NEW YORK**

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

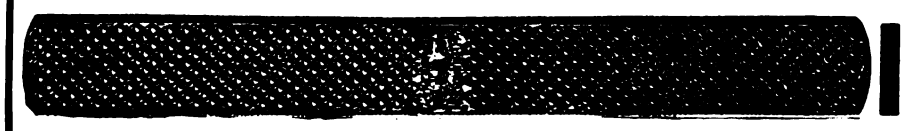
No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.
New York Store: 126 Chambers Street

The Horse Rasp of Quality



Ask your Dealer for the

IMPROVED HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, **"Slim," "Light," "Slim Light"** and **"Fine Cut."** Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial. New catalogue mailed free on application.

HELLER BROTHERS CO. *Established in 1836* **Newark, N. J.**

UNITED STATES HORSE AND MULE SHOES ARE REAL TRADE WINNERS


Front Lt. Long Heel

PERFECT ALL THROUGH AND EASY TO FIT


Hind Lt. Long Heel

Prove It Out On Your Next Order

Carried in Stock by All Jobbers

A Handsome Souvenir Watch Fob Given Away Free To All Blacksmiths and Horsemen Upon Request.

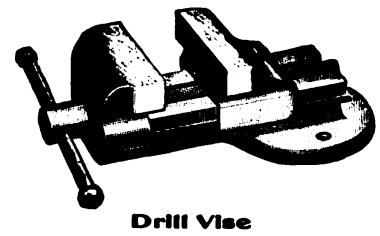
WRITE FOR OUR LATEST CATALOG No. 16 ILLUSTRATING OUR COMPLETE LINE

Manufactured By

United States Horse Shoe Co.

ERIE, PA.

BICKNELL'S DRILL PRESS VISE


Drill Vise

Holds Rounds, Squares and Flats

Saves its cost every year in drills alone.
Base, bed and jaws fully machined.
Swivels to any position on Drill Table, or can be used as a Bench Vise.

For sale by the jobbing trade.

Write for circular.

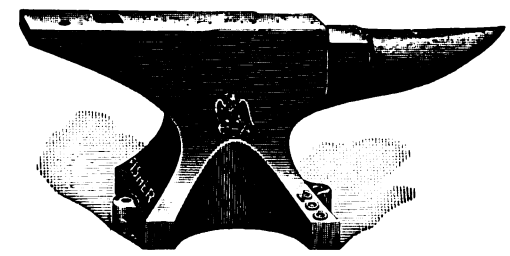
BICKNELL MFG. & SUPPLY CO., JANESVILLE, WIS.

1843 EAGLE ANVILS 1918 AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE

BLACKSMITH AND WHEELWRIGHT

Vol. LXXVII. No. 6. NEW YORK, JUNE, 1918. TERMS ONE DOLLAR A YEAR

Design, Construction, Operation and Repair of Motor Vehicles

Part V—How Gasoline Engines Are Lubricated, Various Types of Oiling Systems and Construction of Oil Pumps

The gasoline engine, like every other piece of machinery, requires proper lubrication and the problem presented is greater in this type of machine than in any other, because of the many factors entering into its construction. In our last installment we stated that, at the time of the explosion, the temperature of the cylinders reaches a point above that of molten iron. One can see, therefore, that the lubricating system must be of the best or the lubricant will not reach the moving parts.

The average engine is designed to operate at a flywheel speed of around 1,000 revolutions per minute. At every half revolution each of the pistons travels from the top of the cylinder to the bottom, and in an engine having a five-inch stroke, the piston travels ten inches at every revolution, approximately 833 feet per minute. This means that the cylinders must be bathed in oil at all times despite the terrific heat. It would not do to flow the oil in at the sides or the top, because it would carbonize in the explosion chamber and cause trouble. Just enough oil

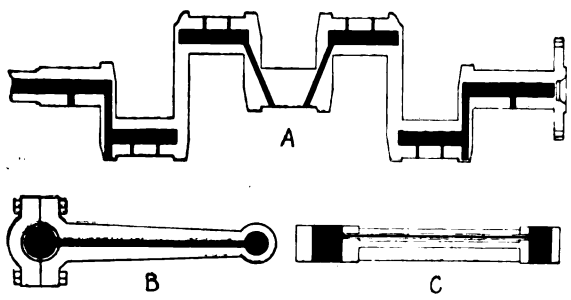


Fig. 15—A, Crankshaft; B and C, Connecting Rods; Showing Oil Channels in Black.

must reach the cylinders and the system must be designed so that little or no oil will escape into the cylinder head.

Three Types of Oil Systems.

There are three main types of lubricating systems, the force feed, the splash and the circulating, and in addition to these three systems many manufacturers use various combinations of the three.

In the force feed type, the oil is drawn from a tank by a pump and forced to all of the bearing surfaces, through tubes or channels cut or made in the castings. An engine of this sort is usually fitted with crank shafts which are bored with a number of oil holes as shown in Figure 15 at A.

The oil under pressure is pumped into the main bearings and from these bearings the pressure forces it to the various crank pins through the oil channels. The connecting rods may be made in two different types, those as at B in which the hole runs through the web of the connecting rod to the wrist pin and those as at C where an auxiliary tube is provided and fastened to the side of the rod.

Cylinder Lubrication.

From the crank pins, on the crank shaft, the oil passes up through the connecting rod oil tube to the wrist pin and through the wrist pin to the bearings in the piston. In the straight, force feed system the lubrication of the cylinders is through the hole in the wrist pin. The cam shaft is fitted with an oil channel similar to the crank shaft.

The timing gears are lubricated by the overflow from either the crank shaft or the cam shaft, though some engines are fitted with a special tube for supplying these gears with oil.

Types of Oil Pump.

There are three types of oil pumps—the plunger, the rotary and the gear. The second type is shown in Figure 12 of our last installment and is but seldom used in the lubricating system. Plunger pumps may be operated from the camshaft as shown in Figure 16 at A, or from an eccentric mounted upon any revolving engine shaft as shown at B. The gear pump is illustrated in the same figure at C and is the type most commonly used. These pumps usually draw the oil from the reservoir and force it to the various bearings as spoken of above. As a general rule the base of the engine forms the oil reservoir.

A means of regulation must be provided or the oil pressure would continue to increase as long as the pumps were operated and so the force feed system is provided with a small safety valve or by-pass arrangement. When the oil pressure reaches a predetermined point the valve opens and passes the oil around the pump, thus preventing a further rise in pressure.

The Splash System.

In the splash system of lubrication, the oil level is of such a height as to permit the connecting rods to splash into it at every revolution. In this way the oil is splashed into every interior part of the engine, lubricating the cylinders, the cams, the pistons and the connecting rods, as well as the main bearings.

The objection to this type of system is that the oil level must be maintained at a certain height or lubrication fails. In travelling up grades the engine is necessarily tipped slightly and the oil runs towards the back, so that the front cylinders do not obtain the necessary lubrication, while those in the rear are apt to be overlubricated.

For this reason the circulating splash system has been designed. In this type of engine, directly beneath each connecting rod is placed a shallow basin into which the connecting rod dips at every revolution. The shallow pan or basins are kept filled with oil, pumped from the base by one of the types of pumps shown in Figure 16.

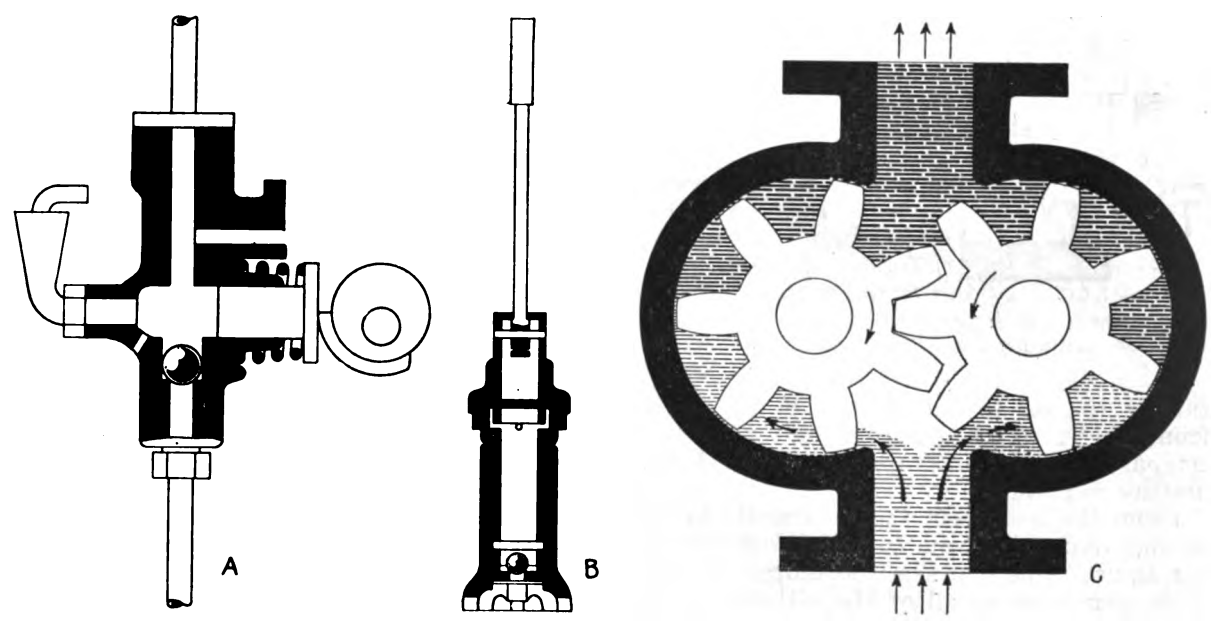


Fig. 16—Showing Three Types of Oil Pumps. A, Plunger Pump Driven from Cam Shaft; B, Plunger Pump Driven by Eccentric; C, Gear Pump; Arrows in C Show Path of Oil Travel.

With this arrangement the cylinders are kept lubricated with a fine spray of oil at all times. However, unless arrangements were made for the oiling of the connecting rods, these bearings, as well as the main bearings, would shortly burn out, and so upon the end of each connecting rod is placed a small projection called a dipper. These dippers are hollow, and a channel through them permits the oil to pass to the connecting rod bearings.

Main Bearing Lubrication.

The main bearings are fitted with holes and at the top are small pans which collect the oil and allow it to run into the main bearing babbitts. In some instances a special tube is provided from the pump which supplies the main bearings with oil. The cam

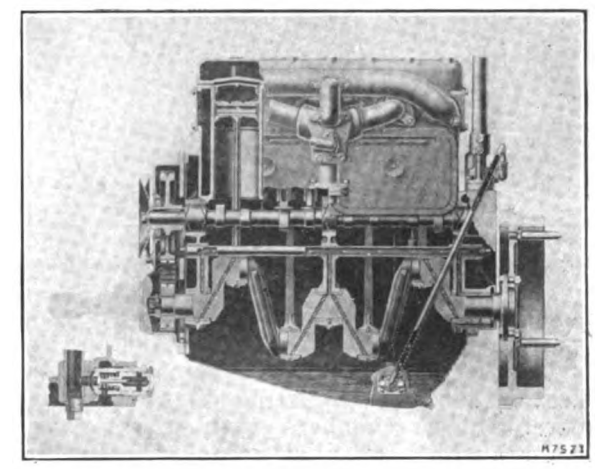


Fig. 17—Cross Sectional View of Hupmobile Engine, Showing Oiling System in Detail. Insert Shows Oil Relief Valve.

shaft bearings are lubricated in the same way as are the crank shaft bearings.

Timing gears are usually located in the front of the engine and require a special oiling system, and for this reason a special tube is provided to carry the oil from the pump to this part of the engine. In the straight splash system, a slanting pan is provided which catches the oil from the splash and directs it in between the gears.

During its circulation the oil collects considerable dirt and dust and so the pump is protected by a fine gauze screen. In most cases this screen is removable from the outside, in order that it may be kept clean at all times. The screen as well as the pump is usually located at the lower part of the engine. If the pump is located above the oil level, an oil well is provided in which is placed the filtering screen and the pump intake, at the lowest point of the oil base.

As a general rule, the oil reservoir is the base of the engine, and in order that the driver may see just how much oil there is, the base is provided with an indicating device of

Digitized by Google

some sort. In practically all of the force feed systems, and in many of the circulating systems, an indicator is placed upon the dash which shows whether the oil is under pressure, or whether it is circulating properly.

These indicators are connected with one or two lengths of copper tubing with the oiling system. In the pressure systems, but one tube is used, as a general rule, for this tube carries the pressure from the system to the

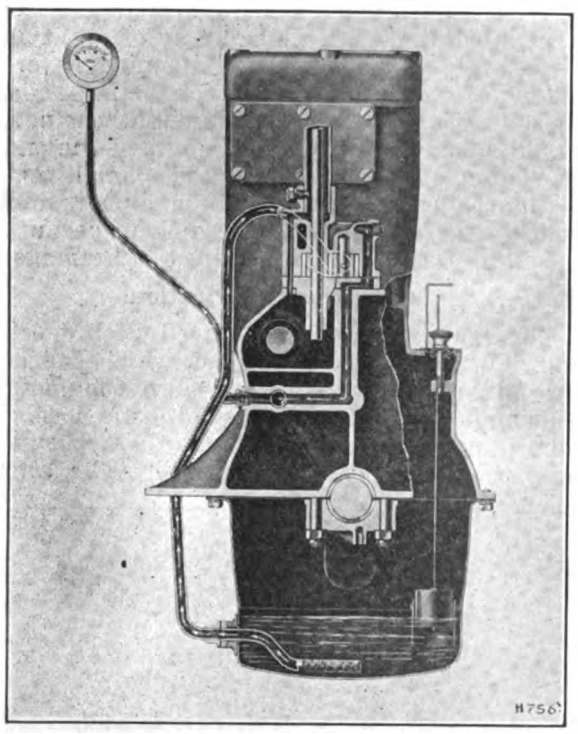


Fig. 18—Sectional End View of Hupmobile Engine, Showing Oil Pump and Gauge Connection.

indicator, which shows the pressure in pounds per square inch. These indicators are divided very similarly to a steam gauge. Indicators for the circulating oil systems are merely little chambers with glass covers through which the oil circulates. Should the oil fail for any reason, it is quickly evident to the operator.

Various Combinations in Use.

As has been suggested before, there are a number of combinations of systems depending upon the manufacturers' ideas and the type of engine in use. The Franklin, for instance, is fitted with a gear pump which has a number of leads from it. These various tubes supply the different bearings and the cylinders with oil.

The Ford engine is fitted with a circulating splash system, but instead of using one of the types of pumps described above, it utilizes the flywheel. In this machine, the lowest part of the oil basin is the bell housing beneath the flywheel, and so the flywheel constantly revolves in a bath of oil, throwing the oil into the transmission and the rear of the engine.

Centrifugal force drives the oil from the flywheel surface into a funnel shaped tube located just beside the cam shaft. This tube carries the oil to the timing gears at the front of the engine and from the timing gear compartment the oil flows into the first connecting rod pan.

From the first pan, the oil travels to the second, and so on back to the flywheel housing again. One can see, therefore, that the front pan receives all of the oil and, therefore, the splash is greater in the front cylinder than in those following.

Many garage men are of the opinion that one of the reasons for excessive carbonization in the first two cylinders of a Ford car is due to this excessive lubrication of the first two cylinders.

Gravity Feed System.

A few of the older cars still in use are fitted with gravity feed lubrication systems and we have given no description of this, for the very simple reason that there are so few of them on the market today. This type of system was very simple and requires but little explanation. A tank of oil was mounted upon the dashboard and fitted with sight drip oilers and tubes leading to various parts of the engine.

A later development of this system resulted in a connection between this tank and the exhaust line so that the oil was fed by pressure, in addition to gravitation.

Oil Pump Details.

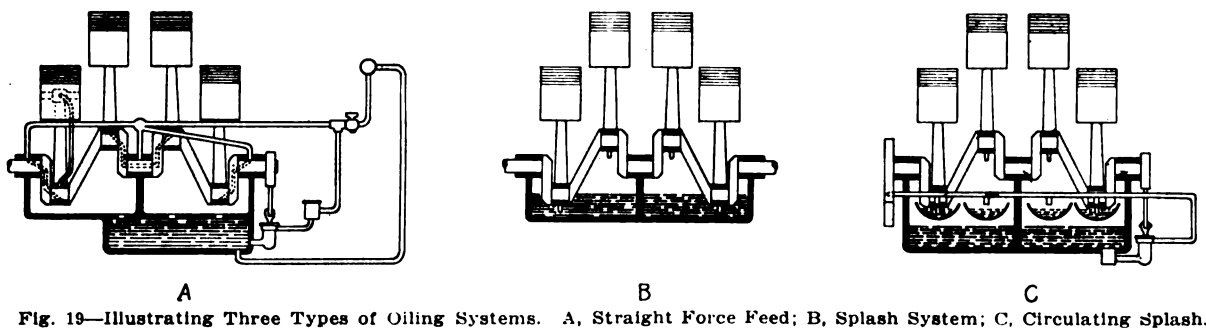
We have purposely left the details of oil pump construction to be treated upon at this point in order that we might go into their description more carefully. The plunger type of pump is very similar to that used upon steam engines or in houses, in that it has a travelling plunger, valve, an outlet and inlet.

The plunger used in the types which are operated from a special eccentric mounted upon some revolving member of the engine is usually made like that of the engine piston. It may be fitted with one or two rings, a connecting rod and wrist pin, and the material used for the piston may be either cast iron or brass. The valve usually consists of a round steel ball contained in a cage and resting upon a cone seat. In this type of pump two valves are necessary because of the fact that the plunger operates up and down.

In the second type of plunger pump, the plunger is small and is fitted with a strong steel spring. This type of pump is operated from one of the cams on the cam shaft, the cam compressing the plunger and forcing oil through the system, the spring returning the plunger to its original position at the lower cam point. This type of pump is seldom fitted with rings because of its extremely small size. Some designers arrange the plunger pumps in such a manner that the stroke may be altered by the will of the driver or by a mechanical governor of some sort. This mechanical governor arrangement is usually connected with either the spark advance lever or the throttle. By means of this governor, the eccentric is changed in relation to the center of the revolving drive member.

The Gear Pump.

The gear pump is the simplest form used and is gaining favor rapidly among the manufacturers. In this type of machine, two gears having large teeth are mounted in a shallow casting in such a manner that the teeth engage with each other at the center and contact with the casting through about three-quarters of their circumference. The oil enters as the gears are revolving and since it cannot pass between them it fills the space between the teeth and is carried around the circumference as the gears revolve. When it has reached the outlet tube, it is forced through it, because the oil cannot pass between the teeth again. With this type of pump the oil pressure rises steadily and a regulating device must be provided. This usually consists of a small steel ball held against its seat, by coil spring. When the pressure reaches a certain point, the spring tension is overcome, and the oil passes by the ball to the inlet side of the pump.



A B C

Fig. 19—Illustrating Three Types of Oiling Systems. A, Straight Force Feed; B, Splash System; C, Circulating Splash.

(To be continued.)

CHANGE WITH THE TIMES.

How Brother Blacksmiths in the Mississippi Valley Earn Their Living.

By J. A. THOMAS.

During my wanderings around the country, particularly through the Mississippi Valley States, I find that many blacksmiths are being hard hit by war conditions.

Early this month I stopped at a little blacksmith shop in Missouri, to have a chat with a man in charge. I noticed that his shop was fitted with the best of machinery, that he had three or four forges, and room enough for four or five extra men, only one forge was being used, and one blacksmith was all that I could see about the place. As usual, the blacksmith had a hard luck story to tell me. He said that in his locality before the war, business was great, and he was making considerable money. His blacksmith force consisted of six experienced men and they were often obliged to work into the evening. He paid them well and managed to make quite a little money for himself.

As soon as war broke out, his business began falling off and he said that he thought the trouble was due to the decreased number of horses in that locality. Every farmer who had good horses sold them, for they began to realize that they could replace horses with trucks and tractors if necessary. Many of the horses were used in Mexico and some of them were sent across the water, he thought.

Stiff Competition.

There were two automobile repair shops in his town and so he didn't get any of this kind of work. He said that he didn't know much about automobiles anyway. Not only did the automobile shops do automobile work, but one of them hired an experienced blacksmith and carriage man to take care of this branch of the trade. He found that many of the farmers thereabouts were in the habit of taking their wagons or carriages to the garage man just because they were acquainted with him and knew that he could do automobile repair work.

I had quite a talk with this blacksmith but could not convince him that he could learn the automobile trade, and so I left him, to journey on to another blacksmith shop about 200 miles north.

An Up-to-Date Blacksmith.

What a difference in the two blacksmiths! Upon my journey from the station to his shop, I passed an automobile agency. I stepped in and found that this agency did absolutely no repair work, for that end of the business did not pay. When I arrived at my friend's blacksmith shop, I had to wait around about an hour before he could spare a minute to speak, and when he did he was full of enthusiasm. It seems that as soon as he had found the blacksmith trade was getting to be somewhat of a back number, he began to educate the farmers into bringing their automobiles to his place of business. He purchased all the books that he could on the subject of automobile repairing and hired an automobile repair man.

For a while the automobile repair man cost him more than he made on repair work of this sort, but he realized that it would never do to allow the automobile work to go anywhere else. The result was that all of his former friends relied upon him for automobile repairs and they never got into the habit of going anywhere else for their work. A number of times, different men had tried to start repair shops in the village, but soon went under. This blacksmith, when I saw him, was a mighty busy man. But now he had four mechanics working for him and only one blacksmith, and he had remodeled his shop to fit the new business.

Traveling still farther north I came across a number of blacksmith shops that were not successful, but occasionally I dropped into an automobile repair shop that had formerly been a blacksmith shop. In every case where the place looked progressive, I found

Digitized by Google

that the sign upon the door had the word "automobile" in it. Some of the blacksmiths did tire repairing; others made a specialty of electrical systems, some of them were welders, while others still, found that they could do a big business simply in altering cars over into delivery trucks. I will venture to say that the conditions are the same throughout the country and would advise all of your readers to study the subject of automobile mechanics.

NOBODY WANTED IT.

A plan which a merchant in a small California city had found effective as a means of keeping trade from going to mail-order houses is told by System. There is a lesson in it for every merchant. When he started to sell cream separators, one of the first things he did was to order a $60 "mail-order" separator. In due time the box containing the machine arrived. The merchant, however, did not open it. The box was left on the floor near his own stock of separators. When customers began bickering over the prices of the merchant's machines, and mentioned in contrast the price of the mail-order machine, he was ready. "Why," asked one prospect for a separator, "should I pay you $100 for a separator when I can send East and get a Hardwick separator for $60?" "Oh, you want the Smith separator, do you?" responded the merchant. "Well, I carry that, too. I'll be glad to sell it to you." "Where is it? Let's have a look at it," answered the prospect. "It's right there in that box," said the dealer. "Open her up. Let me see whether I want it or not." "No," said the merchant, "it will stay in that box till it's sold. Isn't that exactly the way you buy from the mail-order houses? Don't you pay your money before you ever open the box? I'll sell the separator to you on the same terms. That's fair, isn't it?" The prospect saw the point. This incident has happened a good many times since. The box is still unopened. But it has proved as profitable an investment as the merchant has made in a long time and has resulted in many sales—The Canadian Harness Journal.

The Motor Truck Is Becoming Indispensable to the Average Farmer

In These Days of High Labor Costs and in Face of the Demand for Food and Produce, the Farmer Should Investigate the Possibilities of the Truck

BY F. L. PHILIPS

Since the days of the Revolutionary War, the officers in charge of various armies throughout the world have realized that the one thing making for efficiency and the winning of a war is quick transportation facilities, and we find that in the present war these facts are brought out more than ever before.

A few years ago, experts were of the opinion that air supremacy was the vital and deciding factor. To a certain extent this has been true, but experience has shown that a preponderance of aeroplanes does not necessarily mean that an overwhelming advantage is obtained therefrom.

The directors of Germany's war machine were fully cognizant of the fact that rapid transportation would be vitally necessary and long before war they perfected the railroad system and a road system with the end in view of making a network of roads along their war fronts.

Motor Trucks in Service.

With the coming of the motor truck the situation has been changed. Prior to its advent an advancing army was obliged to build both roads and railroad systems to carry supplies and ammunition. At the present time railroads are not used so greatly as are motor trucks. A railroad is limited. It extends over a certain part of the country. Supplies, all food stuffs, and ammunition must be carried to its receiving stations and distributed from its various terminals. This means both an additional cost and the waste of considerable time in loading and unloading.

The use of the truck, however, is flexible. Goods are loaded in it at the point of consignment and delivered at the points at which they are required. Upon the war fronts, time is vital. The loss of only a few minutes might mean the loss of many miles of ground. The question of money is not so important.

Efficiency at Home, Vital.

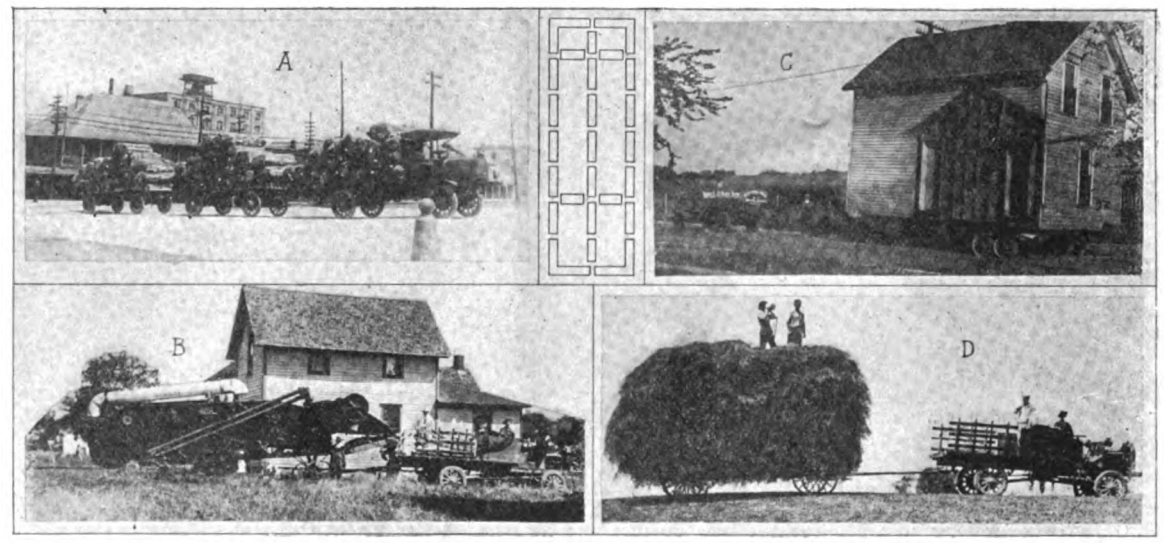
In this country we do not as yet realize that efficiency plays just as important a part as it does in France and Belgium. Our country is facing a serious situation. The railroads have always been overtaxed with freight to a certain extent, particularly in their eastern sections. The margin upon which profits were made was very small, and in order to show any profit at all, rolling stock had to be kept down to a minimum, for every empty freight car meant a loss of money. Railroads tried to operate in such a way as to reduce the "empties."

When we entered the war we were brought face to face with this problem, excess amount of freight and only enough cars to carry freight for our own needs.

Unequal Distribution.

The situation was rendered more serious from the fact that the distribution of loads was not even. Trains arrived at the eastern points fully loaded, but not so much stuff was sent westward. This meant that freight cars coming into New York, Boston, Baltimore and Savannah were taxed to their utmost with foodstuffs and supplies for these cities and those adjacent to them. Since these points are all trans-Atlantic shipping ports it was essential that practically all of the ammunition and supplies for the countries at war be forwarded through them, and in order to make possible the shipping of stuff for these points, an embargo was put into effect preventing the freightage of non-essentials.

What was true at that time is true now, and to a certain extent true of many other cities throughout the country. The problem is large enough in any event, but is made more serious by the shipment of merchandise and commodities in what are termed "short hauls." The ordinarily congested freight cars were utilized for carrying freight upon short distances only and this part of the problem has a ready answer in the utilization of motor trucks.



Illustrating the Service Value in Trucks. A, Duplex Four Wheel Drive Truck, Hauling 50 Bales of Cotton Weighing More than 12 Tons. B, Duplex Truck Hauling Separator at Charlotte, Michigan. C, How They Move Houses in Waterloo, Georgia. D, Duplex Truck Hauling Load of Hay on Trailer Car.

Motor Truck the Solution.

It has been proven that no medium for transportation is quicker or more practical than the motor truck. By the use of the truck much time may be saved and although, to a certain extent, this mode costs slightly more, it is offset by the time saved as well as the money saved in packing and crating. In this case, however, we face a problem somewhat similar to that faced by the railroad: that of uneven freight distribution.

For instance, Philadelphia sends to New York a great amount of freight, but New York does not send an equal amount to Philadelphia. Even if the freight were balanced, the truck owner in New York carrying goods to Philadelphia might be able to collect a load for New York upon his return trip. To solve this problem, the Chambers of Commerce in the East in the various cities are trying to establish a Return Loads Bureau, and they hope to solve the problem to a certain extent.

The Truck and the Farmer.

The farmer has profited by the introduction of the truck more than any other business man. Prior to the introduction of this mode of transportation, the farmer was obliged to rely upon railroads and electric car lines. In many cases he was isolated from transportation facilities and so was obliged to depend upon teams for getting his produce to the market. This mode of transportation was both slow and costly. His produce was handled many times before it reached the market.

In the first place, green stuff was taken from the garden and either carried by hand or by wagons to the barn, where it was sorted over and crated or packed in the wagon. A second wagon carried the goods to the nearest freight station where they were dumped upon the platform to await the coming of the car. From the platform they were transferred by hand to the freight car and the freight car carried them to the nearest point to their destination, where they were again placed upon the platform to await the coming of a third team which took them to the market.

With the coming of the motor truck, however, everything was changed. The motor truck was driven directly to the garden and loaded with the produce. The produce was delivered directly to the market, saving all of the handling and much time. The profits which the railroad or car line might have had, now go to the truck owner or the farmer himself. The truck is practical for other work upon the farm as well. It may be used for hauling load lumber or hay wagons. It may be used for transporting live stock, and it is not limited to the load which it carries itself in every case.

Where the roads are good and the country is level, one or two trailer cars are often

Digitized by Google

used, each of which may be loaded with any sort of goods. One of our illustrations shows an instance of this, where the Duplex Four Wheel Drive Truck is used for hauling bales of cotton to the market.

Not every farm brings in revenue enough to enable the farmer to keep one truck busy at all times. This does not mean, however, that the farmer should dispense with this valuable piece of machinery. If he has capital to invest, a truck is a practical investment, for he can use it in his own business and while he is not using it, rent it to other farmers in his vicinity.

In this number appears an article relative to the community tractor and it brings to mind the question, why not a community truck? Surely one is as practical as the other.

A Community Truck.

Why is it not practical for three or four farmers to get together? With the money which is furnished they might purchase at least one truck, each one of the farmers paying his proportion of the truck cost. We will assume that there are four of them, and each one pay one-quarter of the total price. In addition to this money, each one should pay one-quarter of the driver's salary.

The day might be divided into eight hours and each farmer might be allowed to use the truck for two hours. The truck could must he content himself to suffer the loss of delayed shipments.

An Actual Example.

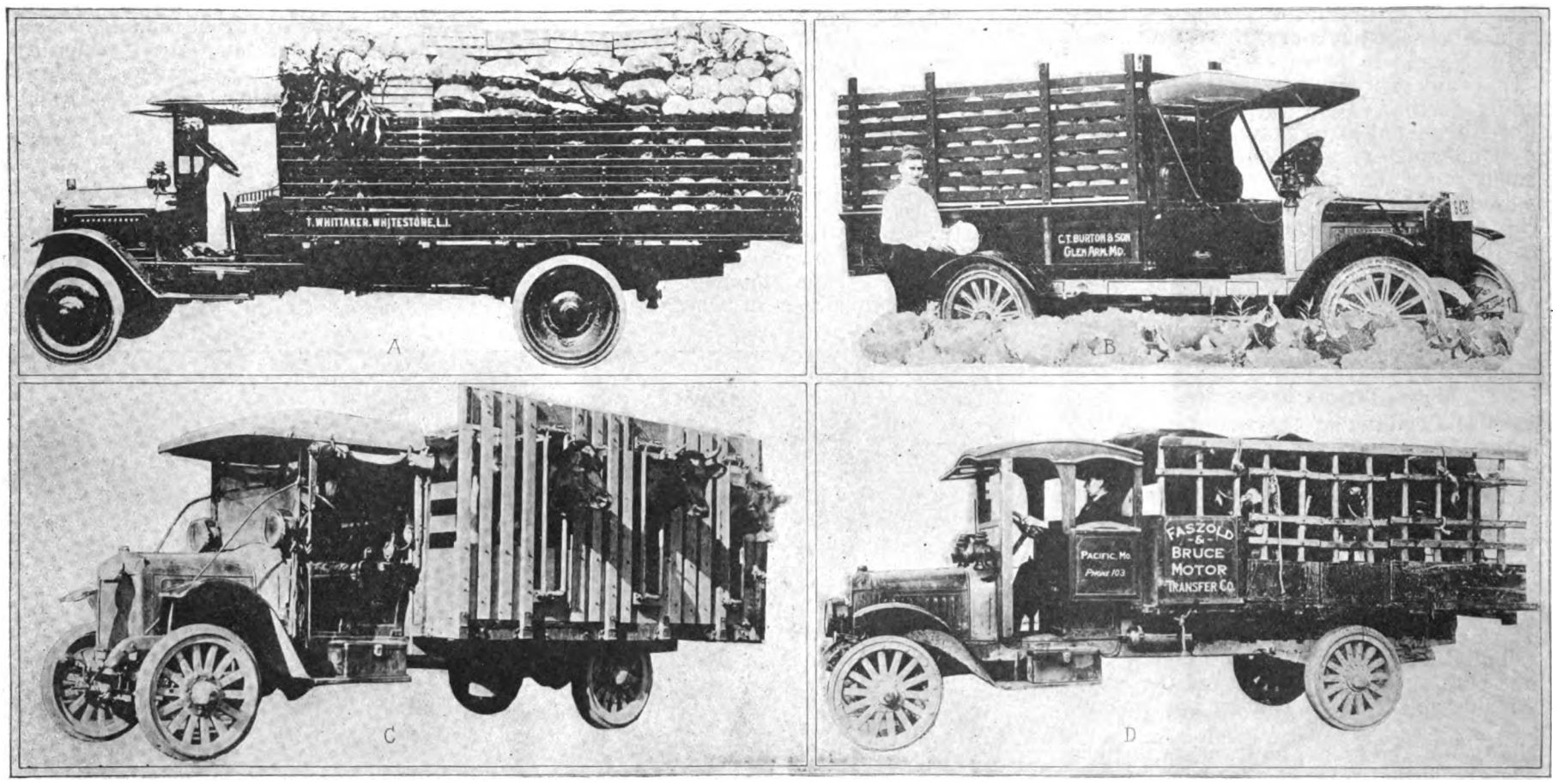
I have in mind the instance of a farm in Connecticut owned by two brothers. The boys had worked sometimes fifteen hours a day to earn their living and pay for the farm. To use the old English expression, they were "land poor." They were able to cultivate only about one-third of the land. The other two-thirds was a wasted investment. They were located four miles from the nearest freight station, about eight miles from Westerly, and a slightly greater distance from Stonington.

They owned twenty-four cows, and all of the milk was carried by team to the trolley freight. This milk was marketed by a large dairy association and the boys were often forced to pay for loss and spoiled milk. The dairy association would accept no milk cans smaller than twenty gallons. Consequently they arranged to feed to the pigs about eight gallons of milk per day, for the very reason that they could not dispose of this extra milk. Six neighboring farmers faced the same problems, and conditions were very unpromising, until the boys decided to buy a truck. With the coming of the truck none of the milk was wasted. It was all carried to Westerly and disposed of in that city. There was also a saving of time because it managed to obtain a sufficient number of pickers and assistants, for packing, so that as fast as the crop was harvested it was carried in the truck to New London, Stonington, and Westerly. This distribution was extremely practical because they could call by phone and find which was the best market upon that particular day.

To a certain extent, the truck was the solution to the hired man problem. No hired man likes to feel that he must stay upon the farm seven days a week. Neither does he care to walk five or six miles to the nearest trolley line. To drive a truck that distance, however, was not considered as work and when not in use upon the farm, two or three of the hired men would take the truck and use it for "joy-riding." Rather a costly proceeding you will say perhaps, but there are times when the average farmer is willing to pay most any price to keep the men. There is a certain class of farm labor which is possessed of the wandering spirit and it is not always possible to keep them, under any conditions. At the same time, however, a truck used in the manner which we have suggested offered them certain temptations in way of remaining upon the farm.

Other Inducements.

I called this fact to the attention of the boys one day when I visited them and after talking it over they decided that they would



Republic Trucks Are Used for Many Purposes. A, A Big Load of Produce for the Market. B, A Load of Cabbages Fresh from the Field. C, The Humble Cow's Limousine. D, A Load of Steers for the Slaughter House.

be driven to the first farmer's house and the milk cans for the morning's shipment placed upon it. The driver would then go to the second, the third and the fourth farmer's house and collect their milk cans, carrying the whole lot to the station for shipment or to the nearest town, as the case might be.

With a slight amount of planning the four farmers could arrange their loads so as not to interfere with their partners'. It might be well to assign the truck for every second day to one of the farmers who would then pay a slightly increased amount towards the upkeep and the driver's salary. At the end of the year a trial balance should be made showing the cost of maintaining the truck for that year and the increase in profits, and each farmer would then be able to see just how much money the truck had saved him. In a number of cases where such an arrangement has been adopted, each one of the farmers desired to purchase the truck at the end of the year for he found that with a truck, his profits were so much larger that he could hardly afford to be without it.

Another point which is worth considering is that by means of a truck the farmer is made entirely independent. He is not obliged to rely upon the middle man, nor took no longer to deliver the milk at Westerly than it did to carry it to the freight station by horse and team.

Other Problems Solved.

They soon found that they had disposed of many of their problems besides that of the marketing of milk. A few years before, approximately at the same time they purchased the farm, labor was a drug on the market and they had been able to obtain hired men at a very low figure. At that time they put as much of the land under cultivation as possible, and utilized much of it by planting peach trees.

The season prior to the purchasing of the truck had brought them a worry which was as great if not greater than the disposal of the milk, and that was the marketing of peaches. As every farmer knows, a thousand peach trees in a good bearing year will furnish an enormous number of peaches, but the peculiarity is that the crop is not extended for a period of months but ripens seemingly all at once, and must be harvested in a very short time.

At that particular time of the year transportation facilities are badly tied up and the truck proved to be a welcome asset. They try another scheme. They purchased a Ford touring car, and used this machine as an inducement for keeping their help. When they hired a man they told him that he could use the car upon his "afternoon off," in company with one of the other hired men. In other words, they divided the car between two of the hired men, one afternoon a week. It was cheaper than the truck, and they often used it for carrying small loads of green stuff to the market. They could also use it for small errands and found that it gave them a certain amount of relaxation after the day's work.

Today I think that these boys look upon both their automobile and their truck as being two of the most valuable pieces of farm machinery which they have. The truck has been largely responsible for their success, and I doubt if they would consider parting with either machine if they were unable to obtain another. They have managed to get out of the "land poor" class for they have begun to realize that the gasoline engine is the most practical machine on the market today.

In a future issue I will tell of their experience with a tractor as well as other farm machinery.

Digitized by Google

A Blacksmith Who Turned Iron Scrap Into Blacksmith Heaps of Gold

One of Our Brothers in Indiana Found That The Welding Torch Was a "Magic Wand"

BY JAMES F. HOBART, M. E.

Close beside the Nickel Plate Railroad on Wayne street, in Fort Wayne, Ind., there used to be a prosperous blacksmith shop, operated by Mr. Mescer, but that busy smith shop, once swarming with horses being shod, is in evidence no longer. Mr. Mescer, however, is there, and so is the shop, but there is not a horse to be seen around or in the place, and it would take some hunting to find many horse shoes there. Still, the shop is busier than ever, and the owner is here, there and everywhere directing, doing or helping as he finds necessary.

But why no more smithing and horseshoeing? The fact is, the shop has grown from a shoeing smithy into a first class oxy-acetylene welding establishment, and the fact that shoe-smithing has been abandoned is pretty good evidence that the welding has proven to be profitable.

During a leisurely chat with the owner one Monday afternoon—his leisure day, when he had one, was always on Monday, and the writer went for a talk on that day by appointment—it was explained that the owner got into welding because of having to send away so many welding jobs which came to the shop, in the course of wagon repairing, general blacksmithing and some automobile repairing.

Plenty of Welding Jobs.

So much of the latter work still comes to the shop, mostly welding, that a pit has been made in the floor, in which the workman can stand or lie when at work under a machine, and it was stated that a good many welding jobs are done with a machine over the pit, without even dismantling the broken parts.

Having so much welding of his own to be sent out, it was decided to purchase a welding outfit, and the plunge once made, the owner found his hands mighty full, learning the use of the new machine and also learning how to do general welding. Soon the matter was so far mastered that no more welding had to be sent out. Then, after a short time, the shop began to take in outside work instead of sending out its own work.

Beginning of Profits.

This change made quite a difference in the looks of the ledger, and each balance sheet showed that the profits were steadily increasing. At this time it was decided to obtain some kerosene heating torches, which was done. Previous to that time, the larger pieces had been preheated on the smith's forge, brick and iron being builded up around the parts to be preheated in such a manner that the forge fire could supply the necessary amount of heat, which it did in good shape after it was learned how to confine and direct the heat against the parts to be heated. A good many small pieces used to be—and are now, preheated in the large stove with which the shop is warmed in cold weather.

But since purchasing two large kerosene heating torches, it has been found far more preferable and very much quicker, to heat with the torches, with the broken parts right in position for welding, loose bricks and pieces of sheet iron being used to partially cover in the parts to be heated so the torch flame will concentrate upon the work in a manner which prevents much waste of heat and secures better and more thorough heating.

A Steel Welding Table.

But the owner of this converted smith shop early felt the need of a good bench upon which to do welding. To this end, some ¼" boiler plate;—tank steel; in fact, that inferior plate being far cheaper than "shell" or "flange" material, and the tank steel was exactly as good for a bench top inasmuch as it differs from the better steel only, in that it does not possess the quality of flanging over upon itself without cracking or breaking. But for table or bench tops tank steel is all right.

The legs and rails of the table were made of 3" x 3" angles, ¼" thick. The legs A, A, A, Fig. 1, were fitted to the top and bottom rails and girts, B, C, C, etc., and then welded solid, thus making the frame of the table so rigid that it would stand without appreciable buckling when supported entirely upon two diagonally opposite corners.

The table or bench top, D, was still further stiffened by welding in two cross girts between long top rails, B, and its mate, but the table top was in no way fastened to the frame. The top was simply laid on loosely

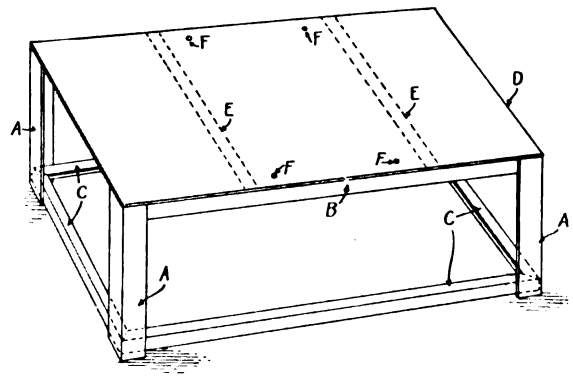


Fig. 1.—A Handy Welding Bench.

and then prevented from sliding off by means of the dowel pins, F, F, F, F, which were tight-driven and welded into the rails, B, B, but were left in loosely fitting holes in the bench-top, A.

By thus loosely fastening the bench-top in place, there never was any trouble met with, when in preheating something upon the table, the top became unequally heated and expanded in one direction more than another. Had the table-top been stiffly welded to the frame, there would have been many kinds of trouble when the top expanded under heat, and the table top and frame would necessarily have cut some queer antics in their irresistible desire to part company under fierce expansion stresses. But leaving the table top loose prevented the expansion troubles noted above. Hence, should any smith construct a table of this character, let him look twice to see that he has taken care of the expansion factor.

Saving Threaded Holes.

When welding crank cases and similar pieces of work, this shop uses a method whereby threaded and other holes in the case are not closed up, neither are the screw threads in such holes damaged in the least. Fig. 2 will give an idea of the manner in which threaded holes are saved. When the parts to be welded are chipped or ground as at holes K and L, in plate G H, then great care is taken to stop the chipping or grinding just before the holes are reached.

That is, the chipping chamfer is run out just before the holes are reached and as shown at M and at N, there is a little metal left at the holes, but as little as possible so as not to let the chipping break through into the threads.

When the welder finds one of these "run-out" pieces of chipping, he uses great caution in welding close to the hole and usually manages to melt new metal into the groove and to unite the new with the old in so clever a manner that the threads in the holes have not been damaged in the least. Sometimes he carries things just a bit too far and a very little metal will flow through into the threads. But the quantity is so small that merely running a tap into the threaded hole will restore it to perfect condition.

The gentleman in question has become so skillful in this work that he can usually weld up so close to a reamed hole that after the work has been completed, it is rarely necessary even to ream such holes again in order to make the pin fit tightly again.

Saving Small Pieces.

One "Kink" which is well worked in this shop is the assembling of small badly broken parts in such a manner that each and all are "saved" and any holes therein are made useful again after welding, without much reaming or tapping. To do this, the pieces are carefully assembled and then backed up with calcined plaster, which, after setting very quickly, is found to hold the several parts most admirably.

Something of this kind is shown in Fig. 2, at O, O, O and P, P, P, where the small pieces have been so cleverly reassembled that the holes I and J may be "saved" as directed in a previous paragraph, and the small pieces, O, P, so cleverly held before and during welding, that it is frequently hard to find a trace of the breakage after the welding has been finished.

In reassembling the pieces by the "plaster" method, the pieces are supported upon bits of wood or metal, propped up into exact position in any desirable manner possible, then thinly mixed calcined plaster is carefully worked under the broken fragments and left to "set." If "dental" plaster be used, the parts will be ready for preheating and welding in a very few minutes. But when this quick-setting plaster is used, it requires lively work on the part of the mechanic to get things into shape before the plaster sets fast.

There are several makes of calcined plaster which have varying times for setting, and there is one kind in particular which sets very slowly indeed, requiring many hours in which to harden enough to be safely handled. Should the plaster at hand work too quickly, mix it with vinegar and water and the setting will be delayed according to the amount of vinegar used instead of water.

Welding Gears.

A large number of gears are brought to this shop to be welded, the owner having worked up a very desirable reputation for successful gear repairing. It is the practice here, when the rim of a gear has one or more pieces broken out, to make a thin steel band or hoop with its ends turned out and drilled to receive a clamp bolt.

A broken gear is reassembled on floor or on welding table, a hoop slipped in place and

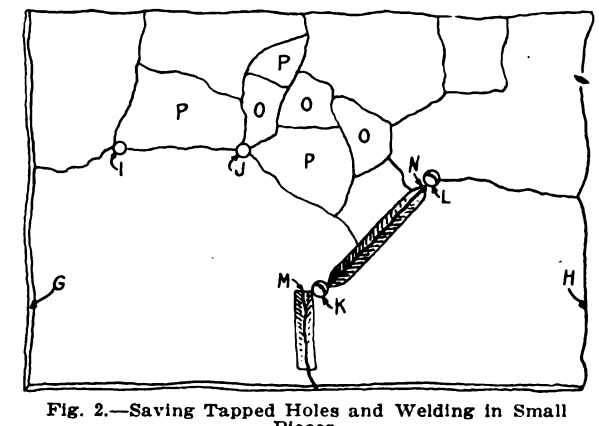


Fig. 2.—Saving Tapped Holes and Welding in Small Pieces.

the bolt tightened, then the rim stays where it belongs and may be easily welded fast with each and every part in its exact position. Preheating is as easily done with the clamp-hoop in place as without that useful appliance, and the necessary chipping or grinding is done in such a manner as to leave adequate bearing points which will permit the clamp hoop to hold the broken parts in their exact normal positions.

In theories and vocalized wind we soar high and talk loud, but the aerial business cannot displace the virtues of hard work and good shoe leather.

A vicious disposition is sometimes hereditary—the cub of a wolf is not likely to grow wool.

Digitized by Google

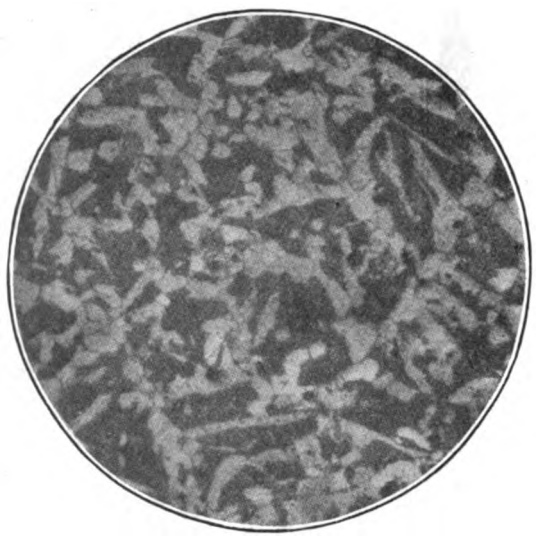
The Scientific Heat Treatment And Hardening of Steel

Part 2—Reasons Why the Color on the Outside Does Not Always Indicate the Condition of the Metal at the Center

BY J. F. SPRINGER

Both steel cools from the outside. The inside cools last. So we might have the outside at dark red and the inside at a bright cherry. This would not be a proper condition with which to start re-heating for the purpose of annealing. We are to begin with the whole of the steel—inside and outside—below medium cherry. If we cool it off until we know the whole is black or colder still, then we will be sure to be right. We can cool the metal until it is cold, if we like. We now go ahead with the re-heating. What we have to do is to heat the steel up to a proper point and then prevent the temperature from rising any further.

The effect is to restore the grains to their proper small size or nearabout that size. It is highly important to know when we have reached the point at which to halt the heat. Fortunately this is rather easily done for all ordinary steels, provided they contain at least 0.40 per cent. of carbon. That is to say we have an easy method for all except soft steels. This method makes use of our old friend, the horseshoe magnet. We have already found that the magnet enables us to tell, for tool steels, when we get to medium cherry red. For these steels we heat just



Overheated Steel .50% Carbon. Reheated to 1800 Degrees Fahrenheit and Cooled in Furnace.

a trifle higher than medium cherry red and then stop the heat from going higher. The result is that these tool steels will have their grains made small again.

Perhaps the grains are not at the smallest size. At any rate we have, unless the steel contains a very high percentage of carbon, done just about the best thing. For steels containing less carbon than tool steel—that is, for steel containing less carbon than 0.90 per cent.—but not less than 0.40 per cent., we may also use the magnet. Really we want a temperature above medium cherry red in order to get the best results; and it so happens that the magnet helps us to determine the proper point. That is to say, for steels containing carbon between 0.40 and 0.90 per cent., we re-heat until the magnet ceases to have a good grip and then carry the temperature up a trifle further—say, 75 degrees. We have then reached the point at which the grains assume about their smallest size. We must then halt the heating.

Rule for Restoring Steel.

Let me put the rule now in a short form. To restore the quality of overheated steel containing more than 0.40 per cent. of carbon, heat up the steel from a comparatively cool condition — black, for instance — until it reaches the point where the magnet loses its grip and then heat a trifle higher. This is the modern, scientific method of heat-treating overheated steel of medium and hard grades.

I must give some warnings. We must recollect that we have metal all the way through from one side of the article to the other. We may, if we are not alert, heat up the steel until the outside has reached the proper stopping point but the inside is yet below it. If the steel has been overheated all the way through and we want to restore the quality all the way through, then we must do the re-heating in such way as to bring up the interior to the proper point as well as the exterior. Because the magnet stops gripping the outside is not necessarily a reason that it wouldn't grip the inside, if it had a chance at it. What is to be done in a case like this? Of course, we can go on heating the whole piece up until we are sure the inside has come up to the proper point; but the trouble with this way of handling matters is that then we may have heated the outside too high. Heating any part of the steel to too high a point means producing big grains and weakened steel. This is the way we must look at it, at least. So we will have to look around for a better way.

A very good method is to do the final heating very slowly. By going slowly, the inside will be close on the heels of the outside. The difference in temperature will always be comparatively small. However, the thicker the work, the slower we will have to go, in order to give the inside time enough.

Oven Heating.

A second method and a good one is to do the heating in such a way that no part of the work can become hotter than what is wanted, no matter how long it is exposed to the heat. Thus, by putting the work into a muffle or oven and then heating the muffle or oven no higher than the point desired, we adopt a sure means of keeping the work from getting too hot, inside or out. The work will never get hotter than the muffle or oven.

The smith may now ask, What about steels that are fairly soft and very soft? This is steel below 0.40 per cent. of carbon. The magnet will not help us a great deal with these steels. The reason is this: the magnet loses its grip before these steels are fully restored in quality after having been overheated. Still the magnet is some help. When we notice that it no longer has a real grip we are to understand that we are getting pretty close to the point where we must stop the heat from going higher. The more carbon the steel has in it the closer we will be to the stopping point when we note that the magnet fails to grip.

It will be well now to sum up some of the important matters treated in this article.

(1) Steel is principally made up of grains or crystals.

(2) If the steel, contains just about 0.90 per cent. of carbon, then it will consist simply of grains or crystals of pearlite.

(3) A grain or a crystal of pearlite is made up of alternate layers of cementite and pure iron.

(4) Cementite contains both carbon and iron.

(5) If the steel contains more carbon than 0.90 per cent., then the grains or crystals of pearlite will be separated by films of cementite.

(6) If the steel contains less than 0.90 per cent. of carbon, then the grains or crystals of pearlite will be separated by films of pure iron.

(7) When steel is heated above medium cherry red, the grains or crystals grow and the steel loses strength.

(8) They may be made small again by forging, etc.

(9) Or they may be made small again by annealing.

(10) To anneal steels containing 0.40 per cent. of carbon or more (medium hard and tool steels), we heat a little higher than the point where the magnet loses its grip.

(11) To anneal steels that contain less than 0.40 per cent. of carbon (soft steels) we must heat up beyond the magnetic point—and the less carbon, the higher we must heat.

(12) The magnet loses its grip at about medium cherry red for tool steels. For softer steels, it holds on for higher points.

CONCRETE SHIPS.

There has been considerable agitation in this country on account of the possibilities brought forth in the use of concrete for ship construction. The Government, through the Shipping Board, put out a contract for an experimental ship. Preliminary reports concerning the test of this concrete ship have been very favorable and another contract has been awarded to the San Francisco Ship Building Company for the construction of a second ship to have a capacity of 7,500 tons.

Concrete ships have been used in commerce by Norway and seem to be very practical. Their construction is much more simple than those made of wood and engineers claim that considerable time may be saved. The keel must be laid and a skeleton steel frame work put into place. Large wooden molds are used and the concrete poured around them. After the concrete is set, the molds are removed and used in the construction of the next vessel.

Even if this type of ship cannot be used for ocean commerce, it may be found very practical for use upon inland waters and for coast commerce.

THE ART OF BLACKSMITHING TAUGHT IN THE NAVY.

In training our boys for service "on the other side," as well as in the Navy Department, much instruction is given in the art of blacksmithing. Blacksmithing is considered one of the most important subjects to be treated upon and at Washington, D. C., Naval Base, a class is maintained for the practical training of seamen gunners for Uncle Sam's fleet.

The students are enlisted men and expert mechanics. They are thoroughly schooled in every phase of the manufacture of our naval guns. Graduates of this school are all expert on every type of ordnance, and the high standard of gunners in our navy can be attributed largely to the work that is being carried on at this school.

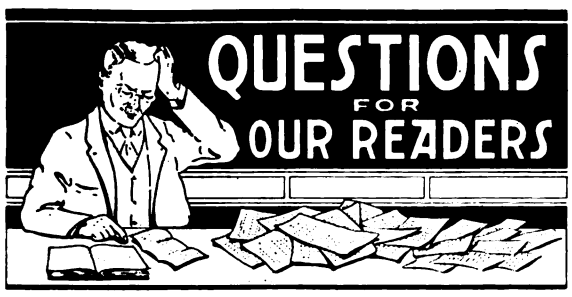


Training Our Boys for the Navy.

Our photograph shows the interior of one of the smith shops where the young men under the guidance of experienced instructors are learning various branches of forge craft. There is a big opportunity for mechanics of all sorts in the service at the present time and the government is sending out calls continually for good machinists and blacksmiths.

Debtors as a rule have short memories, while on the other hand, the man who lends seldom forgets.

Digitized by Google



Our question department is open to every reader. Through these columns our subscribers are at liberty to ask any questions that trouble them. The rest of the readers are requested to answer any questions that they find, for only blacksmiths who have had practical experience are able to answer many of the questions satisfactorily. The answers will appear in our Workshop Experience Department.

Remember that your question may be puzzling another of our readers, who will be glad to obtain an answer to it. Don't hesitate because you have not the proper paper or ink. Write the question in pencil on a piece of wrapping paper or even old newspaper if you want to; it makes no difference. Do the same with your answers. Don't worry because you can't write good English—we will attend to that part.

Don't be afraid to see your name in the magazine—Mr. Wilson doesn't mind, why should you? We are all friends and should help each other—do your part.

Who Will Second Our Brother's Motion?

From J. A., Rhode Island.—In a recent issue of the Blacksmith and Wheelwright I noticed a question from J. A. Morrison of New York, who wanted to obtain a sketch of a boring bar. I hope that one of my blacksmith brothers will send in a sketch, for I want the same thing. I think your idea of "trading experiences" is very good and I feel that all of us Brother Smiths in the country should help each other out. I am only a new reader, but I surely will try to "do my bit." I only hope that my older Brothers will "second my motion."

Who Has a Cure for a Balky Horse?

From M. R. Lessing, Mississippi.—I wish that some of the readers will tell me of a REAL cure for a balky horse; I don't mean something that will start him up for the time being, but a real cure.

How Can Files Be Hardened?

From Stanley Perkins, Ohio.—Will one of my Brothers tell me how to harden files so that they will not warp?

Shoeing a Kneesprung Horse.

From J. A. Winters, New York.—I would like to hear from some of your readers relative to shoeing a horse that has been kneesprung; not a new case, but one of long standing. How should the shoes be made to correct the fault as much as possible?

PLAN TO REDUCE THRASHING LOSSES.

A project to reduce losses of grain, especially wheat, through greater attention to clean thrashing is the outgrowth of recommendations from various sources and studies which indicate that more than 3 per cent of the wheat crop has in the past been lost by hurried and careless operation, or inefficient thrashing machines.

Efforts are now under way to have every thrashing outfit in the United States put in efficient working order and operated in a manner to save every grain of wheat possible. To direct the work a special Thrashing Division has been created as a part of the Food Administration Grain Corporation, with Capt. Kenneth D. Hequembourg, U. S. R., at its head. Capt. Hequembourg has had first hand experience in thrashing operations. The Grain Thrashing Division will have national headquarters at the office of the Food Administration Grain Corporation, 42 Broadway, New York City.

CRACKED CEMENT.

The blacksmith or farmer who has had occasion to build anything from concrete may be surprised to find that the concrete has badly cracked during the past winter and he may not always know just what the trouble is with it. One of the chief causes of cracking, during the winter time, is the moisture of the atmosphere.

Upon damp or wet days the small pores of the concrete collect moisture from the air and this moisture freezes and naturally expands, exerting pressure on the surrounding concrete and causing tiny cracks to appear. These cracks in turn fill with moisture and the action continues until summer comes again. During the winter time, the cracks are unnoticed because of the fact that they are filled with ice and dirt, but as soon as spring appears and the ice is thawed from the cracks they begin to show up.

Concrete, like any other material except stone, is subject to the wear of the elements. Even stone itself suffers to a certain extent but not so badly as does concrete. There is one sure way to prevent the destructive action of the weather and that is by coating the concrete with a good surface of weather paint. Do this after the warm weather has dried the material thoroughly, thus preventing any moisture from being left in the concrete.

EAT POTATOES.

Food Administrator Hoover urges everybody to eat more potatoes, which have been, and are still cheap in most places, and the object of this advice is to save wheat for our Allies in Europe. They must have flour for bread.

It is up to the people of this country to substitute for wheat everything they can, and most everybody is fond of potatoes in some form or other. Last year there was a big crop but they did not get to market in time to make them cheap in the fall and winter. Many farmers held their crops for bigger prices and were badly disappointed. Congestion on the railroads all winter interfered seriously with shipments. The result has been that this spring, millions of bushels of potatoes were dumped on the big markets and prices dropped to $1.50 a bushel or thereabouts, making potatoes about the cheapest food one has been able to buy.

Attempting too much has its penalties—the boy overreaching himself for a bird's nest broke his leg.

HE WAS TRUTHFUL.

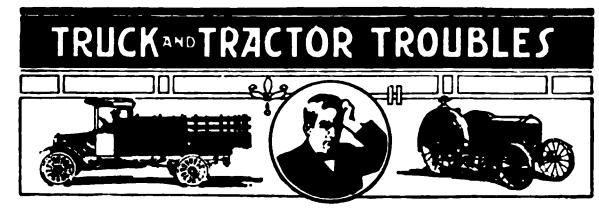
The Boggs River and Northern Railroad was putting into effect a most rigid practice of economy. Locomotives were patched and repaired with old parts and pieces until O'Leary, the shop foreman, threatened to break down under the strain.

To cap the climax, one day, a wornout looking locomotive was placed in the shop. O'Leary was asked to give it a thorough examination with a view to ascertaining just what would be required to put it in first class running shape. The same afternoon O'Leary, after having completed his review of the locomotive, dispatched the following laconic note to headquarters:

"No. 36—in today. To put in complete repair: Jack up her whistle and put a new engine underneath."—The Canadian Harness Journal.

ALL WHEAT IN KANSAS MARKETED.

The Food Administration in Kansas announced on May 1 that practically all the wheat of that State had left the farms. Elevators had worked overtime to handle the remnants of the 1917 crop. The April sale almost doubled the sales of March. The State is being combed for any unmarketed wheat, and where any is found, if held from unpatriotic motives, it will be taken over by the Government, the owner being paid for his grain at the regular market price, less the costs of handling.



From every part of the country, we receive letters telling about the low prices for blacksmithing, the big competition, and the slackness of blacksmith work. This is not as it should be, for the blacksmith is one of the best of mechanics, his work should be at a premium and he should be kept busy at all times.

There is one solution of the problem—do automobile, truck, and tractor repair work. If you can't do this, do welding or make tire repairs. Bring your problems to us and we will try and give you an answer, both in this department and by mail.

Don't hesitate to write us your troubles, no matter what they may be, we will answer your questions and put the questions before our other readers—they may give a better answer than we can.

If you find a question in these columns, and know the answer, write us and we will print the answer in a later issue. Help your brother subscribers and they will help you. Our nation is based upon Unity, for in Union there is Strength. Let's all get together and exchange our views.

Trailer Car Idea Wanted.

From C. P. J., Canada.—I wish that you would ask one of my brother readers to send me some drawings or sketches of a good trailer car for an automobile. I prefer the two-wheel type and want to know, especially, how they are fastened to the car. The trailer should be large enough to carry a load of about 800 pounds.

Fire Responsibility in Garage.

From A. E. Roe, Michigan.—I am running a garage and store a number of cars during the winter, charging for storage on same. In case of fire and the destruction of the cars would I be held liable for damage?

Answer from M. H. B., New York.—If ordinary care was exercised while the cars were stored in your garage, you would not be responsible for their destruction in case of fire, unless, of course, there was some agreement on your part that you would be responsible.

If you were careless about allowing men with pipes, cigarettes, etc., in your garage, in violation of the laws of your locality, and fire resulted therefrom, I think you could be held responsible.

By all means, post several conspicuous signs in your garage, reading: "Not responsible for automobiles or personal property in case of fire." It might be well to print this notice on all your letter-heads and bills.

Answers Mr. Meyer's Question.

From Frank L. Knox, Ohio.—Blacksmith and Wheelwright and Brother Smiths: Although I am not a very good writer, I am going to make an attempt to write a reply to Mr. J. D. Meyer's question in regards to finding a missing cylinder in a Ford car. Now the two previous answers were all right, but what would one do in case there were a master vibrator and the coils all put together and only one buzzer in action? Now here is the way I do it, and it never fails.

I take a wood handled screw driver and "short" the spark from the plug to the cylinder and can at once see which cylinder is off, by the action of the engine. This not only works with a Ford, but with most any other machine, and it does not take the time as the other way does. I hope I have made everything clear to Mr. Meyers or anyone else that is interested.

To be generous with wealth is better than the other thing—sometimes a mouse smothers in a cheese.

Digitized by Google

The Pioneer Journal of Its Class in the World.
Member of the Audit Bureau of Circulations.
PUBLISHED MONTHLY BY
M. T. RICHARDSON COMPANY,
71-73 MURRAY STREET, NEW YORK.
POST OFFICE BOX, 654. TELEPHONE—7377-7378 Barclay.
CHICAGO OFFICE, 608 SOUTH DEARBORN STREET.
Entered as second-class matter at the Post Office in New York City.

M. T. RICHARDSON, President and Treasurer
F. R. WHITTEN, Secretary
M. T. RICHARDSON, Editor
FRANK L. AVERY, Managing Editor

F. R. WHITTEN, Advertising Manager
H. F. LUDINGTON, Western Representative
GEO. A. SMITH, Eastern Representative
FRANKLIN MYERS, Art and Copy Dept.

FOREIGN AGENTS:
NEW ZEALAND
MR. R. HILL, Matlock House, Davenport, Auckland, New Zealand.
GREAT BRITAIN
ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.
One Copy, one year, including postage, if paid in advance.....$1.00
One Copy, six months, in advance.....60 cents
Single Number.....10 cents
Canadian subscriptions.....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English Money.
Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

ADVERTISING RATES SUPPLIED ON APPLICATION.

SPECIAL NOTICE

Subscribers failing to receive their magazine regularly will favor us by giving us notification to that effect.

CHANGE OF ADDRESS

Subscribers who desire the address of their paper changed should send us the old as well as the new address.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

Making Money by Building Bodies for Automobiles and Delivery Cars.

A COUNTRY blacksmith at the present time realizes that shoeing horses is not the only thing that he can do. The horse is gradually being pushed aside for the automobile and it is a very poor farmer indeed who does not own a machine. Next time you see one of your farmer friends drive past your shop in his own automobile, wave a red flag at him and talk with him for a few minutes. Tell him that his car is a dead investment unless he utilizes it in his business.

Persuade him to allow you to build a produce or delivery body for it. If he does not want you to do this, tell him that you can make him a mighty good trailer car in which he can carry everything from cord wood to eggs.

Why Shouldn't the Blacksmith Sell Trucks and Tractors?

IT MAY interest our readers to know that the tractor manufacturers have compiled statistics which show that more tractors are sold by the automobile dealers and garage men than by any other trade interest. Brother blacksmiths, doesn't this suggest something to your minds? Doesn't it look to you as though something was wrong? Aren't you just the men to sell tractors?

Don't you realize that every time a farmer comes into your shop you have a chance to sell him a tractor for he will surely buy one some time or other. Perhaps you know many farmers in your locality who even now are thinking of purchasing tractors. The next time Mr. Robinson or Mr. Weatherbee or any other of your farmer friends comes in to see you, or starts talking about the lack of farm help and the amount of land that he owns, why don't you bring forward a clinching argument in favor of the tractor? Why don't you show him that he can dispense with his dozen hired men and half dozen horses and buy one or more tractors? With the tractors he will be able to cultivate all of his land and make more money than he ever has before.

Suppose he **does** sell his horses. You have sold him a tractor and you will have the chance to do all of the repair work on the machine. In this way you will make more money, much easier, than by shoeing horses. At any rate, tractors will be sold this year more than ever and if you are bright you will see that you might just as well have the business. Now is the time to get into the game because every food conservation bulletin is an advertisement for the tractor.

Why Penalize Our Western Subscribers by Increasing Postage?

NEW YORK is what might be termed the publication center of the United States and while there are a few magazines published in the Middle West and West, 90 per cent are published in the Atlantic Coast cities.

Every person in the country so long as he conforms with the law is free to do as he pleases. He has the benefit of our free public centers and our educational system and it does not seem right that those people living west of the Mississippi River should be penalized just because they are away from the publication centers.

Despite this fact, Congress has passed a law which goes into effect on July 1st. It means that the postage rates on magazines will be increased many hundred per cent. We feel that our Western subscribers should receive our magazine, and that they should not be obliged to pay more for it than our Eastern subscribers. At the same time, however, it is not fair that our Eastern subscribers should pay for sending the magazine to the Western readers. It does not seem as though there was any reasonable way to adjust the subscription rates without being unfair to someone and this is why we want all of our readers to ask for the repeal of the unjust postal law.

We feel that the United States should be a united country in every sense of the word and no matter where a person may be located, that person should receive just as many privileges as any other person living anywhere's else in the country.

In Those Good Old Days When Macadam Roads Were Curiosities.

DOUBTLESS all of our blacksmith readers recall the "good old days" back in the eighteen hundreds when a macadam road was a curiosity. In those days, a hundred mile jaunt, was "some trip." Business was limited; prices were low; farm produce was often given or thrown away.

With the coming of the automobile, conditions changed, largely because the roads were improved. The farmer was able to market his produce throughout the surrounding country and in the nearby towns or cities, so that little of it went to waste.

The main point for consideration is that the road improvement was the principal cause for this growth. Good roads are essential and everyone should do their part towards promoting the interest in the highways.

A deplorable fact has been brought out recently when it was found that the roads in the East were being destroyed very rapidly by the passage of heavy army trucks. One representative in the State legislature even went so far as to introduce a bill to deny the use of the roads to army trucks. In other words, he wanted to admit that the roads were not suitable for traffic conditions and to prevent traffic upon them. Our resources should be used for the betterment of roads over which much of our future transportation is to be done.

Keeping Up To and a Little in Advance of the Times.

ONCE upon a time in a small town of Montana there was a busy blacksmith, who was always "up to his ears" in work because of the fact that when he did anything he did it well and that was the end of it. He never had to do anything over twice. As time went on this busy blacksmith began to find more and more leisure moments, until finally much of his work had dropped off.

Being gifted with intelligence he discovered that his little territory was being occupied, partially, by another up-to-date blacksmith. There was not business enough for both of them, and our first friend realized that one of them must go. Naturally he felt that he should be the one to stay for he was on the ground first.

Being an enterprising man, he did not sit down, put his head in his hands and groan. He simply tried to work out the problem of dividing five into two parts and figuring how he could keep the larger part for himself. He didn't happen to be a subscriber to The Blacksmith and Wheelwright so he was obliged to figure the problem out for himself.

It took him two months to find the answer, an answer which he could have obtained in our magazine two months ago. He has just started to repair automobiles and wishes that he had taken up this branch of work a year ago.

There is a little moral to this story which we trust everyone of our readers will be able to see without our telling it.

Do Your Bit by Giving the Boys a Lift.

A SHORT time ago our editor was waiting on the corner for a street car and noticed four young fellows in uniform nearby. The boys evidently were strangers in Brooklyn, on a leave of absence, and seemed to be on a sightseeing trip. They were relying upon the cars to get them to the various interesting points and were bemoaning the fact that their leave of absence was so short.

The writer was on the point of speaking to them and giving them some suggestions when a man in a large seven-seated touring car stopped at the corner. He hailed the boys and requested them to get into the machine. As the driver was evidently a stranger to the young fellows, the editor took the number of the machine and later on called upon the man to find the reason for his kindness and compliment him upon the fact that he was so thoughtful.

He found that this man made a practice of hailing every young fellow in uniform, whether he was a soldier or a sailor. He made a point of carrying them as far as he could in whatever direction he happened to be going at the time, providing they cared to take the ride. He said that he recalled the instance of the four young fellows very well, and that he not only took them from Brooklyn (where he had met the boys) but had spent about three hours showing them the sights in the city. He said that he felt he could not do enough for our boys. They were going to risk their lives for his business and deserved all of his attention.

We wish that there were more such kind-hearted men in the country. It does not seem right that a large touring car should be run to-day unless its seating capacity is entirely taken up, particularly when there are men in uniform waiting upon the corners for cars. Their time in this country is short. Perhaps they may never come back. At any rate, they will always remember the kindness of an automobile owner who helps them as much as this man did.

If you own an automobile, brother reader, take a lesson and make a point of stopping whenever you see a man in uniform waiting for a car. It is your duty to give him a "lift," and you must realize that he is doing a greater favor for you than you will ever be able to do for him.

Too many irons in the fire have burnt many a man's fingers.

Digitized by Google



In this department our readers are invited to contribute articles explaining how they solve the various problems arising from day to day in the shop. You may have developed a method whereby a piece of work is finished quicker, easier and better than formerly, but when you have done so why not give your fellow-craftsman the benefit of your experience? No matter how simple the job may appear to you it may be one that is bothering the other fellow, so make a rough sketch of it, write a few words of explanation and send it to the editor of this department. He will have the sketch remade by an artist and fix up the article. We want every reader to join in making this department one of the features of our publication. Any suggestion for lightening one's labors in the shop will be welcomed and appreciated by your fellow-craftsman.

Would Organize for Better Prices.

From U. S. W., Arkansas.—As I have not noticed anything in The Blacksmith and Wheelwright I decided to tell Brother Hood how things are going here. They are not going very well. There is about eight inches of snow and sleet here. Now as to the things the blacksmith has to put up with. I expect they are about as usual, plenty of work, more than we can do, especially farm implements, wagons and shoeing horses and mules.

We are not getting enough for our work here and I want to get the other boys to see it that way. We are getting $1.20 for shoeing a horse or a mule all around plain, and $1.50 for toeing all around, and other things in proportion. If some brother could tell me how to remedy this I would sure appreciate it.

I have been trying to get the boys to raise on their work, but have failed thus far. I believe in everything being equal. The merchant is getting what his goods are worth, you bet. The farmer gets 30 cents for his cotton, $1.50 a bushel for his corn, while we poor blacksmiths are sitting here and you can't tell a darn bit of difference in the ring of his anvil. And you don't see any big fur coats on him or his wife to stand the cold weather.

I admire the brothers in Nebraska for the prices they are getting. I would like to say right here if all the blacksmiths and wheelwrights did likewise in one year there would be no more low prices.

I consider The Blacksmith and Wheelwright the best paper published. I would not take $5 for the December issue alone. I have been trying to get all the brothers here to subscribe for it.

Two Handy Tools.

From J. T. Newbury, Colorado.—As I have received so much help from the columns of your paper and from the experiences of other contributors, I want to give you some of my ideas. I have been a follower of the blacksmith trade for fourteen years, and, while I have not learned everything, I do know something about the trade. I remember very distinctly the first year of my experience. It was in a country shop, which I

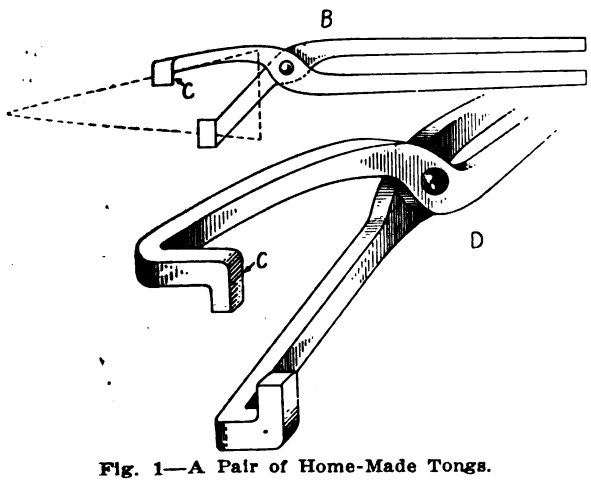


Fig. 1—A Pair of Home-Made Tongs.

opened more for the benefit of the community than anything else. I needed tongs and forge tools more than anything else, but didn't know how to make them. As it so happened, however, I was a subscriber to The Blacksmith and Wheelwright and just at my time of need some kind contributor explained how to make tongs. I tried out his idea and found it to be about as easy as anything I had ever seen.

I do considerable plow work here and judging from a number of satisfied customers I handle that branch of the business very satisfactorily. In sketch No. 1, I show the

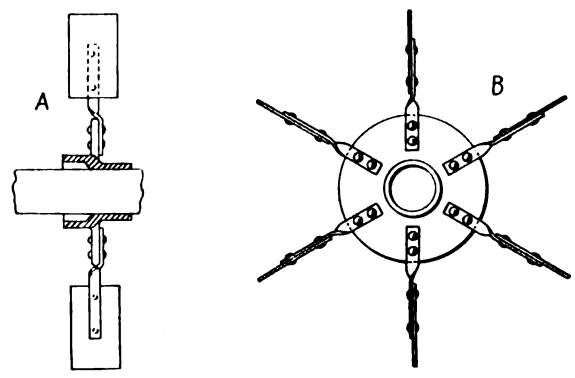


Fig. 2—Mr. Newberry's Blower Fan.

tongs which I use for handling plowshares, in making as well as dressing them. B shows the tongs as they look from the side and the dotted line shows the position of the share while it is in the tongs. Sketch D, in the same figure, shows how the lugs of the tongs are bent at the top and bottom. The top lug C is just long enough to reach over and down on to the quarter part. This tong holds a plow high, while it is being dressed. I also made a power blower which I will try to describe. It is strong enough to run four fires and gives plenty of air. I obtained an old Ford car hub-flange. One of the old-style models which is bored for one-inch straight shaft. Upon this flange I riveted six pieces of light strap iron measuring 1 in. wide by ¼ in. thick, as shown in Figure 2 at A and B. I next twisted the iron pieces ¼ of a turn, bringing their faces at right angles to the hub, and riveted six flat blades on them. Then I took a piece of Maxwell transmission shaft measuring 1 in. in diameter and keyed the Ford flange to it. I mounted the rig upon

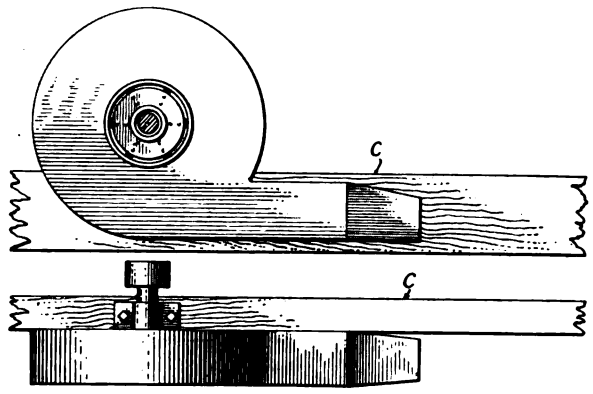


Fig. 3—The Blower Assembled.

a beam shown in Figure 3 at C, using an old box which I rebabbitted, to carry the fan shaft. I bolted the beam, which is long enough to reach across two joists, to the side of my shop, so that it would be out of the way, and built the tin case around the fan blades, leaving just enough clearance for the fan to run inside. I run the fan at about 1,000 revolutions per minute and get a good strong blast from it.

Must Make More Money.

From G. T. Tucker, Alabama.—As I have not written anything for The Blacksmith and Wheelwright, and have noticed nothing from the southern smith, thought I would send in just a little bit.

We hardly read anything or hear very much other than war and high prices, and as our country is at war, we ought to do all we can to help win, every man doing his bit.

We people of the south suffered the greatest disaster by a flood in 1916 that has been known since the Civil War. Everything planted in the lowlands, and some high land crops, were drowned and sapped to death right here at home and for many miles around us, but 1917 brought a bountiful harvest of grain and cotton, as well as a lot of vegetables. The farmer has received the best prices for produce that has ever been known to his generation. We blacksmiths have worked at the same old price, only charging more where material cost us more, not getting any more for our labor than we did in the past. We have paid nearly double for our groceries and provisions of every kind. Now I feel that we need to go higher, not overcharging for our work, but getting our share of the high prices.

We have a lot of patrons who are still holding their cotton for the highest price possible, and those who have already sold received a good price, yet they expect us to work at the old price and kick terribly if we ask them to pay more.

I feel sick when thinking of continuing to blacksmith while there is but little to it, in dollars and cents, and so much to it in labor. The average farmer does not work more than one-fourth of his time, yet he is living better than I am and has extra money to put in the bank for a rainy day, or to put out on a good rate of interest.

We are not getting our dues. We shoe a horse or mule (4 shoes) for 80 cents and do other work at less proportion. Shoes cost us 8 cents per pound and nails 15 cents, yet we get more per hour for shoeing than any other work we do. Of course the shoeing we do is just plain shoes, the greater part being farm animals and mostly mules.

I do not know just how to begin adjusting prices as material, both iron and wood, also tools, keep soaring higher, but one thing I do know, if prices are not changed in our favor, for our labor, well, you know what will become of us.

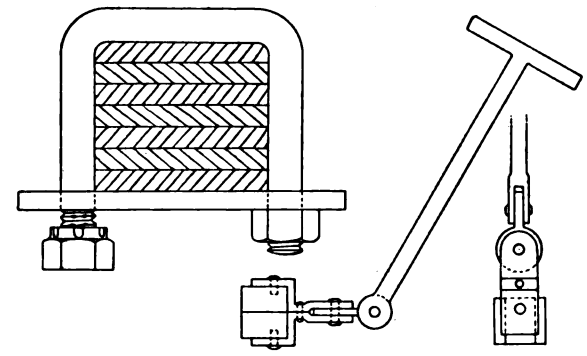
I want to thank you again for the help I have derived from your journal.

Threading Spring Clips.

From W. E. D., Kansas.—A great many times, particularly when doing repair work on autos, it is not easy to get at some nuts which are in places where the regular wrench cannot be swung. I am sending you a sketch of a wrench which makes this kind of work easy. The wrench has a universal joint effect and is shown at the right in the drawing. It consists of a socket wrench which can be picked up for a few cents, and a flexible joint which, although not shown in detail, is easily made. A true universal could be made if wanted. With this wrench you can get at the work easily, and the length gives you a good leverage.

The tapping or cutting of threads of a bolt or a stud of an axle clip and where the threads have been damaged, can be done by making a castle nut die. A great many times the threads are such that a nut a little oversize must be used, and often the bolt or threaded member is not easily got at. Nor does one want to take the work down just to cut a new thread.

Of course one can use a three-cornered file to smooth up the damaged threads, but this is not always practical when the thread or bolt is not easy to get at. I use a castle nut for fixing up the damaged threads. I run the slot end of the nut on the bolt first, and this will cut its way down almost as good as a die. These castle nuts are usually case hardened. An ordinary nut can be



Using Castle Nut to Cut Damaged Threads and a Flexible Jointed Socket Wrench.

used in the same way, but it is best to file a taper in the nut and on the bolt before trying to start it down.

Oversize tapping can be done by laying one thickness of ordinary cloth over one side of the tap, and a hole can be reamed by the same process.

Digitized by Google

Late Photographs Entered in the Photo Contests

Prize Photo No. 27.

From E. Burzlaff, Wisconsin.—I am a constant reader of the Blacksmith and Wheelwright and am interested in the prize photo contest. I have seen the pictures of shops from many different parts of the country but as yet, none from Wisconsin, so I am



View Showing Inside of Mr. Illig's Smith Shop.

sending you a photograph of the inside of the shop owned by E. Illig, and in which I work. You can see that there is still some horseshoeing going on yet. There are six horseshoeing shops in this town; they all belong to Local No. 268; but we can manage to keep busy.

The gas used in our shop is furnished by the city. You will note that we have a number of fireplaces, three in all. Each one is fitted with an individual electric blower.

Formerly we had three men in here, but now that the automobile business has grown so large, we only have two. On the average, we do about $6,000 worth of work in a year. We get 55 cents for numbers 1, 2, 3 and 4 shoes, and 65 cents for numbers 5, 6 and 7 shoes.

We charge from 30 to 35 cents for resetting common shoes and for Neverslip shoes we get from $2.80 to $3.20. For time work, we charge 75 cents per hour, while for automobile repair work we charge $1 per hour.

Prize Photo No. 28.

From Chas. Muller, Ontario.—We have noticed in The Blacksmith and Wheelwright pictures of shops, etc., of different blacksmiths and carriage builders, so we are forwarding a photograph of our shop and some work we turned out.

Chas. Muller, whom you see nearest the open door at the left side of the photograph, started in business in the small shop at the extreme right of the photo in 1908. In 1911 he bought the carriage business which was carried on in the large building for a number of years. In 1916 he bought a horseshoeing business which was carried on close by and moved that into this shop.

You will notice we do all kinds of repair work, rubber tires, auto repairing, carriage and auto painting. We carry some auto accessories, etc.

The business is now carried on under the firm name of Muller's Carriage Works, with Chas. Muller proprietor.

Prize Photo No. 29.

From M. E. Goller, Pennsylvania.—Enclosed please find two views of my shop, the inside view shows myself and two helpers,



An Interior View of Mr. Goller's Smith Shop.

we do all kinds of work that is done in a general shop and have installed an oxy-acetylene welding outfit. We think it will be a money maker, as well as enabling us to do many jobs that we could not do so well before.

I have been at the business eighteen years and feel I have made a success out of it. I have worked hard and had long hours, and have made some money, possibly not so much as I might have made in some other line with the same effort, but I like the work and feel that the blacksmith business is coming into its own slowly. I can see a big improvement. I think the first good step I took was to subscribe to The Blacksmith and Wheelwright about eighteen years ago and have been reading it as well as other books and trade papers.

I believe that the largest stumbling block in the blacksmith business has been the blacksmiths themselves. If any other business



M. E. Goller's Shop as it Looks Outside.

on earth has been run as the blacksmith business has, it would have ceased to be a business about the time Solomon built the temple. I think the only successful way to make a charge for a job is to keep account of the labor and material and not to get palpitation of the heart when we go to total it up, for fear the customer will kick. If you do the job at a loss they kick, so why not kick ourselves a little and make a fair charge for work done. You have my best wishes for the craft, and The Blacksmith and Wheelwright.

Prize Photo No. 30.

From G. W. Mathiasen, Nebraska.—Enclosed you will find a photo of my shop, and I would like to have you put it in the magazine, in the prize photo contest.

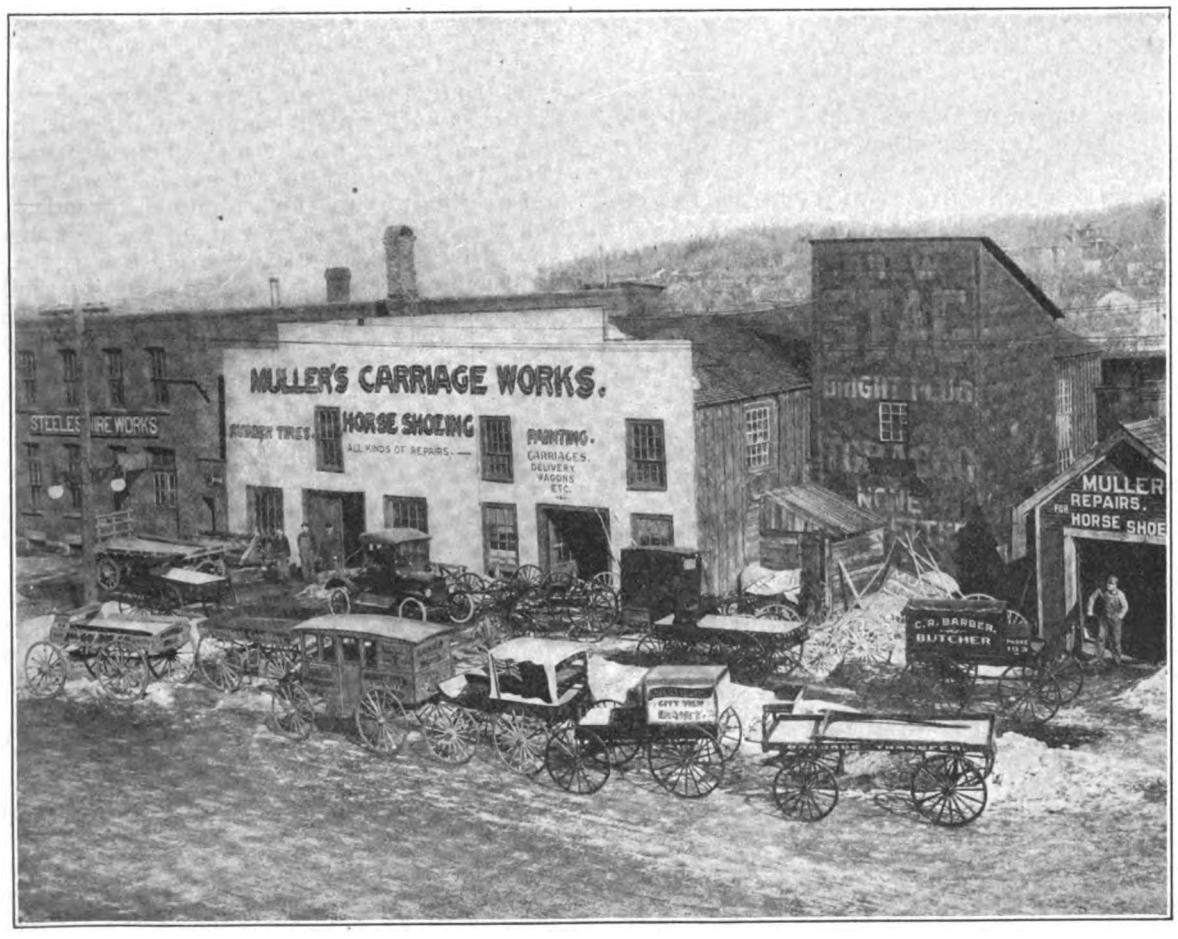
The shop measures 36 by 34 feet and is well lighted, having 13 windows. I believe in up-to-date methods and have installed the



How Mr. Mathiasen's Smith Shop Looks Outside.

most modern machinery, for I know that this is the best way to do business.

One-half of the floor is made of cement, while the rest of the shop is floored with wood. At the present time, I have plenty of work and can manage to get fairly good prices. I have been a reader of your paper for three years and am anxious to receive it every month.



Illustrating Possibilities in the Blacksmith Business.—At Right Is Shown Shop in Which Charles Muller Started. At Left Is Building Now Occupied by Muller's Carriage Works.

Smith Better Than Garageman.

From A. E. Hulquist, Nebraska.—I have been reading The Blacksmith and Wheelwright ever since I located here in Nebraska 10 years ago. I am glad to get it every month. Have been in the blacksmith business for 20 years, but still have lots to learn and every day men may get good points from The Blacksmith and Wheelwright. I am interested in the arguments put up occasionally.

As to automobile work, I for my part do not see why any blacksmith is not capable of doing better work than most of the garagemen. Any garage doing the right kind of work has a smith in some corner.

I have a shop 30 x 60 feet and have a foundation laid for an addition 20 feet longer. I am figuring for automobile repairing. Being located in a small place, I do all kinds of work from soldering to a general blacksmith business.

In regard to neighbor W. J. Ott of California, I think he is right about the corn proposition. He uses brown sugar where I use alum. I have found it to give a big relief. I must say I have some hard competition to

Digitized by Google

buck; that is, the smith in the nearest town is cutting prices in order to get the work, but I don't let that bother me. They will probably give him a trial, but not more than once or twice. They will come back.

What is to become of the shops in the years to come? You do not see any young men nowadays learning the trade. When we old fellows pass I think it will go kind of hard with some. I for one could use a young man if he was willing to learn.

A NAIL-SET HINT.

The ordinary nail-set, as received from the manufacturer, has a very smooth, hard end and one will find that it slips from the head of a nail very easily. This can be prevented without any difficulty. Soften the punch and obtain a fine tooth file. Place the end of the punch upon the file and give it a heavy blow with a hammer. This will leave the impression of the file teeth on the nose of the nail-set and prevent the set from slipping off the nail heads. Harden it, and it is ready for use.

PRIZE CONTEST ANNOUNCEMENT.

We will continue to print all photographs entered in the contest before June first, until all such pictures have been reproduced. After the last picture has been printed the prizes will be announced.

Cooperative Use of Tractors

An Interesting Paper Relative to a Subject of Great Importance at the Present Time

BY W. M. JARDINE *

Not as a representative of a manufacturing establishment, but as a consumer of their goods do I speak. My interest in tractors dates back to 1902, when I operated a steam tractor in Utah. In 1909 I operated a gasoline tractor in Montana. I enjoy the honor, I believe, of having unloaded the first steam engine used in Utah for plowing. That was in the early days of dry-farming, now one of the big fields of agriculture. I helped to start tractor farming in those western states. I had to, for I was born in the West and we had to make farming go or get out. Eventually I got out, but thanks to the perfecting of the science of dry-farming, with the additional aid of irrigation, that western country has been made a good place to live.

My experience with tractors about 1902 was not altogether pleasant. The manufacturers of the engine we bought would undoubtedly be as frank as I am now in admitting that none of us knew very much in those days about the pulling of plows with an engine, not even the proper way to hitch the plows to the engine. The manufacturers were generous, however, and sent a man who worked with us about six weeks, but we finally had to give it up. We did very well with the next, a gasoline engine tractor, as we plowed a thousand acres and then sold it for within $500 of the purchase price. Then we bought a 110-hp. engine and used it a while. I have, therefore, a first-hand knowledge of the development of the tractor and its use in the West and have learned the subject from the practical point of view. In recent years I have also been learning the use of tractors from the standpoint of an adviser of farmers. We have some 6,000 tractors in Kansas now, probably 2,000 or more of which have been placed in the state during the past year, indicating that Kansas farmers are rapidly coming to recognize the value of the tractor as an aid in overcoming the shortage of farm labor. We shall probably find it of still greater value this year.

Kansas Acreage to Be Plowed.

It is as a representative of the Kansas State Council of Defense that I am here in company with Dean Potter, the head of the Engineering Division of the Kansas State Agricultural College and Secretary of the Committee on Labor, Horse and Machine Power of the Council of Defense. The government is asking all of the states to do more than ever in food production this year. There are 24,000,000 acres to be planted to crops in Kansas this spring. We have about 9,500,000 acres in winter wheat. Probably 1,500,000 acres of this area will be killed out, leaving 8,000,000 acres which must be harvested. Ordinarily, from 60,000 to 70,000 transient laborers come into the state to help with the wheat harvest, but there will not be many of these this year.

Kansas has already sent to the training camps or the front some 25,000 young men, half of whom came from the farms. Twenty thousand more will probably go with the next draft. They may be taken before the spring planting is done; if not, undoubtedly before the wheat harvest. Then large numbers of men have gone into industrial work. If 24,000,000 acres of spring crops are to be planted and more than 30,000,000 acres of crops harvested during the season, there is a big job on hand, the limiting factor of which will undoubtedly be labor.

Tractors Alleviate Labor Shortage.

Being interested in tractors, I called the attention of the Council of Defense at its last meeting to the tractor as a possible source of aid in making the most efficient use of the available man-power in the state. I pointed out that a tractor of sufficient horsepower to pull a four-bottom plow, in the hands of a skilled operator, will plow from 10 to 15 acres of land a day; that a man with a four-horse team can plow 4 or 5 acres a day, and that, therefore, such a tractor outfit is equal to three such man-horse-labor units in plowing land for wheat. I am particularly interested in having tractors plow land for wheat, because with tractors it can be done early—in July and August—when it is too hot and often too dry to use horses.

Early Plowing Increases Yield.

Everyone who knows anything about growing wheat—and we ought to know about it in Kansas where 9 or 10 million acres are planted every year—knows that we can increase the yield from 5 to 10 bushels an acre and even more by plowing the land in July and August. Every farmer knows this, but he also knows that plowing can be postponed whereas he cannot put off taking care of his alfalfa, cultivating his corn, stacking his wheat or threshing it if it is left in the shock.

It will not be possible to secure enough tractors to do all the plowing for wheat, but we ought to be able to increase the number materially. I am interested in getting groups of, say, a half dozen farmers to buy tractors cooperatively and put them in the hands of men who know how to run them. One of the chief drawbacks to the practical use of the tractor is the lack of skill on the part of the average man who tries to run them. Ninety per cent of the trouble is due to this cause.

Cooperative Tractor Farming.

If we could ascertain those communities that have one or two thousand acres of land to be plowed for wheat whose owners would be willing to contract to have the land plowed by tractors, we might be able to place tractors in charge of skilled operators in those communities to do the work. Various means would be employed in bringing the land, tractor and operator together, and here is the opportunity for tractor manufacturers! The best way to convince farmers of the usefulness of tractors is to take the machines on their farms and demonstrate that they will do the work better and work more hours per day and more days per month than horses—not just show them that the tractor will plow thirty acres, then leave; the weakest tractor on the market will do that, but it takes a good tractor to plow steadily for thirty days and a good man to keep it going for that length of time. A skilled operator can do this, but the average farmer cannot. I believe it would be profitable, as well as patriotic, for manufacturers to place machines on farms in charge of skilled operators who would give them proper care, and allow the operator to demonstrate to the farmer what the machine will do, the farmer paying so much, usually from $2 to $2.50 an acre, for the work done.

Men engaged in general farming cannot afford to waste their time trying to run machines they do not understand, especially if we can "round up" the men who do know something about engines, even if they are not experts, and put them to work. There are a number of such men. The Kansas State Agricultural College turns out several hundred short-course boys each year who have acquired a good working knowledge of tractors. These are scattered over the state. Last year we were in touch with a thousand that we could recommend as skilled operators. The number will be less this year because many have entered military service.

Cooperation of Kansas Council of Defense.

The Council of Defense is getting in touch with the men in the state who can run tractors. We are also endeavoring to ascertain the farmers and communities who have land to be plowed with tractors, especially communities with a thousand acres and more. We will try to locate men who are willing to buy tractors cooperatively, as we used to buy threshing outfits, and employ men with knowledge of engines to run them. We shall probably find men who know how to run tractors and would be glad to do job work if they could manage to finance the purchase of machines. Some may have a little collateral, or perhaps some banker or business man will back them.

If tractor manufacturers are interested in the proposition of putting tractors on farms as I suggested, the Council of Defense will be glad to render every help, such as assembling jobs close enough together to avoid wasting time in traveling from one farm to another; also to have fair-sized tracts, although one of the sections of the state that needs this help is eastern Kansas, where the acreage planted to wheat and other crops is thought to be too small in many cases to justify the purchase of a tractor unless on a cooperative basis.

We believe in Kansas that the tractor is going to be an increasingly important factor in the development of our agriculture, especially after the war. The difficulty now is that the supply of tractors is limited. They are being shipped abroad. That is very desirable indeed, but we must not forget our home needs. Since we have banded ourselves with the Allies to win this great fight, we must distribute our resources where they will be most effective. This means looking after agricultural as well as military needs.

Besides being good advertising for the manufacturer, the cooperative plan of using tractors will render great assistance in the production of foodstuffs. Kansas crops are among the first to mature and become available for use. It behooves us, therefore, to facilitate their harvest and movement to market in every way possible. Tractors will do this. We need more in the state, and I hope we can get them "by hook or by crook." That is the thought I want to leave.

Heavy Tractors Needed in Kansas.

I was astonished at the number of makes of tractors I saw assembled at the National Tractor Show, with the industry scarcely a decade and a half old! Farmers are thinking in terms of the heavy tractor. The tractor we need in this state, however, is the one that will do all kinds of work on the farm: Fill the silo, thresh the grain, plow the land and pump water for irrigating. The little farmer can use the "baby" tractors. The "12-24" is the tractor that will meet our general needs in Kansas.—Paper read before the Kansas City Section of S. A. E.

*Vice-chairman, Kansas State Council of Defense.

Digitized by Google

Johnston's "Krakno."

"Krakno" is an elastic, non-corrosive, heat resisting paint which is impervious to moisture and gives an inhibitive coating which prevents rust and scale. It is declared by all carriage and wagon painters to be the ideal filler and surfacer. By the use of "Krakno" one can save all the time and trouble of burning off and repriming yet get a perfect job. "Krakno" is manufactured by the R. F. Johnston Paint Co., S. E. Cor. Main and Pearl Sts., Cincinnati, Ohio, and this company urges any blacksmith or carriage or wagon repair man to give a gallon of "Krakno" a trial. "Krakno" is made in the following shades: red, slate, yellow, white, blue, green, maroon, gray and blue black. The manufacturers say that if one will only try a gallon of "Krakno" one will never want to be without it in his shop. Send in your order for a gallon before you forget it.

Northwestern Horse Nails.

The Northwestern Horse Nails, which are made of the best quality material and which have been on the market for a great many years, are manufactured by the Union Horse Nail Co., Chicago, Ill. The manufacturers point out that these nails are perfect in form and finish and that they will hold the shoe longer than any other nail made. The re-enforced point makes it one of the easiest nails to drive and one of the safest to use. Readers who are interested should write direct to the manufacturers for particulars and prices.

Wood Working Machinery.

Every garage and wagon repair shop should be equipped with a good line of wood working machines and no one makes better machines for this purpose than the Crescent Machine Co., 203 Main Street, Leetonia, Ohio. The Crescent Universal Wood Workers are in use all over the United States and if you have not already obtained the Crescent Machine Co. catalog, you should do so. This catalog illustrates a line of band saws, jointers, saw tables, planers, disk grinders, shapers, swing cut-off saws, hollow chisel mortisers, borers, and variety wood workers, made by this large and reliable concern, and the catalog is a valuable reference book which should be in the hands of every garage and wagon repair man. Write for it before you forget it.

A Good Tire Cooler.

The Wolfe Tire Cooler, made by Matt L. Wolfe, West Carrollton, Ohio, is highly recommended by all who have used this excellent machine. This device has stood the test for 12 years in many of the best shops and it is doing all that is claimed for it wherever it is used. Readers who are interested should write direct to Mr. Wolfe for particulars and full prices.

Star Steel Shapes.

This is the busy season for the farmer and, as a consequence, the country blacksmiths are in the market for steel shapes of every kind. The Star Mfg. Co. of Carpentersville, Ill., manufactures a complete line of these shapes including plowshares, listershares, mold-boards, landside plates, landside points, shovel points, plow points, seeder points, subsoilers, cultivator shovels and drill points. For interesting, free, catalog and prices, send direct to the manufacturers.

Bench Lathe Tool Holder.

What is said to be the smallest bench lathe tool holder made is manufactured by the Ready Tool Company, Bridgeport, Conn., and is known as their new style O-O Tool Holder. In putting this tool holder on the market the manufacturers have taken into consideration the requirements of users of bench and watch lathes, and have designed it to meet these requirements. The tool holder is made of a fine quality drop forging and broached with a square true hole for the cutter. With the holder is furnished a high-grade high-speed cutter treated by the Taylor-White process. The tools are nicely finished and sent complete with a 3-16-inch square cutter and wrench. The holder measures 5-16-x½x3½ inches.

Utility Rim Remover.

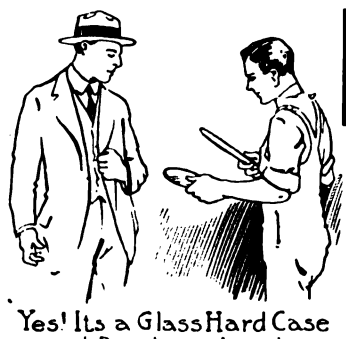
Every motorist who owns a car fitted with demountable rims realizes that the removal or replacing of tires takes considerable time and energy. One is apt to pinch either the tubes or hands in applying the tires without proper tools. The Utility Rim Remover manufactured by R. P. Hartenstein, 544 So. Dearborn Street, Chicago, Ill., is a handy device for expanding and contracting demountable rims. The device is fitted with two jaws and a turnbuckle. In use the jaws are fastened to two opposite points on the rim and the turnbuckle is twisted until the rim is drawn away from the tire. The device may be left upon the rim until a new tire is applied, when the operation is reversed.

Red (E) Tools.

The Ready Tool Co., Bridgeport, Conn., manufacturers of "the tool with the tool steel bearing," have just published their Quick Reference Catalog No. 16. This catalog illustrates and describes their chrome nickle lathe tools with the tool steel bearing, shaper and planer tools, tool holder for bench and watch lathes, which is the smallest tool holder on the market, boring tool holders, boring bars and internal threading tools, cutting off tools, threading tools, side tools, shaper or milling machine vise hold downs, lathe dogs, milling machine dogs, tail grinder dogs, balanced grinder dogs, handy holders, the Hill holdback dog, belt sticks, high speed steel cutters and lastly a price list of extra cutters. This catalog which is small enough to be carried around in one's lower case pocket will be sent to any reader of this publication upon request.

Defender Auto-Lock.

Many insurance companies refuse to insure automobiles unless the machines are fitted with some sort of a locking device, and in view of the many automobile thefts, the Defender Auto-Lock Co., 506-8 Marquette Bldg., Detroit, Mich., are putting on the market what they term a thief-proof lock. With the lock in place the Ford coil box cover is firmly clamped down. When the locking mechanism is turned the coil line is grounded so that the coils cannot be used even with outside current.



Yes! Its a Glass Hard Case and Produced with a Non-poisonous Chemical

FERRO CASE

For Case-Hardening

Is Something You Have Been Looking For

A NON-poisonous chemical that is used by sprinkling upon the red-hot steel, or in a cyanide melting furnace, same as cyanide has formerly been used.

Consumers, large and small, have used Ferro Case for years. So will you, after a trial.

Today is the Time to Write for Prices and Your Dealer's Name Will be Appreciated.

C. G. BUCHANAN CHEMICAL CO.

Makers of Industrial Chemicals and the only makers of Ferro Case

120 East Pearl Street - - - - Cincinnati, Ohio

MOTOR TREADMILL

Entire Patent Sold Outright or State Agencies For Sale

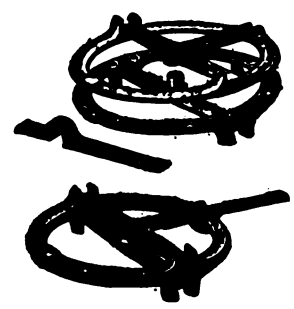


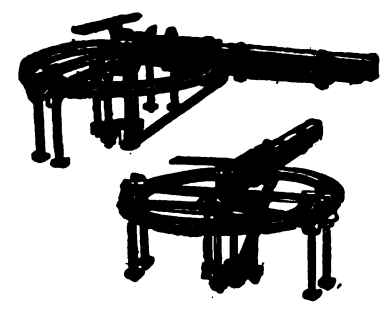
Use any Auto, Saw Wood, Pump Water, Mix Concrete. Cuts Ensilage. Durable. Can be manufactured at low cost.

WRITE **THE GRIFFIN MFG. CO.** FOR TERMS

113 STATE STREET BOSTON, MASS.







TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.

OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.

Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE COCEL MFG. CO., TOLEDO, OHIO.

IT PAYS TO ADVERTISE IN THE BLACKSMITH AND WHEELWRIGHT

WRITE FOR ADVERTISING RATES

946 Pages instead of 824 **1918—SEVENTH EDITION** 3362 Illustrations instead of 2000

$3.82 prepaid **DYKE'S AUTO ENCYCLOPEDIA** $3.82 prepaid

Entirely re-written, hundreds of illustrations and many new subjects added. Practically a new book. A non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 50 Instructions—Simplified and Practical.

3362 Illustrations—the kind you understand at a glance.

2 Supplements, part printed in two colors, treating on the construction, operation, repairing and adjusting of the FORD and PACKARD—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.

778 Illustrations and 279 pages on Electric Ignition, Electric Starters and Generators, etc.

51 pages and 79 illustrations on the Delco system alone.

60 pages and 254 illustrations on Adjustments, Tests, etc., of leading Electric Systems.

154 pages and 1189 illustrations on Repairing.

Oxy-Acetylene welding. Axle, Differential and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.

27 pages and 180 illustrations on Tires and Tire Repairing.

44 pages and 119 illustrations on Carburetion.

89 pages and 291 illustrations on Engines and Parts.

16 pages on Digest of Troubles.

6000 lines to the Index. This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. Index begins on colored paper, easy to refer to.

Dictionary is also included, which gives the meaning of motoring terms.

Inserts: There are five—printed in colors. New features you never before saw or heard of in one of the inserts.

Additions to the Seventh Edition:

TRUCKS, TRACTORS, MOTORCYCLES, AIRPLANES AND AIRPLANE ENGINES

HOW TO BECOME AN EXPERT AUTOMOBILE MECHANICIAN

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion subject so thoroughly, you can adjust any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

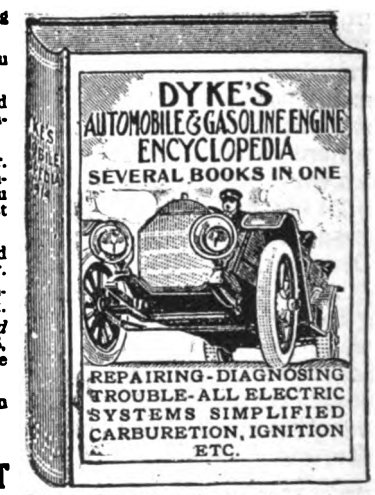
Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical Automobile book in America. Price $3.82, prepaid.

Address all orders to

THE BLACKSMITH & WHEELWRIGHT

73 MURRAY STREET NEW YORK



It's worth ten times its cost if only placed on the shelf and used as a reference.

Digitized by Google

Index to Advertisers

Aetna Nut Co., horseshoe calks....Front cover
Akron-Selle Co., gears....Front cover
Akron Rubber Mold & Machine Co., tire repair outfits....155
American Calk Co., calks....Front cover
Anti-Borax Compound Co., welding compounds....2d cover
Armstrong Mfg. Co., bolt dies....172
Armstrong-Blum Mfg. Co., punches and shears....Front cover
Barcus Mfg. Co., horse stocks....149
Barnett, G. & H., Co., files and rasps, Front cover
Bertschy-Bermo Co., welding plants....172
Bicknell Mfg. & Supply Co., dies....156
Birch Motor Cars, motor cars....Front cover
Bradley, C. C., & Son, shaft coupler, 2d cover
Buchanan, C. G., Chemical Co., industrial chemicals....168
Buffalo Forge Co., blacksmiths' tools....155
Burden Iron Works, horseshoes....3d cover
Bush Motor Co., automobiles....4th cover
Butterfield & Co., taps, dies and screw plates....156
Campbell Iron Co., supplies....171
Canedy-Otto Mfg. Co., blacksmiths' tools....172
Capewell Horse Nail Co., horse nails, Front cover
Champion Blower & Forge Co., blowers....151
Champion Shock Absorber Sales Co., shock absorbers....169
Champion Tool Co., blacksmiths' tools....171
Childs, S. D., & Co., steel stamps....Front cover
Columbus Forge & Iron Co., anvils....154
Columbian Hardware Co., vises....Front cover
Cortland Welding Compound Co., welding compounds....153
Cray Bros., blacksmiths' tools....169
Crescent Machine Co., woodworking machinery....4th cover
Diamond Cak Horseshoe Co., horseshoes....154
Edwards, C. D., Mfg. Co., shears....169
Electric Blower Co., blowers....150
Electric Wheel Co., wheels....171
Empire Mfg. Co., wheels....4th cover
Felton Sibley & Co., paints....149
Firestone Tire & Rubber Co., tires....152
Fisher & Norris, anvils and vises....156
Franklin Steel Works, toe calks....2d cover
Gardner, R., Electric & Mfg. Works, blowers....155
General Welding Co., welding outfits....3d cover
Gillette Clipping Machine Co., clipping machines....4th cover
Gogel Mfg. Co., tire heaters....168
Greenfield Tap & Die Corporation, screw plates and blacksmiths' machinery....149
Griffin Mfg. Co., motor treadmills....168
Gwilliam Co., ball bearings....4th cover
Hart Mfg. Co., stocks and dies....4th cover
Harvey Spring & Forging Co., auto springs....2d cover
Hawkeye Mfg. Co., hammers....172
Hay-Budden Mfg. Co., anvils....4th cover
Heller Bros., horse rasps, tools, etc....156
House Cold Tire Setter Co., tire setters, hollow and spoke augers....4th cover
Jenner, H. W. T., patents....170
Johnston, R. F., Paint Co., paints....154
Kerrihard Co., hammers....153
Kimball Tire Case Co., tire protectors, 3d cover
Lemoine, N., Co., hoof packing....Front cover
Linde Air Products Co., oxygen....156
L. S. P. Calking Machine Co., calking machines....150
Macgowan & Finigan Cordage Co., hammers....155
Mayer Bros. Co., hammers....152
Ness, Geo. M., Jr., steel stamps....Front cover
Nicholson File Co., files and rasps....149
Oneida National Chuck Co., chucks....171
Ottawa Mfg. Co.,, kerosene engines, Front cover
Parker, C. L., attorney....171
Parks Ball Bearing Machine Co., woodworking machinery....153
Peck, Stow & Wilcox Co., pincers....172
Phoenix Horseshoe Co., horseshoes and toe calks....150
Porter, H. K., bolt clipper....4th cover
Prentiss Vise Co., vises....4th cover
Rosewater Electric Co., blowers....3d cover
Shaler, C. A., Co., vulcanizers....4th cover
Sheldon Axle & Spring Co., axles....153
Schwarzkopf, S., tuyere irons....Front cover
Standard Horse Nail Co., horseshoe nails, 4th cover
Star Mfg. Co., agricultural implements....155
Stokes Bros. Mfg. Co., rasps....Front cover
Superior Oxy-Acetylene Machine Co., welding outfits....171
Thompson Tuyere Iron Co., tuyere iron, 4th cover
Union Horse Nail Co., horse nails....3d cover
United States Horseshoe Co., horseshoes....156
Warner, R. P., Electric Co., blowers, 3d cover
West Tire Setter Co., tire setters, hammers....171
Wheel, B Top & Hardware Co., supplies....170
Whisler Mfg. Co., nut splitters, jointer heads....Front cover
Witte Engine Works, engines....171
Wolfe, Matt L., tire coolers....172
Young, W F., veterinary remedies....172

Agricultural Implements

Star Mfg. Co....155

CLASSIFIED BUYERS' GUIDE

Anvils
Columbus Forge & Iron Co....154
Fisher & Norris....156
Hay-Budden Mfg. Co....4th cover

Attorneys
Parker, C. L....171

Automobiles
Bush Motor Co....4th cover

Automobile Springs
Harvey Spring & Forging Co....2d cover

Axles
Sheldon Axle & Spring Co....153

Blacksmiths' Tools
Buffalo Forge Co....155
Butterfield & Co....172
Canedy-Otto Mfg. Co....172
Champion Blower & Forge Co....151
Champion Tool Co....171
Cray Bros....169
Heller Bros. Co....156
Nicholson File Co....149
Peck, Stow & Wilcox Co....172

Ball Bearings
Gwilliam Co....4th cover

Blacksmiths' Machinery
Greenfield Tap & Die Corporation....149

Blowers
Buffalo Forge Co....155
Champion Blower & Forge Co....151
Champion Tool Co....171
Electric Blower Co....150
Gardner, R., Electric Mfg. Works....155
Rosewater Electric Co....3d cover
Warner, R. P., Electric Co....3d cover

Bolt Dies
Armstrong Mfg. Co....172

Bolt and Rivet Clippers
Porter, H. K....4th cover

Calking Machines
L. S. P. Calking Machine Co....150

Calks, Horseshoe
Aetna Nut Co....Front cover
American Calk Co....Front cover
Diamond Calk Horseshoe Co....154

Calks, Toe
Franklin Steel Works....2d cover

Chemicals (Industrial)
Buchanan, C. G., Chemical Co....168

Chisels
Champion Tool Co....171
Peck, Stow & Wilcox Co....172

Chucks
Buffalo Forge Co....155
Oneida National Chuck Co....171

Clipping Machines
Gillette Clipping Machine Co....4th cover

Dies
Bicknell Mfg. & Suply Co....156

Disc Sharpeners
Mayer Bros. Co....152

Drills
Buffalo Forge Co....155
Champion Blower & Forge Co....151

Engines
Ottawa Mfg. Co....Front cover
Witte Engine Works....171

Farriers' Tools
Barnett, G. & H., Co....Front cover
Champion Tool Co....171
Heller Bros. Co....156
Peck, Stow & Wilcox Co....172

Files and Rasps
Barnett, G. & H., Co....Front cover
Nicholson File Co....149
Stokes Bros. Mfg. Co....Front cover

Forges
Buffalo Forge Co....155
Champion Blower & Forge Co....151

Gasoline Engines
Witte Engine Works....171

Gears
Akron-Selle Co....Front cover

Hammers
Champion Tool Co....171
Hawkeye Mfg. Co....172
Kerrihard Co....153
MacGowan & Finigan Cordage Co....155
Peck, Stow & Wilcox Co....172
Mayer Bros Co....152
West Tire Setter Co....171

Hollow Augers
House Cold Tire Setter Co....4th cover

Hoof Packing
Lemoine, N., Co....Front cover

Hoof Parers
Champion Tool Co....171

Hoof Nippers
Champion Tool Co....171

Hoof Shears
Champion Tool Co....171

Horseshoes
Burden Iron Works....3d cover
Diamond Calk Horseshoe Co....154
Phoenix Horseshoe Co....150
United States Horseshoe Co....156

Horseshoe Calks
Diamond Calk Horseshoe Co....154

Horseshoe Nails
Capewell Horse Nail Co....Front cover
Standard Horse Nail Co....4th cover
Union Horse Nail Co....3d cover

Horse Stocks
Barcus Mfg. Co....149

Kerosene Engines
Ottawa Mfg. Co....Front cover
Witte Engine Works....171

Motor Cars
Birch Motor Cars....Front cover

Motor Treadmills
Griffen Mfg. Co....168

Nut Splitters
Whisler Mfg. Co....Front cover

Oxygen
Linde Air Products Co....156

Paints and Varnishes
Felton, Sibley & Co....149
Johnston, R. F., Paint Co....154

Patents
Jenner, H. W. T....170
Parker, C. L....171

Pincers
Peck, Stow & Wilcox Co....172

Punches
Champion Blower & Forge Co....151

Punches and Shears
Armstrong-Blum Mfg. Co....Front cover
Peck, Stow & Wilcox Co....172

Screw Plates
Butterfield & Co....156
Champion Blower & Forge Co....151
Greenfield Tap & Die Corporation....149

Shaft Coupling
Bradley, C. C., & Son....2d cover

Shears
Edwards, C. D., Mfg. Co....169

Shock Absorbers
Champion Shock Absorber Sales Co....169

Spoke Augers
House Cold Tire Setter Co....4th cover

Steel Stamps
Childs, S. D., & Co....Front cover
Ness, George M., Jr....Front cover

Stocks and Dies
Butterfield & Co....156
Champion Blower & Forge Co....151
Hart Mfg. Co....4th cover

Supplies
Campbell Iron Co....171
Wheel, B Top & Hardware Co....170

Swages
Champion Blower & Forge Co....151

Tires
Firestone Tire & Rubber Co....152

Tire Bending Machines
Buffalo Forge Co....155
Champion Blower & Forge Co....151

Tire Coolers
Wolfe, Matt L....172

Tire Heaters
Gogel Mfg. Co....168

Tire Protectors
Kimball Tire Case Co....3d cover

Tire Repair Outfits
Akron Rubber Mold & Machine Co....155

Tire Setters
Buffalo Forge Co....155
House Cold Tire Setter Co....4th cover
West Tire Setter Co....171

Tire Shrinkers
Buffalo Forge Co....155
Champion Blower & Forge Co....151

Tire Upsetters
Buffalo Forge Co....155
Champion Blower & Forge Co....151

Tongs
Champion Tool Co....171

Tool Grinders
Phoenix Horseshoe Co....150

Trucks
Akron-Selle Co....Front cover

Tuyere Irons
Buffalo Forge Co....155
Champion Blower & Forge Co....151
Schwarzkopf, S....Front cover
Thompson Tuyere Iron Co....4th cover

Veterinary Remedies
Young, W. F....172

Vises
Butterfield & Co....156
Columbian Hardware Co....Front cover
Fisher & Norris....156
Prentiss Vise Co....4th cover

Vulcanizers
Shaler, C. A., Co....4th cover

Wagons
Akron-Selle Co....Front cover

Welding Compounds
Anti-Borax Compound Co....2d cover
Cortland Welding Compound Co....153

Welding Outfit
General Welding Co....3d cover
Superior Oxy-Acetylene Machine Co....171

Welding Plant
Bertschy-Bermo Co....172

Welding Supplies
Linde Air Products Co....156

Wheel Dishers
House Cold Tire Setter Co....4th. cover

Wheels
Electric Wheel Co....171
Empire Mfg. Co....4th cover

Woodworking Machinery
Buffalo Forge Co....155
Crescent Machine Co....4th cover
Parks Ball Bearing Machine Co....153

Wrenches
Champion Tool Co....171

Wrenches (Knife Handle and Pipe)
Peck, Stow & Wilcox Co....172



Free 512 PAGES OF BARGAINS

POST PAID

WE WANT TO SEND YOU THIS 512 PAGE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

Tells how you can work up a profitable auto supply and repair business.

Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories

1117 W. 11th Street, Cleveland, Ohio, U. S. A.

Edwards Shears

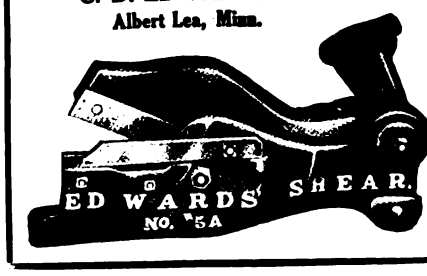
For twenty-four years the **Two Leading Low Priced Shears** in the U. S., representing the **Greatest Value for the Least Money.**

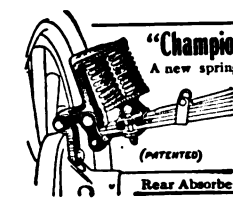
No. 5, weighs 200 lbs., cuts 4x1/4 inch soft steel.
No. 10, weighs 430 lbs., cuts 4x3/4 inch soft steel.

At their price you should have had one long ago. **Order one from the first iron man that calls on you. They All Sell Them.**

Write for descriptive circular and prices.

C. D. EDWARDS MFG. CO.
Albert Lea, Minn.





"Champion" SHOCK ABSORBERS For Ford Cars

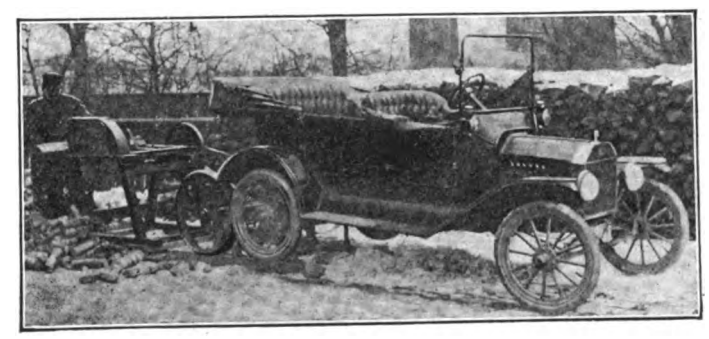
A new spring suspension which absorbs jar and rebound. A wonderful E-Z ride suspension. (E-Z to attach.) Guaranteed by mfrs. Exclusive sales; big profit; agents.

(PATENTED) Rear Absorber

Champion Shock Absorber Sales Co., Inc., Indianapolis, Ind., Mfrs.

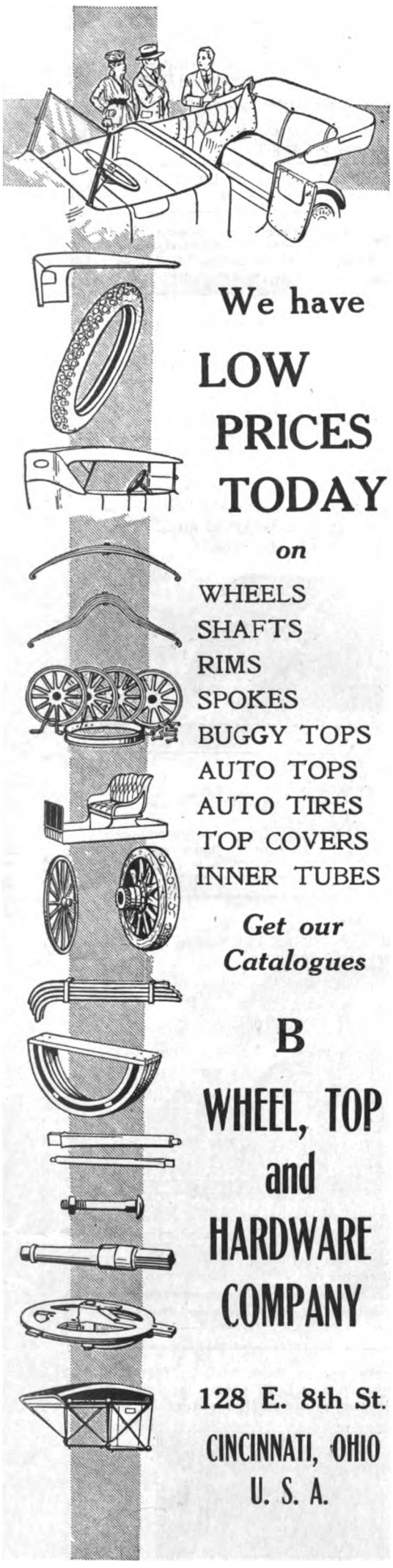
A Clever Motor Treadmill.

Every farmer should investigate the device which the manufacturers call the



Motor Treadmill. With this invention almost any work around a shop or farm can be done with the power from any automobile. By using this machine one can saw wood, pump water, mix concrete, cut ensilage, and in fact do anything where light power is required. We understand that this patent is for sale outright or that state agencies will be sold. Readers who are interested should write direct to the manufacturers, the Griffin Mfg. Co., 113 State Street, Boston, Mass.

Digitized by Google



We have
LOW
PRICES
TODAY
on
WHEELS
SHAFTS
RIMS
SPOKES
BUGGY TOPS
AUTO TOPS
AUTO TIRES
TOP COVERS
INNER TUBES
Get our Catalogues
B
WHEEL, TOP and HARDWARE COMPANY
128 E. 8th St.
CINCINNATI, OHIO
U. S. A.

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

will be inserted under this head at 3 cents a word, including the address, for each insertion, payable in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York.

PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT.

Patents

PATENTS FOR INVENTIONS.

H. W. T. JENNER, patent attorney and mechanical expert, 622 F Street, Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trade-marks registered.

PATENTS.

C. L. PARKER, attorney-at-law, and solicitor of patents. American and foreign patents secured promptly. Handbook for inventors sent free upon request. McGILL BUILDING, Washington, D. C.

For Sale

FOR SALE.

Lathes 11 by 4 feet 8 inches, 15 by 8, 19 by 6, 22 by 12; No. 4 Kempsmith Miller; 30 inch Knife Grinder; 24 inch Wood Planer; 8 inch four-side Moulder. BICKNELL MFG. & SUPPLY CO., Janesville, Wis.

FOR SALE.

Machinery, complete shop outfit consisting of lathe, shafting, hangers, taps, dies, reamers, drills, boiler and gun tools, bargain. BICKNELL MFG. & SUPPLY CO., Janesville, Wis.

FOR SALE.

Anvils, Lathes, Drill Press, Gas Tractors, Threshing Machines, Blacksmith Tools, Avery Truck. J. A. LOFFELMACHER, Fairfax, Minn.

FOR SALE.

Heavy punch and shear, suitable for blacksmith and wheelwright work; price, $150.00. Send for photograph and description. J. L. LUCAS & SON, Inc., Bridgeport, Conn.

FOR SALE.

Blacksmith shop, tools and drilling, with one acre lot. Only shop in town. Owing to poor health am obliged to retire. Address MARTIN NEHRT, Frogtown, Illinois, P. O. Carlyle R. R. 2.

FOR SALE.

Horse-shoeing and blacksmith shop, complete with stock and tools, doing a good business; also nine-room house and barn, 1¼ acres of land with fruit trees. Will sell at a bargain. Terms to suit. Reason for selling, poor health. For further particulars write J. ALEXANDER, R. D. No. 2, Winsted, Conn.

WHEELWRIGHTS

We have discontinued the vehicle business and have some good equipment at very reasonable prices.

1 West Tire Setter with oil pump complete.
1 Box Press.
2 Nut run up machines.
1 Axle caping machine.

We offer also at bargain prices—Auto Buggy Seats, Top Joints, Shifting Rails, Axle and Saddle Clips, and other buggy materials.

PARRY MFG. CO., INDIANAPOLIS

For Sale

FOR SALE.

A number 51 Crescent Universal Wood Worker, in good condition. Write for further particulars to AUG. WEISLER, R. F. D. No. 3, Perryville, Mo.

FOR SALE.

Blacksmith and wagon shop, stock and tools. A1 opportunity. Write now. Will not last long at price offered. Must sell to settle estate. WILFRED REID, Lacota, Mich.

FOR SALE.

Garage, new, 46 x 60. Blacksmith's shop, 36 x 40. Full line of power machinery and equipment. Big business. Sacrificed for quick sale on account of draft. For full particulars address COTTON BROS., Cresbard, S. D.

FOR SALE.

Blacksmith stock and iron and wood stock. Write to TORSTEIN SOLVBERG, Paullina, Iowa.

Miscellaneous

AUTO TIRE VULCANIZING PLANTS.

We buy, sell or exchange. Catalog is free—you save 30%. Instruction book on Vulcanizing, 75c. EQUIPMENT CO., 360 Eighth St., Cincinnati, O.

PRINTING FOR BLACKSMITHS.

Write for prices on printed letter heads, envelopes, statements, etc. NEWS PRINTING CO., Stockton, Ill.

Inventor of punctureless auto tire desires party with capital to start manufacturing, or will sell patent. Address 2702 Riverside Ave., Minneapolis, Minn.

Personal

PERSONAL.

Kidney trouble is not only annoying but frequently leads to serious conditions. Send address for simple and immediate help. G. S. STOKES, Mohawk, Florida.

Wanted

WANTED.

Second hand House Cold Tire Setter, with punch and shear, or with shear. Must be cheap. J. L. SCOTT, 4048 Laclede avenue, St. Louis, Mo.

WANTED.

Good all-around blacksmith. Young married man preferred. Top wages for right man. Address M. W. ABTS, Morrill, Nebr.

WANTED.

Salesman: Calling on quarries, mines, mills, factories and railroads to handle our Damascus Tempering Solution. Used by the largest railroads and steel industries. EMPIRE CHEMICAL CO., Huntington, W. Va.

WANTED.

Blacksmith and blacksmith helpers. FISCHER & DACKERMAN, East Broad and Chestnut Sts., Elizabeth, N. J.

WANTED.

To buy a good blacksmith stand with from ten to forty acres of land, with some fruit. Address with particulars to L. L., box 33, Prairie View, Ill.

WANTED.

Blacksmiths, woodworkers, painters, blacksmith helpers; steady work for right mechanics; good pay. Apply WINEBERGER'S, 3700 Georgia Ave. N. W., Washington, D. C.

Wanted

WANTED.

Blacksmith to shoe and help with wagon work, steady job. M. H. MYERS, Swedesboro, N. J.

WANTED.

Blacksmith helpers, finishers and woodworkers on wagon work. MAREMONT MFG. CO., 916 S. Wabash Ave., Chicago, Ill.

WANTED.

General blacksmith and horseshoer; steady work and good wages to the right man. JOS. H. EFFREIN, Ste. Genevieve, Mo.

WANTED.

Blackmith wanted, steady job for right man. GRONWALL & KULLBERG, Algona, Iowa.

WANTED.

Automobile repair man wanted; prefer man that understands acetylene welding; must be married. BRITTON AUTO CO., Britton, S. D.

WANTED.

A good country blacksmith. This is a steady job. Apply to E. W. STRASSER, Souderton, Pa.

Tires

DOUBLE TREAD TIRES

GUARANTEED

SPECIAL OFFER TO AGENTS. Write for Catalogue

Get our special price on new tires

M. LIBEN & CO.

205-AK West 48th St. New York City

Double Tread Tires

Notice Our Prices Before Going Elsewhere

PRICE LIST

Size	Plain	Size	Plain
30x3	$5.00	35x4	$9.00
30x3½	5.50	36x4	9.50
32x3½	6.50	36x4½	10.00
32x4	7.00	36x5	10.00
33x4	7.50	37x4½	10.00
34x4	8.00	37x5	10.50
34x4½	8.50		

For Non-Skid, 50 cents more on all sizes.

We Carry a Full Line of New and Used Tires & Tubes

GINSBERG & BERKOWITZ, Inc.

236 WEST 48th STREET, NEW YORK

Gears

GEARS & SHAFTS

Transmission gears and shafts, differential gears and axle shafts in stock for over 125 makes (500 models) of pleasure cars and trucks. Obsolete, Orphan and Current models.

Dealers and repairmen, send for our 125-page price list and make a good profit on your repair work.

AUTO GEAR CO., Inc.

844 Eighth Avenue, New York, N. Y. — 1461 S. Michigan Ave., Chicago

275 Marietta St., Atlanta, Ga.

NO SECOND-HAND PARTS OR JUNK

Tires

BUY EARLY AND SAVE MONEY

Double Tread Tires and Tubes

GUARANTEED

Come to the Tire Clearing House—here are prices—clear cut and plain as daylight. We buy wholesale the best "try out" Tires—and you get the benefit—you want truthful tires, and truth is never crushed to earth if given a square deal—real truth is puncture proof—

SO ARE OUR TIRES.

Size	Plain	Non-Skid	Tubes
28x3	$4.40	$4.95	$2.00
30x3	5.50	6.05	2.00
30x3½	6.60	7.15	2.50
32x3½	7.15	7.70	2.75
34x3½	8.25	8.80	3.00
30x4	7.70	8.25	2.75
32x4	8.80	9.35	3.00
33x4	8.80	9.90	3.50
34x4	8.80	9.90	3.50
35x4	9.90	11.00	3.60

Get your order in quick for goods listed here—by all means get in touch with us for further information about our special process—it means money in your pocket. Get in right—write today—yes—today.

Look up rating in Dunn's or Bradstreet's.

Size	Plain	Non-Skid	Tubes
36x4	$9.90	$11.00	$3.60
32x4½	9.90	11.00	3.75
34x4½	11.00	12.10	4.00
35x4½	11.00	12.10	4.10
36x4½	11.00	12.10	4.25
37x4½	12.10	13.20	4.35
34x5	11.00	12.10	4.50
35x5	13.20	14.30	5.00
36x5	13.20	14.30	5.00
37x5	13.75	14.85	5.00

For (non-skid) sizes up to 32x4, 50c extra; all other sizes $1.00 extra.
For rebuilding your old tires we charge you 60% of the above prices.

B. LIBEN & COMPANY

261-A West 54th Street — NEW YORK CITY — 112-A East 110th Street

THE HOME OF DOUBLE TREAD TIRES

Phoenix Horse Shoes and Bull Dog Calks.

Phoenix Horse Shoes and Bull Dog Toe Calks are known wherever horses are shod. Both these products are of standard quality and are made by the largest manufacturers of horse and mule shoes in the world. This company does business on a very large scale, having extensive rolling mills and factories at Joliet, Ill., and Poughkeepsie, N. Y., but the main office of the company, to which all correspondence should be addressed, is at Chicago, Ill. Readers are invited to send for samples of these shoes and calks.

The Kazoo Forge Blower.

The up-to-date blacksmith, if he is located where he has access to electric light wires, should certainly equip his shop with an electric blower. The Kazoo variable speed forge blower is a good electric machine which is manufactured by the R. P. Warner Electric Co., Kalamazoo, Mich. In using this blower, no outside rheostat or resistance box is necessary. One can get any speed from 0—3600, by simply moving the handle and the current consumption is in proportion to speed and, under these conditions, this adjusting makes the blower an economical one to use. The price for direct sales to blacksmiths is only $30.00 F. O. B. Kalamazoo and the blower will be put out on 30 days' trial, you to return the blower to the manufacturers if it is not satisfactory in every respect. No doubt many of our readers will want to take advantage of this generous offer and at any rate our subscribers should certainly write to this company for full information.

Digitized by Google

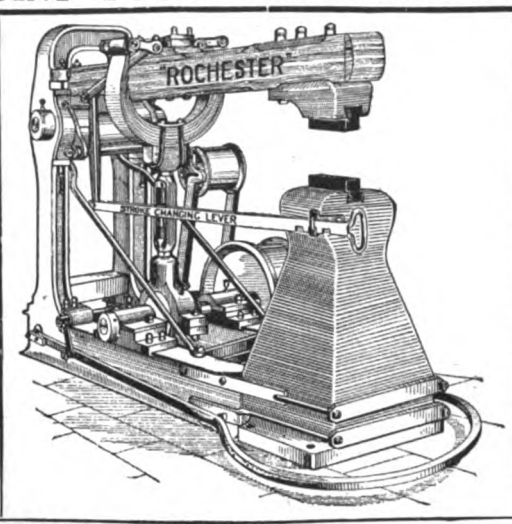
DON'T DISAPPOINT YOUR UNCLE DUDLEY!

WHERE'S THE SENSE

In plodding along with a tool which gives no end of trouble when you can replace it with one that pays for itself in a few months, and is 100% in all-'round human-touch capacity.

We are the King-Bees in Tire Setters and Helve Hammers

6 SIZES
2 Styles of Frames



THE ROCHESTER WEST TIRE SETTER

WEST HYDRAULIC SHELL BANDING MACHINES

THE ROCHESTER HELVE HAMMER

SEND A CARD TO THIS ADDRESS FOR OUR CATOLOGUE AND PRICES

WEST TIRE SETTER CO.
ROCHESTER, NEW YORK

KEROSENE



There's a "Hot Spot"

CUTS FUEL COST ½

Save $15 to $200

in every WITTE Engine that automatically preheats the mixed charge of fuel before it enters into the cylinder. That is why WITTE Kero-Oil Engines are as easy to handle and operate as a gasoline engine, use less fuel than "continuous feed" kerosene engines and give the most power from the fuel used.

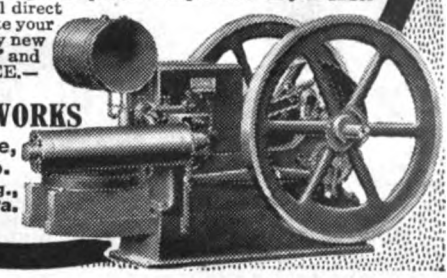
WITTE KERO-OIL ENGINES

Stationary—Portable—Saw-Rig

are **built** to operate on Kerosene or Distillate. The "Hot Spot" heating arrangement is now being used on automobile engines. We've used it for 10 years. WITTE Engines are **standardized** in all sizes—interchangeable parts. Simple and easy to understand. I make engines exclusively, sell direct to you on any terms fair for both. Write your own order and save **$15 to $200.** My new book, **"How to Judge Engines"** and latest direct prices, FREE.—ED. H. WITTE, Pres.



WITTE ENGINE WORKS
2442 Oakland Avenue, Kansas City, Mo.
2442 Empire Bldg., Pittsburgh, Pa.

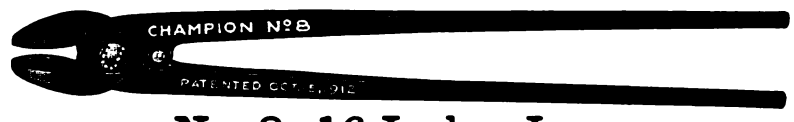


Subscribe to THE BLACKSMITH AND WHEELWRIGHT. $1.00 per year.

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge

Nothing to get out of order.



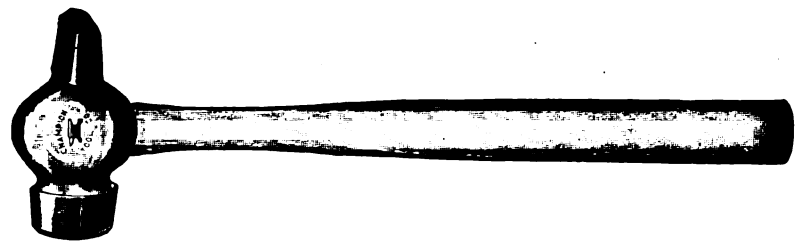
Will hold securely any size of shoe.

No. 8 16 Inches Long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

Weights, 1¼ to 3 lbs.

This Hammer is the most popular Sharpening Hammer on the market.

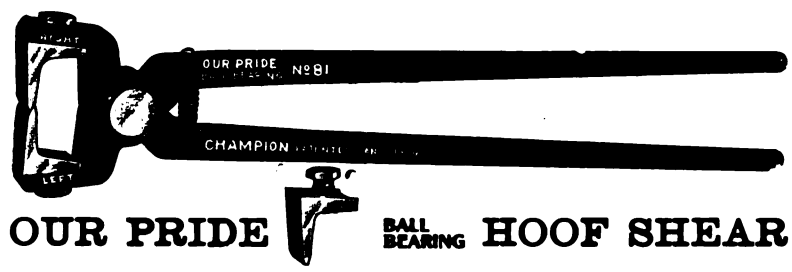


Corrugated Pein.

IT GIVES RESULTS.

No. 12 ELECTRIC SHARPENING HAMMER

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.



Blades easily replaced when worn out.

All parts interchangeable.

OUR PRIDE BALL BEARING HOOF SHEAR

Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY, - Meadville, Pa., U. S. A.

THE LIVINGSTON CO., 131 E. 23rd Street, NEW YORK, Eastern Representatives

Do you want anything? Is your shop for sale, or do you want to buy a shop or hire a man? If so, a "Want" advertisement in THE BLACKSMITH AND WHEELWRIGHT will bring you good results. See terms at the head of the "Want" Department on another page.

SUPERIOR Welding and Cutting Outfits, designed for the Blacksmith's use

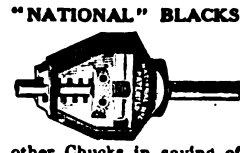
Increase your profits by being able to take care of your repair work by the Oxy-Acetylene process. Saves time and money.

Write for complete catalog and monthly price sheet.

AGENTS WANTED

SUPERIOR OXY-ACETYLENE MACHINE CO.
HAMILTON, OHIO

"NATIONAL" BLACKSMITHS' DRILL CHUCK



Made especially for Blacksmithing and Carriage Work.

Positive, durable, strongest, self-cleaning, always works, quickest to change Drills, casts no shadow, will save its cost over other Chucks in saving of time. BUY THE BEST. Money refunded if not as represented. Ask your jobber for it, or send direct for prices and circular.

ONEIDA NATIONAL CHUCK CO., Oneida, N. Y.

PATENTS

O. L. PARKER
Ex-Member Examining Corps, U. S. Patent Office
Attorney-at-Law and Solicitor of Patents

American and foreign Patents secured. Trade marks registered. Searches made to determine patentability, validity and infringement. Patent suits conducted. Pamphlet of instructions sent upon request.

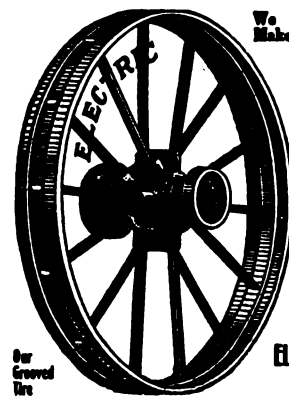
McGill Building WASHINGTON, D. C.

The Campbell Iron Company

Wholesale Automobile, Garage, Machinists, Blacksmith and Implement Supplies, Hardware Specialties. Duplicate Parts for Fords carried in stock.

Write for New General Catalogue.

817 Cass Avenue St. Louis, Mo.



Our Grooved Tire

We Make STEEL WHEEL To Fit Any Axl Plain or Groove Tire

Steel or Hickory Axle Any Size

A Full Line of Wood and Stee Farm Truck With Steel or Wood Wheels

Write for Larg Catalog and Prices

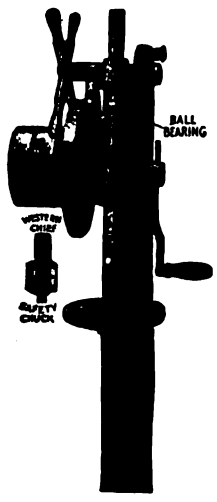
ELECTRIC WHEEL C Box N, Quincy, Ill.

Advertising Rates in The Blacksmith and Wheelwright made known on application.

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

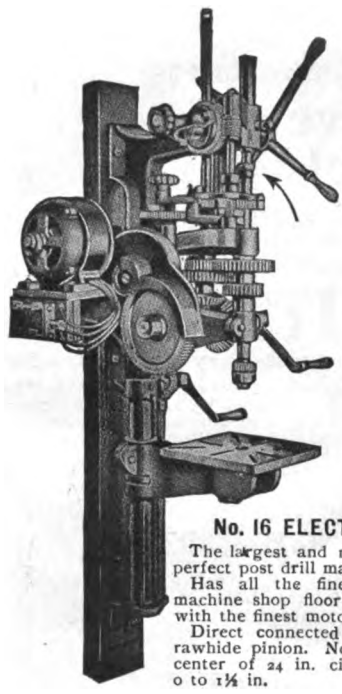
The Better Your Equipment The Bigger Your Profits



No. 19 DRILL

A low-priced combined hand and power self-feed drill.

Drills to center of 16½ in. circle.



No. 16 ELECTRIC DRILL

The largest and most mechanically perfect post drill manufactured.

Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.

Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1½ in.

Buy CANEDY-OTTO
AND INCREASE YOUR INCOME

Once Tried, Always Used : There's a Reason—Quality

OVER 200 DIFFERENT STYLES

SEND FOR CATALOGUE No. 12



No. 100 ROYAL FORGE

The most popular forge ever made.
Fan, 12 in. Hearth, 31½x45½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x50 in. Blower, 12 in.



Blower, 12"
Wt., 135 lbs
Height, 47"

ROYAL BLOWER

(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.

Fire pot is 8x9 in inside.



No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.

All machines are tested before leaving the factory, and guaranteed in every respect.

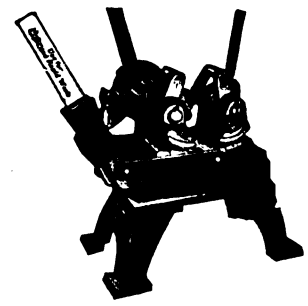
Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

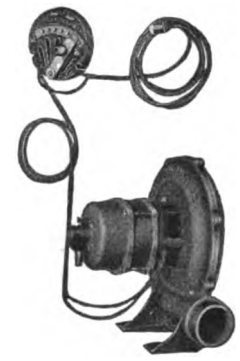
Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS



No. 1 1/2 SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



No. 8 ELECTRIC BLOWER

The best outfit money can buy.

THE ARMSTRONG MFG. COMPANY

BRIDGEPORT CONN., U.S.A.

NEW YORK OFFICE 248 CANAL STREET

like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



"Makers of the Genuine ARMSTRONG Stocks and Dies."

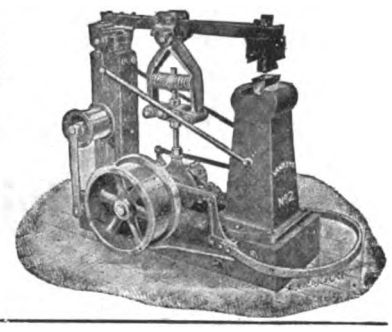
The HAWKEYE HELVE HAMMER'S Built in Three Sizes.

12 years in successful operation. Fully guaranteed. Note the principle of stroke. Double the capacity of any upright hammer of the same weight and price.

For price and descriptive literature write,

The Hawkeye Mfg. Co.

CEDAR RAPIDS, IOWA, U. S. A.



YOU CAN'T CUT OUT A BOG SPAVIN OR THOROUGHPIN

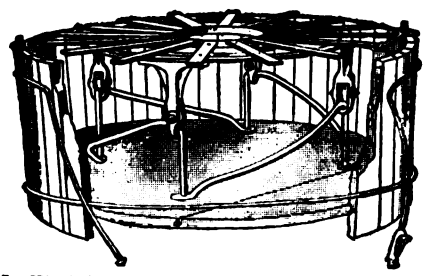
but you can clean them off promptly with



ABSORBINE
TRADE MARK REG.U.S.PAT. OFF

and you work the horse same time. **Does not blister** or remove the hair. $2.50 per bottle, delivered. Will tell you more if you write. **Book 4 R free. ABSORBINE, JR.,** the antiseptic liniment for mankind, reduces Varicose Veins, Ruptured Muscles or Ligaments, Enlarged Glands, Wens, Cysts Allays pain quickly. Price $1.25 a bottle at druggists or delivered. Made in the U. S. A. by

W. F. YOUNG, P. D. F., 55 Temple St., Springfield, Mass.



The Wolfe Tire Cooler has stood the test for 12 years in many of the best shops, and proven all that is claimed for it. The machine is right, so is the price.

Write for circulars.

MATT. L. WOLFE, WEST CARROLLTON, OHIO

WELDING PLANTS, $25.00 to $300.00

Designed for all purposes. Small cash payment; balance, three to six months. Every mechanic and shop should have one.

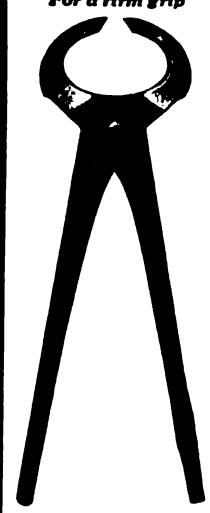
BERTSCHY-BERMO CO. **OMAHA, U. S. A.**

PEXTO



Tools that "Stand the Gaff"

For a firm grip



Pexto Shoeing Pincer

Almost any tool you buy will do its work well for a while. But the real test of merit is the test of long hard service.

Not merely what will it do today, but a year or more from today—that's the question to be answered.

After a year of pulling and yanking, will the jaws of your Shoeing Pincer still close with a bulldog grip, without binding or sticking?

Will your Hoof Parer still cut cleanly and easily, without sawing or pulling?

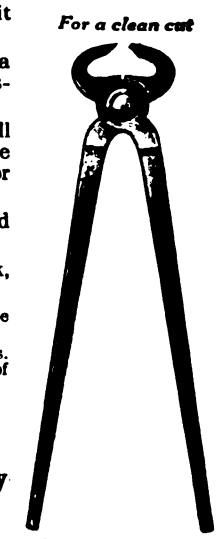
If they bear the Pexto trade mark, "PEXTO," they will.

"I like Pexto tools," said a blacksmith, "because they 'stand the gaff.'"

Pexto tools have been on the market for 96 years. Made by the manufacturers of the largest line of hand tools in the world.

If your dealer can't supply you, write us.

For a clean cut



Pexto Nipper and Parer

The Peck, Stow & Wilcox Company

Mfrs. Mechanics' Hand Tools, Tinsmiths' and Sheet Metal Workers' Tools and Machines, Builders' and General Hardware.

Southington, Conn. Cleveland, Ohio

Address all correspondence to 209 W. Center St., Southington, Conn.

Digitized by Google

NEW YORK PUBLIC LIBRARY

ESTABLISHED 1880

The Pioneer Journal of its Class

THE BLACKSMITH & WHEELWRIGHT

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U. S. Patent Office.

Vol. LXXVIII. No. 1 NEW YORK, JULY, 1918 TERMS: One Dollar a Year. Foreign, $1.50. (6s. 3d.)

STEEL STAMPS
LETTERS and FIGURES
For Marking Your Tools and Your Product
NAME PLATES OF ALL KINDS
S. D. CHILDS & CO.
DEPT. 2
136 S. CLARK ST. CHICAGO

STEEL STAMPS
BURNING BRANDS
RUBBER STAMPS
STENCILS
GEO. M. NESS, JR.
61 FULTON ST. NEW YORK
Send for price list.

"NATIONAL" BLACKSMITHS' DRILL CHUCK



Made especially for Blacksmithing and Carriage Work. Positive, durable, strongest, self-cleaning, always works, quickest to change Drills, casts no shadow, will save its cost over other Chucks in saving of time. BUY THE BEST. Money refunded if not as represented. Ask your jobber for it, or send direct for prices and circular.
ONEIDA NATIONAL CHUCK CO., Oneida, N. Y.



SUREGRIP CALKS
American Calk Co.
DETROIT, - - MICH.

"The Capewell" Horse Nail



Easiest to Drive

Satisfactory Shoeing

When a shoer puts on a set of horseshoes with Capewell nails he knows he can give his customer a satisfactory job. Thousands of the most skilled shoers have for many years used no other.

The majority decided long ago that The Capewell nail drives easiest, clinches best, is safest.

Capewell nails are made in all sizes and styles. They are suited for all kinds of shoeing.

The world's best nail at a fair price—not the cheapest regardless of quality.

The Capewell Horse Nail Co.
Hartford, Conn.
Leading Horse Nail Makers of the World



Saw Those Heavy Bars ON A MARVEL Power Hack Saw
Machine stops when work is cut off. Requires very little power.
Price is Low. Write Us.
Ask for reply by return mail.
ARMSTRONG-BLUM MFG. CO.
340 N. Francisco Ave., Chicago, Ill., U. S. A.

HORSESHOERS
It pays to pack the horse's hoofs with Lemoine's hoof packing. It has no equal for dry, hard, contracted hoofs, quarter cracks, corns and thrush. It never fails to do the work.
N. LEMOINE COMPANY
P. O. Box 88 FRAMINGHAM, MASS.

SUPERIOR Welding and Cutting Outfits, designed for the Blacksmith's use
Increase your profits by being able to take care of your repair work by the Oxy-Acetylene process. Saves time and money.
Write for complete catalog and monthly price sheet.
AGENTS WANTED
SUPERIOR OXY-ACETYLENE MACHINE CO.
HAMILTON, OHIO

PATENTS
C. L. PARKER
Ex-Member Examining Corps, U. S. Patent Office
Attorney-at-Law and Solicitor of Patents
American and foreign Patents secured. Trade marks registered. Searches made to determine patentability, validity and infringement. Patent suits conducted. Pamphlet of instructions sent upon request.
McGill Building WASHINGTON, D. C.



FERRO CASE
For Case-Hardening
Is Something You Have Been Looking For

A NON-poisonous chemical that is used by sprinkling upon the red-hot steel, or in a cyanide melting furnace, same as cyanide has formerly been used.

Yes! Its a Glass Hard Case and Produced with a Non-poisonous Chemical

Consumers, large and small, have used Ferro Case for years. So will you, after a trial.
Today is the Time to Write for Prices and Your Dealer's Name Will be Appreciated.
C. G. BUCHANAN CHEMICAL CO.
Makers of Industrial Chemicals and the only makers of Ferro Case
120 East Pearl Street - - - - Cincinnati, Ohio

THE TEETH IN
BLACK DIAMOND RASPS
ARE MINGLED
So as to Cut Clean and Free and Leave no Furrows In the Work

Twelve Medals of Award by Jurors



At International Expositions

C. & H. BARNETT COMPANY
Black Diamond File Works, PHILADELPHIA, PA.
Owned and Operated by NICHOLSON FILE CO.
Copy of Catalog sent Free to any interested file users upon application.

AETNA STEEL TOE CALKS
Made by THE AETNA NUT CO., Southington, Conn.
BLACK HORSE BRAND



BEST SHAPE
BEST SPUR
TO DRIVE
BEST STEEL

TOE AND HEEL CALKS

SOLD BY ALL DEALERS

Stokes Bros.' Improved Horse Rasps
Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A.

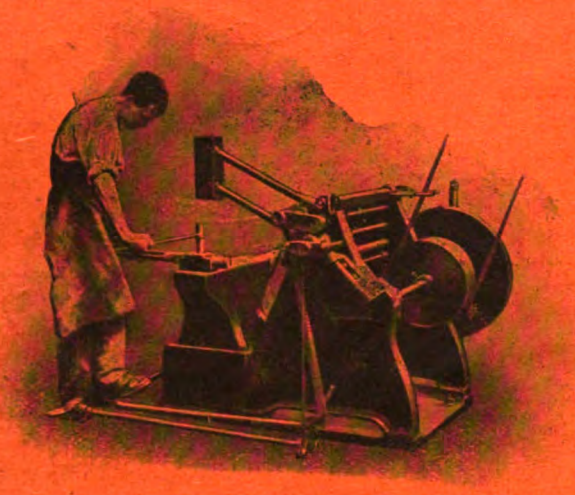
WELDING PLANTS, $25.00 to $300.00
Designed for all purposes. Small cash payment; balance, three to six months.
Every mechanic and shop should have one.
BERTSCHY-BERMO CO. OMAHA, U. S. A.

BUYERS' GUIDE AND INDEX TO ADVERTISEMENTS, PAGE 193

Digitized by Google

GENERAL BLACKSMITHING

BY THE "BLACKER" METHOD



"BLACKER"
PATENT STRIKER AT WORK.

AS DEMONSTRATED
IN THE PRINCIPAL TECHNICAL COLLEGES
and before the leading Engineering Societies of the United Kingdom

OVER 1,000 SUPPLIED IN 3 YEARS
IN GREAT BRITAIN ALONE.

PROPOSITIONS OF ALL KINDS INVITED.

WHAT OUR USERS SAY

A. KELLY & CO.
GUILFORD ST., GRAY'S INN RD.
LONDON, W. C.

The hammer is a great boon to us.

HUGH DENBY
60-64 TOMB ST., BELFAST

The hammer is giving me perfect satisfaction. It does away with the smith's helper.

JOHN MILLER
STOCKPORT RD., GUIDEBRIDGE

Five years ago you supplied me with a Blacker Hammer and I am getting splendid service from it for wheelwrighting, general & horseshoe smithing.

WILDE & BENNETT
STATION RD., HADFIELD

The hammer supplied over three years ago has given every satisfaction. It is well adapted for all kinds of smith's work and hoop piecing.

"OUR SMITHS REALLY LIKE THEM"

RIPPON BROS.
HUDDERSFIELD

Your hammer is a wonderful tool. Our smiths really like them. They would not like to go back to the old method.

Sir W. A. Sanderson & Co., Ltd.
NEWCASTLE-ON-TYNE

The one (Blacker Hammer) which we have installed is fully in use and we anxiously await arrival of the other six.

Wm. VINCENT
CASTLE ST., READING

The hammer which I purchased from you is in every way satisfactory.

Wm. Hardill Sons & Co., Ltd.
CLECK HEATON

We are only sorry we did not install the hammer sooner.

"WISH I HAD IT YEARS AGO"

ARTHUR BRUNT
ANCHOR RD., LONGTON

Your hammer will recommend itself if anyone sees it at work who knows anything about hammers.

WALTON CLIFFE, Esq.
CLECK HEATON

Your hammer has certainly proved to be a most efficient tool, very sensitive, and under complete control when working either lightly or at its full capacity.

T. D. BATTEN
ST. PINNOCK, NEAR LISKEARD

I am in my 69th year and it is a pleasure to me to go into the shop to work, knowing that it is an easy thing to do the work which was before a heartsickening terror.

A. C. PENMAN
DUMFRIES, N. B.

Our output of war office lurries depends entirely on the Blacker Hammer.

EASY TO WORK—ECONOMICAL TO RUN
PATENTED IN ALL COUNTRIES.

PROPOSITIONS OF EVERY KIND INVITED.

THE "BLACKER" HAMMER
IS
Always There—Always Ready—In All Ways Reliable

MECHANICAL HAMMER CO., Ltd.
STAYLEY IRON WORKS STALYBRIDGE, ENGLAND

Digitized by Google

"F-S" PAINTS



"F-S" Products Will Help You Maintain Your Leadership

"F-S" Raven Gloss Automobile and Carriage Paints look better and last longer. They are sold ready for the brush, and dry free from dust over night in moderate temperature. They will save you labor and give your good work its full value.

FELTON, SIBLEY & CO., Inc.

Manufacturers of Colors, Paints, Varnishes since 1863

136-140 North Fourth Street, Philadelphia

(151)

"Crescent" Welding Compound

CRESCENT WELDING COMPOUND TRADE MARK

BEST FOR PLOW WORK

"CRESCENT" can't be beaten for share work, Toe-calks, Split or V-welds. Welds at very low heat; removes all dirt and scale, giving a perfectly clean un-oxidized surface that welds with no trouble.

"E-Z" Welding Compound

"E-Z" gives better results irrespective of the quality of the stock than any other compound. Sticks at very low heat; does not boil off and waste. Removes all scale and gives a clean, sound, flawless weld.

FOR ALL GRADES OF STEEL — E-Z — WELDING COMPOUND

PAT. MAY 27, 1902

Unequalled for General Use

MARKS OF QUALITY

When you have by your fire welding compounds labelled "CRESCENT" and "E-Z," you have a guarantee of reliability in welding. These compounds protect you against inferior work and unsatisfactory results. They ensure welds that hold under the most trying conditions. See that the "CRESCENT" and "E-Z" are at hand for every welding job.

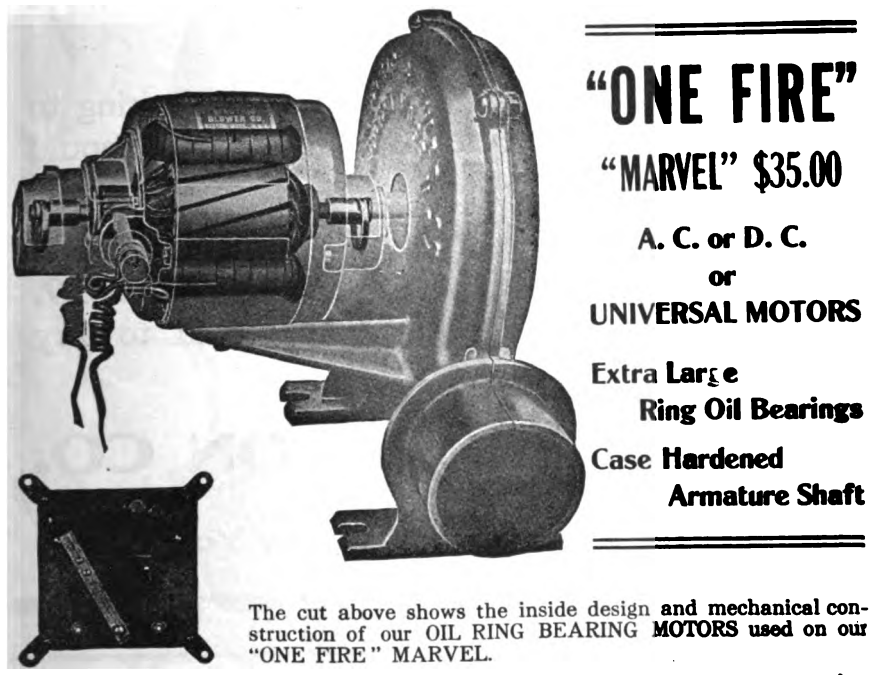
ASK FOR LIBERAL FREE SAMPLES

We also manufacture for Gas Welders Anti-Borax Welding Flux, Anti-Borax Cast Iron Flux, Anti-Borax Aluminum Flux, "Crescent" Tempering Compound and Anti-Borax Brazing Flux.

GUARANTEED WELDING COMPOUNDS

ANTI-BORAX COMPOUND CO.

FT. WAYNE, IND.



"ONE FIRE"

"MARVEL" $35.00

A. C. or D. C. or UNIVERSAL MOTORS

Extra **Large Ring Oil Bearings**

Case **Hardened Armature Shaft**

The cut above shows the inside design and mechanical construction of our OIL RING BEARING MOTORS used on our "ONE FIRE" MARVEL.

With the enlarged oil wells and CASE HARDENED SHAFT, you get long wearing qualities and ruggedness found only in a MARVEL BLOWER. As long as there is ANY oil in the oil-well, the RING revolving on the CASE-HARDENED SHAFT keeps a STREAM OF OIL on the bearings.

This prevents OLD AGE.

Show this cut to the best mechanical engineer you can find, and ask him his opinion regarding our claims.

You naturally want the BEST and the MOST that your money will buy, and in a Forge Blower you will find those qualities in a MARVEL.

Any of the LEADING HARDWARE FIRMS will ship you any one of our MARVEL BLOWERS on 30 days' trial.

NOW is the time to improve your shop equipment.

Ask YOUR Dealer to have us send you one on 30 days' free trial. Unless you get a RING OIL BEARING "MARVEL" Blower, you are not getting the MOST your money will buy.

15 Different Sizes. Descriptive Circular Mailed on Request.

ASK YOUR DEALER.

ELECTRIC BLOWER CO.,

352 Atlantic Avenue, BOSTON, MASS.



QUIT DRIVING YOUR TRADE AWAY

Stop! Look! Think! Every time you put on a set of calks that an owner can replace himself, you are driving trade away from your shop.

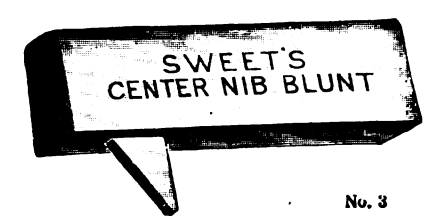
When you use ***welded*** calks, the owner must bring his horse to the shop when the calks need renewing.

Also, every horse's hoofs need the frequent attention of a horseshoer. You're doing the owner a good turn by using ***Sweet's Toe Calks***—"The Cold Cut Dreadnaught"—as well as keeping your shop full.

FRANKLIN STEEL WORKS

Joliet, Ill. Cambridge, Mass.

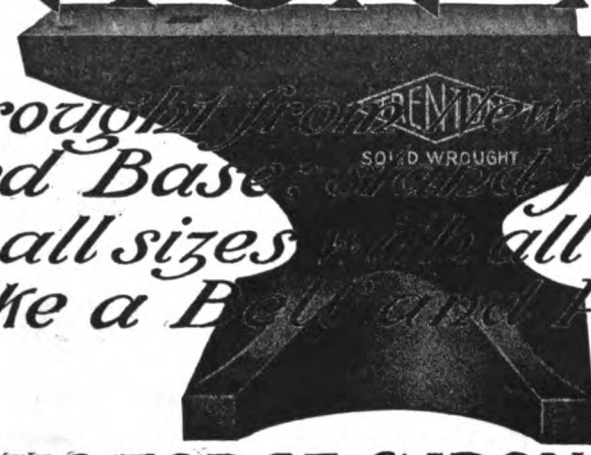
Hamilton, Ont.



No. 3

Digitized by Google

TRENTON ANVILS



Solid Wrought from New Steel, not cast.
Recessed Base, Stands firmly on the block
Made in all sizes with all desirable Clips.
Ring like a Bell and Perfect in Shape.

BOKER CUTLERY & HARDWARE CO., Inc., Sole Sales Agents,
101-103 Duane Street, New York City

THE COLUMBUS FORGE & IRON CO. COLUMBUS, O.

Service

CAR owners will generally estimate the quality of your service by the quality of the product you sell.

Satisfaction to car owners—satisfaction and profit to dealers—that is the ultimate aim of Harvey Service.



THERE'S A HARVEY JOBBER NEAR YOU
Our new catalogue giving complete measurements of over 900 styles of Springs is yours on request

HARVEY SPRING & FORGING CO.
919 - 17th Street, RACINE, WIS.

THE SCREW-CUTTING LATHE

How to select, set up, adjust and operate

By JAMES F. HOBART, M. E.

THIS book is a concise and exhaustive treatise on everything pertaining to the SCREW-CUTTING LATHE, including costs, erection, operation and adaptability. It is written by one who thoroughly understands his subject in all its details, and is so copiously illustrated that everything in it will be readily understood.

It will be found invaluable to those desiring to know just how a Screw-Cutting Lathe should be run.

There are ***92 illustrations,*** and the book is substantially bound in cloth. ***Price, $2.00.*** A copy will be sent postage prepaid to any address on receipt of price.

M. T. RICHARDSON CO.
PUBLISHERS
71-73 Murray St., New York

916 Pages instead of 824 **1918—SEVENTH EDITION** 3362 Illustrations instead of 2000

$3.82 prepaid **DYKE'S AUTO ENCYCLOPEDIA** $3.82 prepaid

Entirely re-written, hundreds of illustrations and many new subjects added. Practically a new book. A non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 50 Instructions—Simplified and Practical.

3362 Illustrations—the kind you understand at a glance.

2 Supplements, part printed in two colors, treating on the construction, operation, repairing and adjusting of the FORD and PACKARD—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.

776 illustrations and 279 pages on Electric Ignition, Electric Starters and Generators, etc.

81 pages and 79 illustrations on the Delco system alone.

60 pages and 254 illustrations on Adjustments, Tests, etc., of leading Electric Systems.

184 pages and 1189 illustrations on Repairing.

Oxy-Acetylene welding. Axle, Differential and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.

27 pages and 180 illustrations on Tires and Tire Repairing.

44 pages and 119 illustrations on Carburetion.

89 pages and 291 illustrations on Engines and Parts.

16 pages on Digest of Troubles.

6000 lines to the Index. This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. Index begins on colored paper, easy to refer to.

Dictionary is also included, which gives the meaning of motoring terms.

Inserts: There are five—printed in colors. New features you never before saw or heard of in one of the inserts.

Additions to the Seventh Edition:
TRUCKS, TRACTORS, MOTORCYCLES, AIRPLANES AND AIRPLANE ENGINES

HOW TO BECOME AN EXPERT AUTOMOBILE MECHANICIAN

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion subject so thoroughly, you can adjust any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical Automobile book in America. Price $3.82, prepaid.

Address all orders to

THE BLACKSMITH & WHEELWRIGHT
73 MURRAY STREET NEW YORK



It's worth ten times its cost if only placed on the shelf and used as a reference.

Digitized by Google

THE FAMOUS CHAMPION BLACKSMITH TOOLS



Hercules Patented Power Hammer. Weight of ram, 65 pounds.



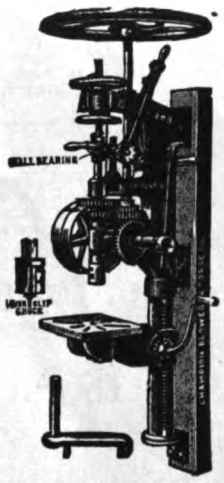
No. 402. Steel Blacksmith's Forge.



No. 400. Crank turns either way.



No. 433. Cast Iron Blacksmith's Forge.



No. 203. Self-Feed and Double Compound Lever Feed Drill.

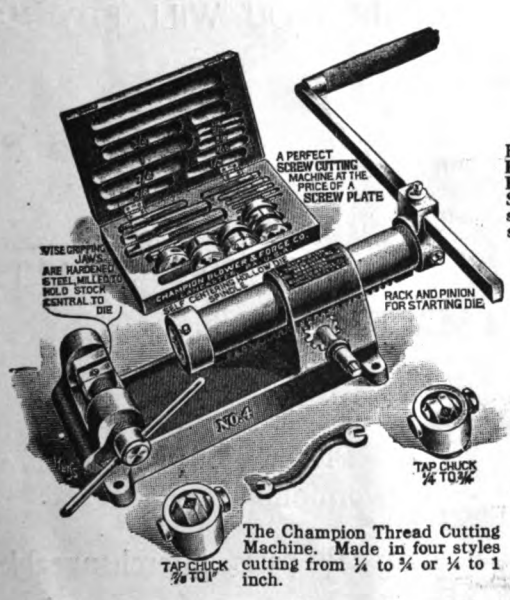


The Champion "Columbian" Tire Bender. Made in 3 sizes.

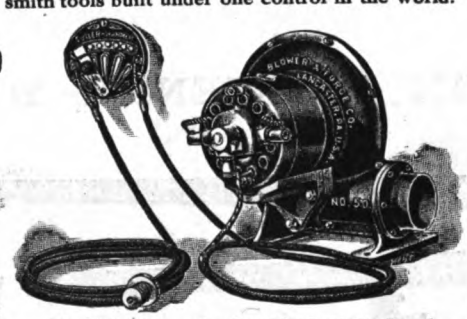
FAMOUS 400

Don't Fail to Get 1918 Catalog

Before purchasing a Hand Blower, Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



The Champion Thread Cutting Machine. Made in four styles cutting from ¼ to ¾ or ¼ to 1 inch.



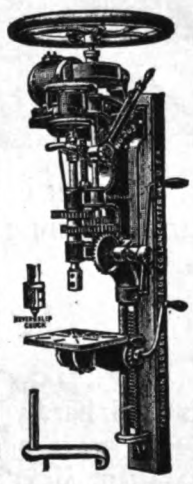
No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower.



No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



No. 200. Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

F.M.

Digitized by Google

WAGON BUILDING

"Build me a wagon that will last forever."

"Sorry, Sir, but 'axle troubles' (due to wear—wear on the spindle, or on the box, or both) make it impossible."

You've often received a specification like that and been obliged to give that answer—haven't you?

The Sheldon "TON-DON"—an axle that will not wear, run hot or break—allows your meeting the requirements of the man who wants a wagon to last forever, **and we have told him so.**

The Sheldon "TON-DON" was originally made for buggies and carriages. Its success was so instantaneous and pronounced that we were deluged with requests for an axle embodying the same principle for use on Delivery, on Business and on Express Wagons.

Hence, the "TON-DON" CONCORD EXPRESS.
In EFFICIENCY—The HIGHEST.
In CONSTRUCTION—The SIMPLEST.
In SERVICE—The MOST SATISFACTORY.

The Spindle of the Sheldon Ton-Don Axle

Ordinary axles wear flat on the bottom of the spindle because the bottom side is the point of contact and where the wear of the spindle is concentrated. It takes a spindle of unusual hardness to resist this wear—greater hardness than any ordinary axle affords. The spindle of the "TON-DON" is hardened by a special process, producing a wearing surface of such hardness that a fine file makes no impression on it—yet the center remains soft or "natural."

The Phosphor-Bronze Lined Box

The peculiarity of this box lining is that while somewhat softer than the spindle, there is no perceptible wear after thousands of miles of running, but becomes harder and more wear-resisting with use.

Phosphor-Bronze (of a mixture which increases its toughness, smoothness under friction, and wear-resisting qualities) is a metal used for making the propellers of ocean steamships, bearings for locomotives, crank-shaft bearings for automobiles and other fine machinery. Imagine what a metal must be to meet such conditions, and you will grasp the advantages of applying such metal to axle purposes.

THESE AXLES CARRIED IN STOCK BY THE FOLLOWING JOBBERS AND CAN BE OBTAINED AT MANUFACTURERS' PRICES.

Baltimore, Md.....E. Scott Payne Co.	Providence, R. I....Congdon & Carpenter Co.
Boston, Mass.....E. P. Sanderson Co.	Rochester, N. Y.....Burke Iron & Steel Co.
Buffalo, N. Y.....H. D. Taylor Co.	San Francisco, Cal....Waterhouse & Lester Co.
Chicago, Ill.....E. D. Kimball Co.	Scranton, Pa.....Bittenbender & Co.
Cincinnati, O.....G. B. Schulte Sons Co.	Seattle, Wash.....Gray Bros. Co.
Indianapolis, Ind.....W. J. Holliday & Co.	Springfield, Mass.....Chas. C. Lewis & Co.
Los Angeles, Cal.....Percival Iron Co.	St. Louis, Mo.....Sligo Iron Store Co.
Milwaukee, Wis....Shadbolt & Boyd Iron Co.	Washington, D. C.....Louis Hartig
Pittsburgh, Pa.....McLean & McGinness	Wilmington, Del.....Delaware Hardware Co.
Portland, Oregon.....J. E. Haseltine & Co.	Bridgeport, Conn.....Chapman & Bangs Co.
Ft. Wayne, Ind.....Mossman, Yarnelle & Co.	San Antonio, Texas..Heusinger Hardware Co.
New Orleans, La.....Jos. Schwartz & Co.	

SHELDON

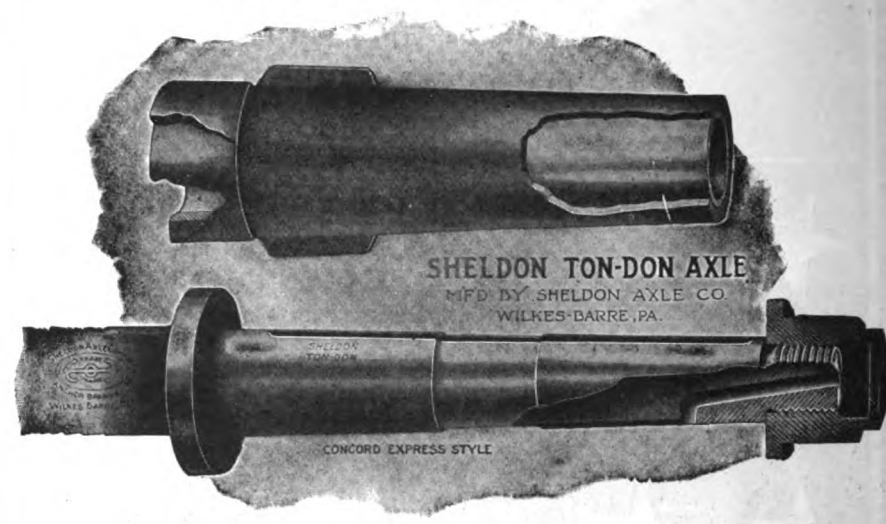
"TON-DON"

CONCORD EXPRESS STYLE

NOT A BALL OR ROLLER BEARING—BUT

ANTI-FRICTION—EVERLASTING—INTERCHANGEABLE

IT WILL NOT CUT, HEAT OR STICK



NOTICE THE PATENTED OILING DEVICE
HAS ALL THE ADVANTAGES OF FRICTION AND ANTI-FRICTION AXLES WITHOUT THEIR DISADVANTAGES
"TON-DON" MEANS KNOWN QUALITY WITHOUT FANCY PRICE
MADE ALSO FOR BUGGIES AND SURRIES

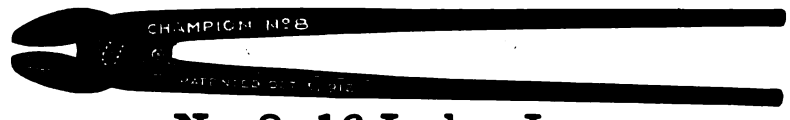
SHELDON AXLE & SPRING CO.,
WILKES-BARRE, PA.

LARGEST AXLE FACTORY IN THE WORLD.

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge

Nothing to get out of order.



Will hold securely any size of shoe.

No. 8 16 Inches Long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

Weights, 1¾ to 3 lbs.

This Hammer is the most popular Sharpening Hammer on the market.

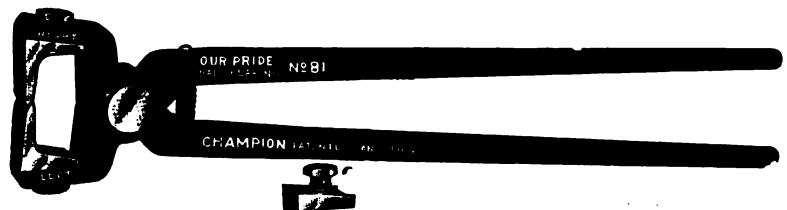


Corrugated Pein.

IT GIVES RESULTS.

No. 12 ELECTRIC SHARPENING HAMMER

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.



OUR PRIDE BALL BEARING HOOF SHEAR

Blades easily replaced when worn out.

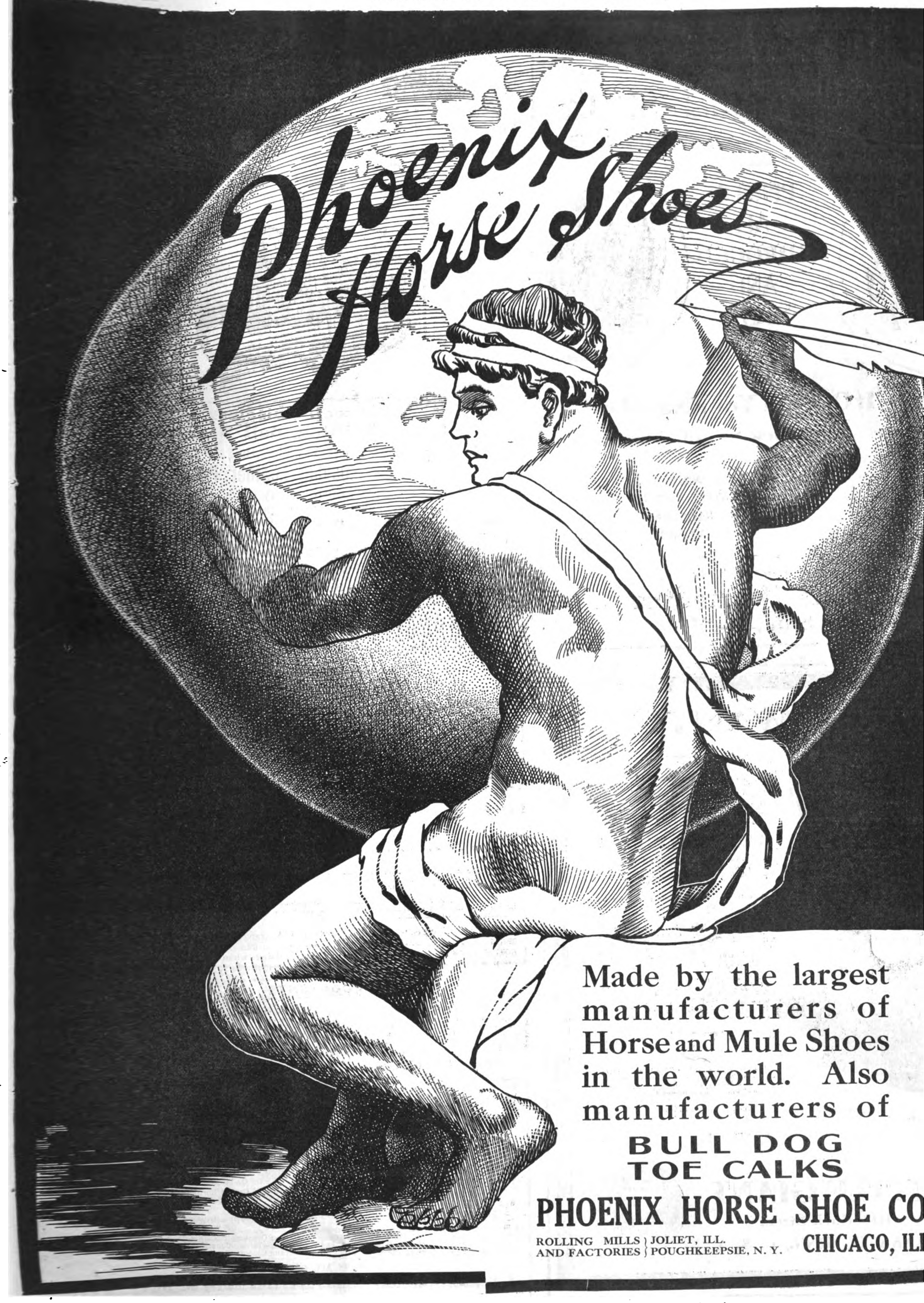
All parts interchangeable.

Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY, - Meadville, Pa., U. S. A.

THE LIVINGSTON CO., 131 E. 23rd Street, NEW YORK, Eastern Representatives

Digitized by Google



Digitized by Google

UNITED STATES
HORSE AND MULE SHOES
ARE REAL TRADE WINNERS


Front Lt. Long Heel

PERFECT ALL THROUGH AND EASY TO FIT


Hind Lt. Long Heel

Prove It Out On Your Next Order

Carried in Stock by All Jobbers

A Handsome Souvenir Watch Fob Given Away Free To All Blacksmiths and Horsemen Upon Request.

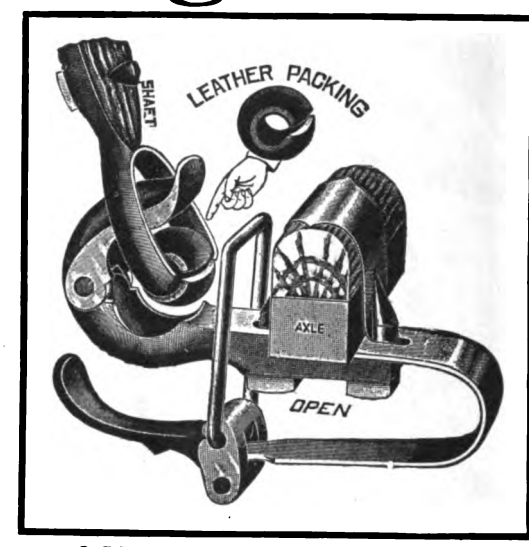
WRITE FOR OUR LATEST CATALOG No. 16 ILLUSTRATING OUR COMPLETE LINE

Manufactured By

United States Horse Shoe Co.

ERIE, PA.

THE BRADLEY
BALL-BEARING
Carriage Coupler



All-Steel, Noiseless, Quick Shifting, Ball Bearing

The ONLY Carriage Shaft Coupler that is furnished with a

One-Piece Moulded Leather Packing

A packing that will outwear any other packing ever made. It fits the ball and socket. It is held in place by a spring steel retaining ring. It may be put on and taken off in a jiffy, and it stays where it is put.

MADE IN FIVE SIZES.

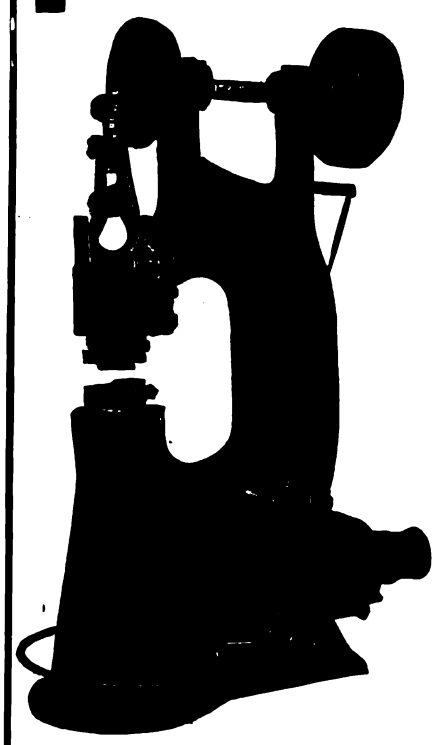
Pony—Buggy—Surrey—Delivery—Express

To fit axles 3-4 inch to 2 1-4 inch

Your Jobber Can Supply You.

C. C. BRADLEY & SON, Syracuse, N. Y.

JOB WANTED



An able bodied workman seeks a position in some good blacksmith or machine shop.

He is an old acquaintance and friend of the Editor of the Blacksmith and Wheelwright, to whom he is permitted to refer.

He is not particular as to what locality he works in, provided he has plenty of good hard work to do, and his employer honest and careful.

With such a boss, he agrees to never touch intoxicants or indulge in other dissipation. He agrees to be on hand ready for work at seven o'clock in the morning, or any earlier hour the shop opens. He will work overtime without grumbling, even to twenty-four hours daily for as long a period as may be necessary.

He will agree never to strike, ask for higher wages, or even want to go fishing or take a holiday.

He will board himself and remain in perfect health indefinitely. He has no family cares to worry about. He and his brothers, older and younger, are of the well known L. G. P. HAMMER clan, world renowned for skill, integrity and ability.

He is willing to work for twenty cents a day and agrees to do more work than any six skilled men at $3.00 per day. After his wages have been paid for twenty months, he agrees to work for nothing during the remainder of his natural life, which he estimates at fifty years.

He agrees to come on trial, and after thirty days' work, if his boss is not satisfied he will return home without any charge for his services.

He guarantees that he will relieve his employer from all drudgery, so he can spend more time with his family, and not be so eternally tired that he can get no enjoyment out of life.

He will treat all customers so pleasantly and do their work so skillfully that they will always bring their work to his shop, and advise their friends to do likewise.

He is not subject to enlistment or draft, and is ready to leave at once and begin work immediately on arrival.

ADDRESS:

LITTLE GIANT

103 Rock Street

MANKATO, MINN., U. S. A.

JUST PUBLISHED



AUTOMOBILE WELDING

WITH THE OXY-ACETYLENE FLAME

By M. KEITH DUNHAM

167 Pages **Price $1.00** Fully Illustrated

Sent Postpaid to Any Part of the World.

This is the only complete book on the "Why" and "How" of Welding.

EXPLAINS in a simple manner apparatus to be used, its care, and how to construct necessary shop equipment. Proceeds then to the actual welding of all automobile parts, in a manner understandable by everyone.

Gives principles never to be forgotten. Aluminum, cast iron, steel, copper, brass, bronze and malleable iron are fully treated, as well as a clear explanation of the proper manner to burn the carbon out of the combustion head.

AUTOMOBILE OWNERS, GARAGE AND SERVICE STATIONS, BLACKSMITHS AND MACHINE SHOPS, as well as industries using the oxy-acetylene flame, will find this book of the utmost value, since the perplexing problems arising when metal is heated to a melting point are fully explained and the proper methods to overcome them shown.

CONTENTS

CHAPTER I.—APPARATUS KNOWLEDGE.

Oxygen Supply—Care of Oxygen Cylinder—Acetylene Generator—Care of Generator—Regulators—Care of Regulators—Creeping Regulators—Gauges—Care of Gauges—Welding Torch—Care of Welding Torch—Effects of Heat—Hose and Goggles.

CHAPTER II.—SHOP EQUIPMENT AND INITIAL PROCEDURE.

Preheating Agencies—Welding Table—Location of Welding Outfit—Starting the Welding Outfit—Adjustment of Flame—Principle of Welding—General Welding Knowledge—Welding Rods and Fluxes—Choice of Tip—Expansion and Contraction.

CHAPTER III.—CAST IRON.

Simple Welding—How to Hold the Flame—Hard Cast Iron—Pin Holes and Blow Holes—Lug on Cylinder—Water Outlet—Cylinder Welding—Compression Head—Finishing and Testing—Scored Cylinders—Cylinder Parts—Fly Wheels—Pistons—Crank Cases—Babbitted Bearings—Valve Guides—Preserving Threads—Conclusion of Cast Iron.

CHAPTER IV.—ALUMINUM.

Use of Welding Knowledge—Puddle System—Flux System—Comparison of Systems—Welding Rod—Preparation of the Weld—Inlet Manifold—Arm of Crank Case—Welding the Arm Without Taking Out the Motor—Break in the Body of Case Welding Cold—Wrong Method of Setting Up—Lug or Boss Welding—Preheating the Case—Gas Preheating Flame—One Side or Both—Collapse of Weld—Broken Bearings—Direction of Welding—Shrinkage Cracks—Missing Parts—Finishing—Die Mould Castings—Body—Other Parts.

CHAPTER V.—STEEL

Welding Knowledge—What the Flame Does to Steel—The Welding Rod—Simple Welding—Position of Flame—Reinforcing the Weld—Frame Welding—Lengthening the Chassis—Tube Housings—Worn Parts—Gear Welding—Case Hardening—Light Metal Welding—Gasoline Tank—Welding Adjacent to Rivets—Shaft Welding—Construction of Parts.

CHAPTER VI.—MALLEABLE IRON COPPER, BRASS, BRONZE.

How to Detect Malleable Iron—Brazing Malleable Iron—Rear Housing—Reinforcing the Braze—Brazing Tube to Housing—Building Up Worn Parts—Copper—Brass and Bronze—Silver Soldering.

CHAPTER VII.—CARBON BURNING AND OTHER USES OF OXYGEN AND ACETYLENE.

Principle of Carbon Burning—Method of Operation—Lead Burning—Soldering—Case Hardening—Heating Uses.

CHAPTER VIII.—HOW TO FIGURE COST OF WELDING.

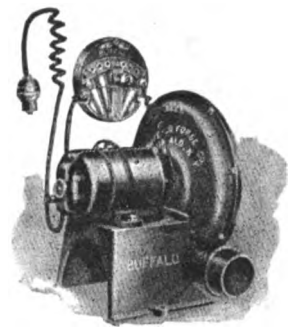
Oxygen Consumption—Dissolved Acetylene Consumption—Torch Consumption Test—Acetylene Generator Consumption—Cost Card—Conclusion.

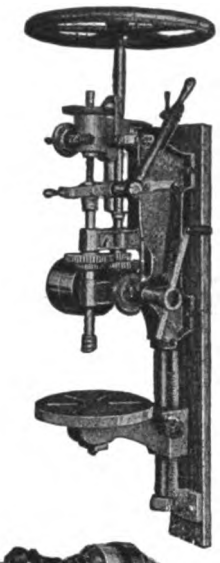
ADDRESS ALL ORDERS TO

M. T. RICHARDSON COMPANY, 71-73 Murray St., NEW YORK

Digitized by Google







Modern Shop Efficiency

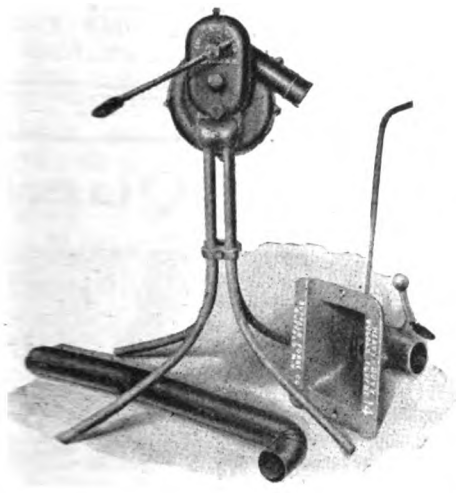
BLACKSMITHS AND GARAGEMEN are determined to have the best that may be had in Blacksmith Shop Equipment.

The work of the modern shop demands modern efficient tools—tools that will stand up under severe service.

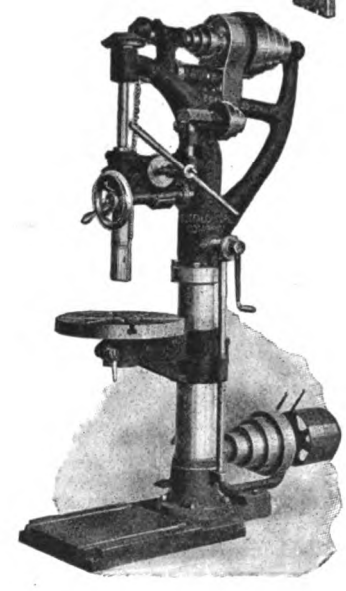
Forges; electric blowers; drills—floor and post type; shears—for cutting angles, bars and sheets—and of every size from the little bench type hand power shear to the heaviest power shear made—these are the tools you should know about.

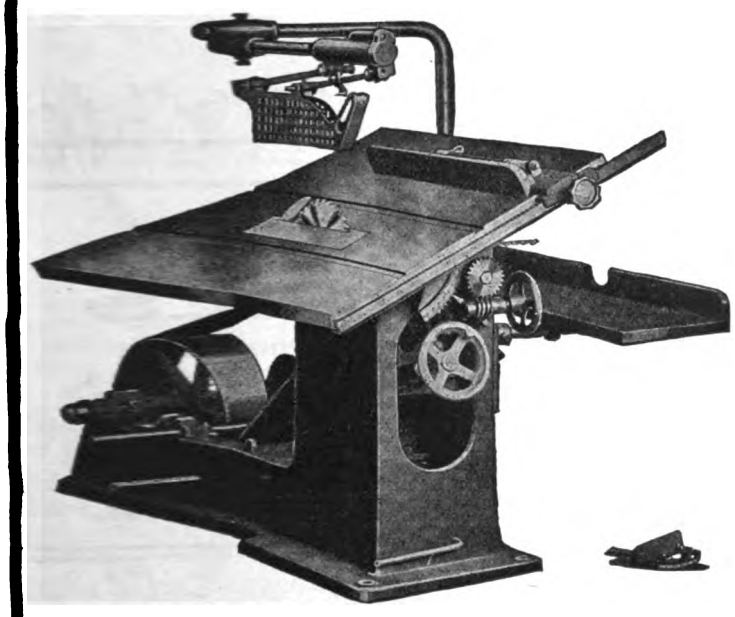
Write Dept. 6 for Catalog

Buffalo Forge Company, Buffalo, N. Y.



"Buffalo"





CRESCENT Wood Working Machines

will always satisfy those particular users who want the highest quality at reasonable price.

Send today for catalog of band saws, saw tables, shapers, jointers, variety wood workers, planers, planers and matchers, swing saws, cut off table, disk grinder, borers, hollow chisel mortiser, Universal wood workers.

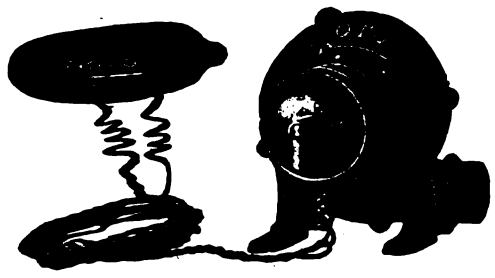
THE CRESCENT MACHINE CO.
203 Main Street
LEETONIA, OHIO, U.S.A.

The ROTO ELECTRIC BLOWER ONLY $27.50

SAVE TIME! SAVE MONEY!

It is your patriotic duty to save. Labor is in great demand. Machinery must take its place. Are you still blowing your forge by hand? Do you know that this time is WASTED? Install a ROTO ELECTRIC BLOWER and SAVE this time. It lets your hands free for other work. You will then say, like hundreds of our customers,

I wouldn't sell my ROTO for $100.00 if I couldn't get another.



N. B.—The above price is subject to change without notice.

Buy direct from the makers and save from $10 to $15, the middleman's profit. The Aeronautic Department of the United States Navy uses the ROTO. You can rely on it. Mail the coupon today and try out this time and money saver.

SEND THE COUPON. DO IT NOW.

THE ROSEWATER ELECTRIC CO.
5516 KINSMAN ROAD, CLEVELAND, OHIO

Send me by ..... An AIR COOLED ROTO BLOWER with one year's guarantee, complete with cord, plug and Speed Regulator. I will return it to you at the end of 30 days, if it does not give me entire satisfaction, and if I keep it, I will pay you $27.50 at the end of 30 days.

Name ..... Address .....

Current ..... Voltage ..... Cycles .....

Your Electric Light or Power Company Will Give You This Information.

Would You Sell Your L For $65?

You wouldn't part with even an arm or a leg for that fi would you?

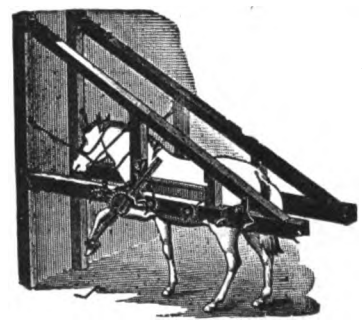
Yet every vicious horse you shoe is likely to do more dan in the twinkling of an eye than can be repaired at several t the cost of **Barcus Stocks.**

When you place a horse in a Barcus Stock, he is harmle he cannot hurt either you or himself. Costing only $65 it is cl insurance, indeed.

BARCUS STOCKS not only furnish the logical way to serve "Safety First," but they are also a positive aid to good sho The BARCUS is a modern Stock—automatic working parts ins of the bothersome ropes, straps and blocks that made the old stock almost more of a nuisance than a help.

If you don't know about **Barcus Stocks** you owe it to y self and your family to write **at once** for the complete detail

The Barcus Mfg. Co.,
Wabash, Ind.



Please send me full partic regarding your Horse Stocks wi any obligation on my part.

Name .....

Town ..... *State* .....

Digitized by Google

LINDE OXYGEN

From Coast to Coast 65 Producing Plants and Distributing Stations provide an unlimited supply of Linde Oxygen for users everywhere.

LINDE SERVICE means no investment except for oxygen actually received—no expensive overhead or upkeep charges.

Linde Oxygen may be obtained from any of the following Linde Plants and Distributing Stations where a large suppply of charged 100 to 200 cu. ft. cylinders is kept on hand constantly to insure immediate shipments.

Mail or telephone your order to THE LINDE AIR PRODUCTS CO., at the nearest point. **Shipments will be made on day order is received.**

PRODUCING PLANTS AND WAREHOUSES

Alabama
*Birmingham
10th Ave. & 28th St.
California
*Emeryville, Oakland
*Los Angeles
1405 Mission Road
Colorado
*Denver
S. B'way & Exposition Ave.
Connecticut
Hartford
1095 Main Street
District of Columbia
Washington
9th & Maryland Ave., S. W.
Georgia
*Atlanta
Plyant St. & Southern R. R.
Savannah
OgeecheeCanal, So. of BaySt.
Illinois
*Chicago
3633 Wall Street
East St. Louis
6th & Walnut Ave.
Peoria
721-731 So. Washington St.
Indiana
*East Chicago
S.E. Cor. Kennedy & 145th St.
Fort Wayne
414 E. Columbia Street
*Indianapolis
2819 Roosevelt Ave.
Iowa
Davenport
118 Harrison Street
Des Moines
117 W. 5th Street
Kansas
Wichita
Rock Island Ave. & 2nd St.
Kentucky
Louisville
126 East Main St.
Louisiana
New Orleans
861 Fulton Street
Maryland
*Baltimore
25th & Montebello Ave.

Massachusetts
Cambridge
25 Waverly Street
Springfield
Napier Street
*Worcester
961 Southbridge St.
Michigan
*Detroit
St. Aubin Ave. & Newton St.
Grand Rapids
Pearl Street by the Bridge
Minnesota
Duluth
Seventh Ave., West
*Minneapolis
1809 Hennepin Ave.
Missouri
*North Kansas City
14th & Charlotte St.
*St. Louis
4218 Forest Park Blvd.
Nebraska
Omaha
1007 Jones Street
New Jersey
*Elizabeth
Linden Ave.
Newark
354 Plane Street
New York
Albany
Montgomery & Colonie Sts.
*Brooklyn
475 Driggs Ave.
*Buffalo
155-183 Chandler St.
*Utica
Walnut & Schuyler Sts.
Ohio
*Cleveland
802 East 72nd Street
*Cincinnati
Stanton & Mellish Aves.
Columbus
310 Dublin Ave.
Dayton
521 E. First Street
Lima
338 East High Street

Ohio
Toledo
441 South Erie Street
*Youngstown
601-621 Jones Street
Oklahoma
Oklahoma City
27 E. Grand Ave.
Tulsa
1 North Boulder St
Oregon
Portland
15th & Hoyt Streets
Pennsylvania
Erie
1502 Sassafras Street
*Norristown
*No. Philadelphia
18th & Cambria Streets
Pittsburgh
16th & Pike Streets
*Trafford
Tennessee
Chattanooga
212-238 King Street
Memphis
203 Washington St.
Texas
*Dallas
Harwood and Coombs St.
Houston
Cedar & Baker Sts.
San Antonio
512 Dolorosa St.
Utah
Salt Lake City
112 West Second St., South
Virginia
Richmond
1709 E. Carey Street
Washington
*Seattle
Henrietta St. & 8th Ave., So.
Spokane
121-123 S. Madison St.
Wisconsin
Manitowoc
810 Quay Street
*Milwaukee
36th St. & National Ave.

(Star) * Designates Plants.

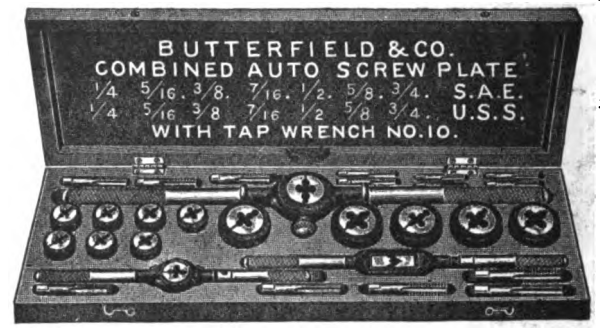
Other Plants and Distributing Stations are planned for other industrial centers throughout the country and will be established as fast as and wherever the local demand for oxygen warrants.

THE LINDE AIR PRODUCTS COMPANY

Largest Producers of Pure Oxygen in America

Forty-Second St. Building **NEW YORK**

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.

New York Store: 126 Chambers Street

The Horse Rasp of Quality



Ask your Dealer for the

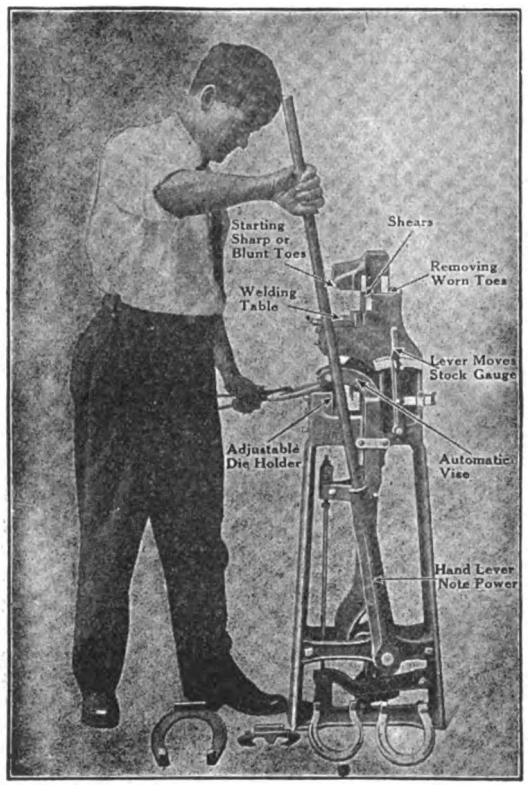
IMPROVED HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, **"Slim," "Light," "Slim Light"** and **"Fine Cut."** Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial. New catalogue mailed free on application.

HELLER BROTHERS CO. *Established in 1836* **Newark, N. J.**

1918 MODEL
THE L. S. P. CALKING MACHINE

The Greatest Time and Labor Saving Machine On Earth



1918 MODEL—Fully covered with Patents

OUR 1918 Model is the same as our 1917 Model with the exception that we have eliminated the steel plugger attachment and strengthened some of the parts.

Do not mistake this for a machine which makes toe calks or a foot vise. This machine is for turning heel calks, both Blunt and Sharp, sticking and welding toe calks, clipping and trimming ends of shoes. IT CALKS SHOES, doing the work just the same as you do by hand with the hammer, only it is done much better and easier, and in a fraction of the time.

In turning heels, you can turn up just as much stock as you wish, upset or stoveup to make as heavy as you like and square up the calks without use of hammer. There is no losing of toes when you weld on the L. S. P.

It is a strong, handsome, well made machine and will last, as you might say, a life time, fully warranted for one year. It is in use in the best shops in the United States, users claiming more for it than we do.

Write at once for full information and prices.

L. S. P. CALKING MACHINE CO.

P. O. Box 225 **WYALUSING, PA., U. S. A.**

NATIONAL MACHINE CO., Brighton, Ontario, Canada

STAR STEEL SHAPES

PLOWSHARES **LANDSIDE PLATES** **PLOW POINTS**
LISTERSHARES **LANDSIDE POINTS** **SEEDER POINTS**
MOLDBOARDS **SHOVEL POINTS** **SUBSOILERS**
CULTIVATOR SHOVELS **DRILL POINTS**

Soft Center **Solid Cast** **Crucible Steel**

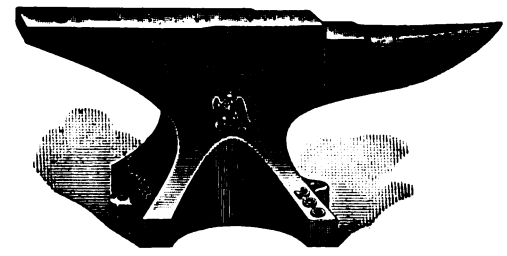
STAR MANUFACTURING CO., Carpentersville, Ill.

1843 EAGLE ANVILS 1918
AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE
BLACKSMITH AND WHEELWRIGH

Vol. LXXVIII. No. 1. NEW YORK, JULY, 1918. {TER ONE DOLL

Design, Construction, Operation and Repair of Motor Vehicles

Part VI—The Generation of Electrical Current and the Principles of Magnetism and Electric Generators

Before the reader can hope to understand automobiles thoroughly he should make a careful study of electrical apparatus. It has been said that the magneto is the heart of the automobile engine; at any rate, if for any reason the electric current fails, the engine will not run. At the present time, when carburetors are nearly "fool proof," most of the engine troubles can be traced directly to the ignition system.

In order that our readers may understand the ignition system of a car, we will begin at the very first and explain the elements of electricity and current generation.

There are two big divisions of electricity, namely: Electric Current and Magnetism. In one way these two are not related, magnetism may exist without the presence of current, but current cannot exist without magnetism. We will not try to define either of these words, for every reader knows just what they mean.

If an electric current passes through a wire, circling around the wire are magnetic

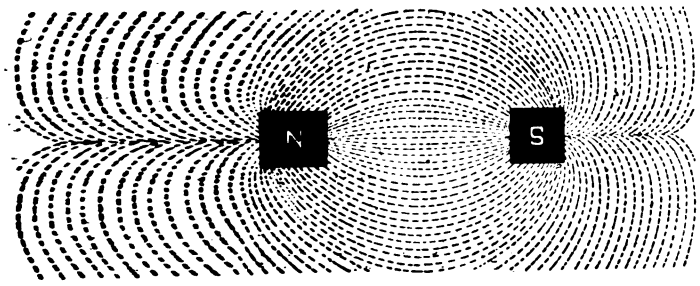


Fig. 20—Showing Lines of Force Around Poles of a Horseshoe Magnet.

lines of force. If the wire is coiled around a piece of iron or steel and a current passed through it, the iron or steel core becomes magnetized and radiates lines of force.

Now it is impossible for one to see these lines of force, but if one were to place a piece of stiff paper or glass upon the poles of a magnet and sprinkle upon the glass a small amount of iron filings, the filings would form themselves into a design or figure as shown in Fig. 20. The figure shows a number of lines and these lines are termed lines of force.

These lines of force are the only evidences of magnetism that we can find, they are given off by all kinds of magnets and are always present where there is any electricity. They seem to travel from the north to the south pole of a magnet, through the air or through any intervening metal. Distance is the only insulator. They may be likened to the force of gravity in this respect, there is no way to prevent them from passing from the north to the south pole of the original magnet.

Strength Depends Upon Lines.

As the lines of force are the evidences of magnetism, it follows that the strength of the magnet depends upon the number of lines of force it has. In the case of an ordinary steel permanent magnet, as time goes on, the number of lines of force diminish, and the magnet "loses its magnetism or strength," as it is often said.

Like any other force, the more work the lines of force have to do, the sooner they will be decreased. This means then that the longer distance the lines have to travel through the air, the sooner the magnet will be weakened. For this reason, in dealing with electrical magnetic apparatus, the magnets are kept as near to the wires as possible. For this reason, also, a keeper is supplied for the well known type of horseshoe magnet.

Magnetism, as we will term the lines of force, like electrical currents, travels in circuits. It may be said to arise at the north pole on a magnet, travel through the air to the south pole, then through the magent itself to the north pole again. If one were to place a piece of iron or steel in this circuit, many of the lines of force would be collected and pass through the iron or steel, for these metals are good conductors of magnetism as well as electricity.

We have said that a piece of iron or steel may be magnetized by winding a wire around it and passing a current through the wire. If this is done, an electro-magnet is formed; if soft iron is used as a core, the magnetism will cease as soon as the current ceases, but if steel is used the steel retains the magnetism and a permanent magnet is formed.

Current Generation.

Now it so happens that most every cause and effect in nature or science is reversible and it is so with magnets and electric current. If we wind a wire around a piece of iron, then magnetize the iron suddenly, current is generated in the wire.

There is a peculiarity about this, however, and the reader should not be confused in reading the last sentence in the above paragraph. We have said that if the iron is magnetized suddenly, a current is generated. If the coil were placed upon a magnet of the permanent type, the magnetic lines of force would continue to pass as usual, but there would be no current in the wire as long as it remained stationary upon the magnet. This brings up the first rule of current generation, which may be stated as follows: When the magnetic lines of force are broken or cut by a coil of wire, a current is generated in the wire.

Suppose we were to make a coil of wire

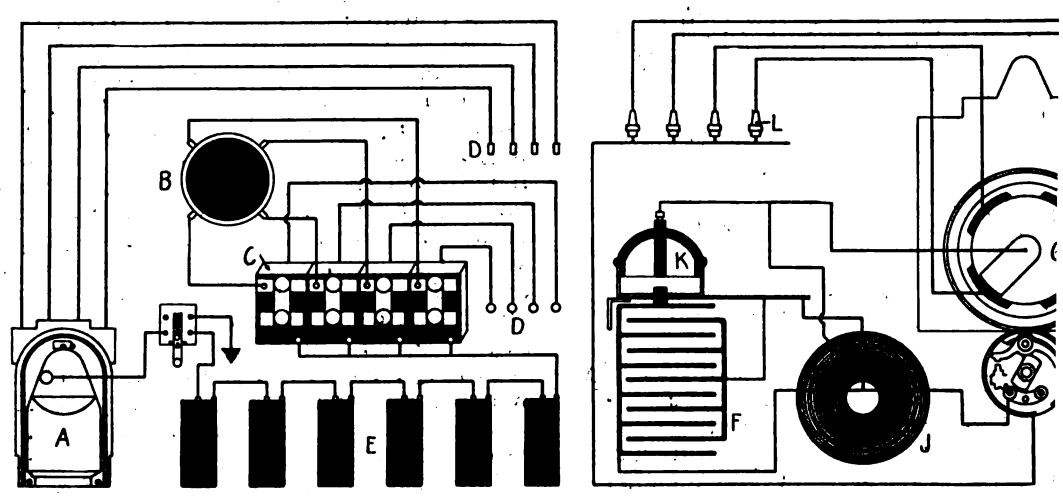


Fig. 21—A Dual Magneto System at Left; Low Tension Magneto System at Right. A, Magneto; B, T Vibrator Coils; D, Plugs; E, Battery; F, Condenser; G, Distributor; H, Breaker Box; J, Coil; K Spark Gap; L, Plugs.

upon a hollow spool and connect the two ends with a sensitive current detector. If we then placed the coil of wire over one pole of a magnet, or between two poles, we would notice a deflection in the detector when the coil entered the magne The detector would remain at zero as the coil remained stationary in but would again indicate current v coil was removed.

In these few paragraphs we have the principle of current generation ing us to the simplest type of elec chine, the magneto. In this device one or more permanent steel magn one or more coils of wire placed upon termed an armature, between the po ends of this wire are so arranged th may be connected with the outside As a general rule, one terminal is co with the iron core, or grounded,

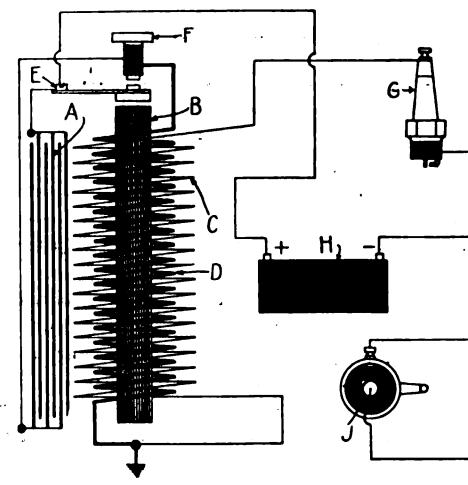


Fig. 22—Wiring of Spark Coil and Ba System. A, Condenser; B, Coil Ma C, Secondary Coil; D, Primary Coil Vibrator; F, Adjusting Screw; G, S Plug; H, Battery; J, Timer or Bre Box.

termed, while the other is connecte collector ring, or center pin, from w current is taken through a brush.

Suppose the coil of wire starts at tion where its plane is directly ac tween the poles of the steel permane net, it cuts comparatively few lines and there is no current flowing thr Now assume that it is being rotated plane begins to turn, it cuts more a lines of force, until it stands "up an between the poles. At this point it maximum number of lines of force turned, the current began to be g and increased until it reached this p the coil rotates still further, the lines cut, decrease, and the current decre until it reaches zero.

This makes one-half of a revolu as the coil rotates through the oth the current flows in the opposite d At every revolution of the coil, t

current flows through the wire in t tions, forward and back. This i "alternating current" and is the typ rent generated by all magnetos.

Before going any further we mu

Digitized by Google

stand fully electrical current. There are two kinds of current—high and low tension. A high tension current will leap across a gap in the wiring and it is this type of current that is necessary in the spark plugs to fire the gasoline mixture. A low tension current will not jump across an air space. The difference between the two may be stated by saying that a high tension current is a current of extremely high voltage and comparatively low amperage.

Electrical terms of voltage, amperage, watts, ohms, etc., may be understood if one compares electricity with water. The term Volt is equivalent to pressure; amperage to amount, watts to horse-power; ohm to the resistance of the pipe. For instance, the electrical terms are given beside their equivalents in the following sentence: A tank of water, a certain height from the ground, is connected through a pipe with a turbine; the water pressure is 80 pounds per square inch (voltage), the pipes deliver 12 gallons of water per second (amperes) to the turbine. The amount of power that the turbine delivers is dependent upon the water pressure and the number of gallons per second passing through it (watts).

Units of Electrical Measure.

One watt is equal to a volt multiplied by an ampere. Now all of these electrical units depend upon each other and it has been proven that in any electrical circuit, the amperage is equal to the voltage divided by the resistance. This is called Ohm's law, and the reader should memorize it, it is important.

The usual output of a low tension magneto is about six volts, while the amount necessary to jump a gap ¼ of an inch long is around 3,000 volts. Some means must be used, therefore, to "step up" the voltage to this amount and a device called a spark coil is often used.

A spark coil consists of a primary winding which is connected with the magneto circuit and is made up of a few turns of comparatively heavy wire, wound around a soft iron core. Around this primary winding or coil is the secondary winding, many thousands of turns of very fine wire. One end of this secondary wire is connected with the insulated center of the spark plug, while the other is connected with the engine base. (In this chapter we will not consider the timing devices or distributing devices which cause the spark to occur in the proper cylinder at the proper time.)

Going back to our theory of magnetism we find that when current passes through the primary winding, lines of force are generated and the soft iron core gives off magnetism. Since these lines of force pass through the

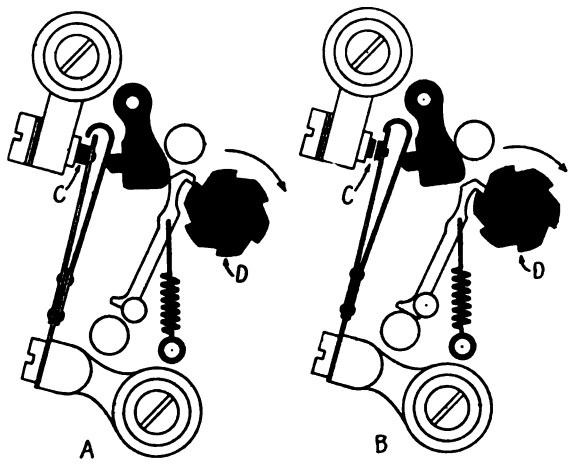


Fig. 23—Parts of Breaker Box. A, Points Closed; B, Points Open; C, Breaker Points; D, Cam.

secondary winding, a current is generated in the secondary winding, but unless the primary current is alternately made and broken, the secondary current will not be continuous.

For this reason a mechanical device called a vibrator is introduced in the circuit. As the iron core becomes magnetized it attracts the tongue of the vibrator and as this member moves toward the magnet, the circuit is broken. The magnetism ceases, since the core is of soft iron, and the vibrator returns to its original position connecting the circuit again; this operation continues so long as current passes through the circuit, and as long as the current is made and broken, a high tension current passes through the secondary coils. Coils of this type are termed vibrating coils.

There is one other way in which the same end may be accomplished. It is not always necessary to employ a vibrator to obtain a secondary current, however, it is necessary to break the primary current or a secondary current cannot be obtained. Many magnetos are fitted with a so-called "breaker-box."

The breaker-box is a device which is usually located on the magneto shaft and arranged in the circuit in such a way that it breaks the circuit a number of times every revolution of the armature. The reader should bear in mind the fact that the current is generated in the coil only when the circuit is made or broken, and so the break should occur when the current is at its maximum strength or when the armature coil is cutting the most lines of force. This is an important point to remember in overhauling magnetos.

Unless means were taken to prevent, the contact points on the vibrator or those in the breaker-box would soon be destroyed by the passage of current. As the points separated an arc would be formed and the points would be burned very rapidly. To prevent this, a device called a condenser is provided. This is made up of a number of sheets of tinfoil, separated by waxed paper or other insulating material. The tinfoil sheets are connected with others alternately, making two sets of plates, each set being connected with the vibrator or breaker points.

The excess current, instead of jumping or arcing across the points, is stored momentarily in the condenser and passes through the coil, adding its strength to that of the original current.

Low tension magnetos were the first types of generators put on the market for ignition purposes and as they required a set of coils, as well as much wiring, manufacturers worked to design a more simple system for ignition purposes. They finally produced a combination machine, which they termed the "high tension magneto."

High Tension Magneto.

This machine acts upon the same principle as the low tension, but is a combination magneto, secondary coil and condenser. Around the ordinary armature winding is a second winding of very fine wire. This second winding answers the same purpose as does the secondary winding of a spark coil, thus combining the two units into one, making a less complicated system.

As examples of the various systems considered so far we have the simple alternating current magneto with vibrating coils, such as the Ford; the low tension magneto with non-vibrating coil and a breaker-box, such as the Splitdorf; and the true high tension magneto, such as the Bosch.

There is still another type of magneto which is gaining favor among the manufacturers of the type represented by the Dixie. In this machine there are no moving coils, however, the theory of current generation is the same as in all of the others.

The coil of wire in this machine is placed between the poles of the magnets, while rotating inside it is a soft iron core. At each end of this core is placed a heavy piece of iron. The armature resembles the letter Z somewhat. When the armature is parallel with the ground, the lines of force travel from the north pole of the steel magnet, through one of the iron pieces, through the core in the coil and thence to the south pole of the magnet through the other iron piece. When the Z armature is rotated one-half of a turn, the lines of force travel in through the core of the coil, in the opposite direction.

This change in the direction of the lines of force generates the current in the coil. The coil is a regular spark coil and is fitted with a secondary winding, thus the current passes from the magneto to the plugs as high tension.

There is still another type of magneto which should be considered at this time, and this is termed the Dual magneto. Such a machine is manufactured by the Bosch Magneto Company, and as far as the magneto itself is concerned it is a regular high tension machine. The only difference lies in the breaker box. In the ordinary type of high tension magneto, the breaker box is fitted with two contact points; one of the points is grounded while the other is connected with the primary winding of the armature coil.

As the two points come together the circuit is completed through the armature coil and a spark is formed in the secondary winding. Now in the Dual type there is an extra

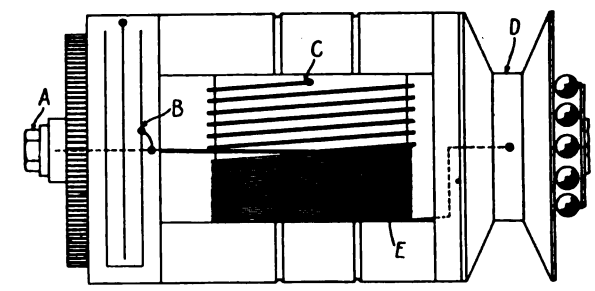


Fig. 24—Armature of High Tension Magneto. A, Primary Wire Terminal Screw; B, Condenser; C, Primary Coil Grounded; D, Secondary Collector Ring; E, Secondary Coil.

contact insulated from the armature winding terminal and connected with a battery system. The second set of breaker points serve to make the contacts for the battery system. In this case an extra coil is necessary.

In some cases the extra contact is connected through the armature winding and the regular breaker box. In this case the battery current is used for strengthening the current generated in the armature itself. Of course the reader realizes that there may be any number of combinations made with these systems, but in this article we have outlined the various principles of operation so that the repair man should have little or no trouble when he encounters any of the combinations.

Now that the magnetos are being used so extensively upon motor trucks and aeroplanes, and because of the fact that a cheaper ignition system can be produced, many automobiles on the market are fitted with battery ignition systems. In fact, we may safely say that the majority of machines produced today are fitted with battery systems.

Battery System Explained.

A battery system consists essentially of three units, the battery, the breaker box, and a secondary distributor. The breaker box of a battery system is very similar to the breaker box used on magnetos and described above. As a general rule the breaker box and the distributor form one unit. As an example of this we have the Atwater Kent Ignition System. The breaker box is situated on the bottom of the unit and upon the same rotating shaft is mounted an insulated distributing brush which distributes the secondary current to the various cylinders in the firing order.

The breaker points are operated through a suitable cam and are arranged to make a very rapid break of contact. This is to eliminate the necessity for a vibrator upon the secondary coil. The circuit on one of these systems is very simple. The current travels from the battery, through the coil to the breaker box and, when the breaker points are in contact, through them, back to the battery again. A suitable switch is provided at any place in the circuit so that the current may be shut off at any time.

Upon many of the ignition systems of this type there is a coil of resistance wire. This wire is connected in the circuit and should the switch be left on while the engine is stopped the resistance wire gradually heats, thus increasing the resistance and cutting down the amount of current passing through the system. This prevents an excessive drain upon the storage battery should the switch be left in over-night by mistake. While the engine is running the breaker points are constantly being snapped apart and not enough current is used to heat the resistance coil.

(To be Continued.)

Digitized by Google

Down In Tennessee Our Colored Blacksmiths Keep Their Eyes Open and Are Up To Date

A Good Point Regarding Work Done on Credit Is Brought Up and A Friend Tells How He Began To Make Money As Soon As He Began To Work on a Cash Basis

BY JAMES F. HOBART, M. E.

There are very many excellent smiths among the colored population of the South, and Memphis has her full share of them. I recently spent an hour in a little shop upon a well travelled street and found two colored men running the shop and doing about every kind of job that came along, for horse, wagon or automobile.

The shop was equipped with two fires, an electric motor, a 12-inch buzz planer or "jointer," a 30-inch band saw, wheels 30 inches in diameter, a good back-geared drilling machine, a spoke-boring chuck which could be attached to the drill spindle and there was a hole in the shop floor which permitted a wheel of any size being placed under the spoke tool while that tool was on the drilling machine spindle. The hole in floor could be covered while not in use.

There was also a good emery or carborundum grinding stand with double wheels, an hand blowers for the fires. Each of the two forges was double so that in case of necessity, four fires could be run at the same time. Shoes were made up from scrap iron, old bolts of ½, ⅝ and ¾ inches in diameter being the sizes mostly used for light, medium and heavy shoes respectively. The shoes were forged about as described on page 136 of the May 1918 Blacksmith and Wheelwright.

Outside Advertising.

The owners of this shop surely believed in outside advertising, and plenty of it too, as was testified by the outside of their shop as shown by Fig. 1 herewith. And the lettering was very plain, too, albeit the work was evidently "hand-painted by a home-made artist," but he knew how to make big "loud" letters so the signs "threw themselves at you" as you passed the shop.

The owner of the shop said that five years ago he "let up" on credit work, put his entire business on a cash basis, and since then, had made more money, worked fewer hours, and made better wages per hour. "I 'spects it am most like the rum-selled down in the river bottom boss," the darky smith remarked.

"How was that, uncle?"

"Why, dat ole man had trusted eberybody and had a big slate hanging on de do' all filled wif de names of all he neighbors and how much rum an' whisky dey had bought from him. One day a shiftless po' white who owed too much, came to de do' and saw de slate. No body was lookin' and de po' white trash jist natcherally rubbed out eberyting 'dere was on de slate!

"When de ole man saw what had been done to hissn slate, he just put some mo' names on to it an wen he had done finish, he said to himsel'—'dere, I'se may not hab quite as much on de slate as I'se had befo' but I'se done sure it is on better men!' And it 'pears, boss, dat since I'se done forgot how to charge up work, dat all of it is on better men too!

"Yessir, Yessir! Lots of de ole customers left me, but new ones done come an' I'se done doin' a whole lot better since ole dog trust done died!"

While two of the workmen were hammering horse shoes out of old bolts, another workman, of so dusky a hue that Sundays it was necessary for him to wear a white collar in order to tell where neck and black coat joined, was busily engaged in repairing an automobile wheel. He had made some new spokes and with the assistance of a dusky wheelwright, was putting the spokes in place.

Something the assistant wheelwright did, was not according to the ideas of the boss, who delivered himself as follows, of a bit of advice it would do well for all wheelwrights to remember whenever they "tackle" automobile wheels.

"Hi dere Nigger!" said the foreman wheelwright, "How many mo' times must I tell you all not to work an ottermobile wheel like you all do a wagon wheel? Didn't I done tell you all dat a wagon wheel is built from de rim in, while dat ottermobile wheel done be built from de hub out? An' what for you done want me to tell you all never to try to spring de rim on de spokes of an ottermobile wheel? Say! Nigger! can't you all nohow, ebber learn to drive de spokes in de rim first, not into de hub same as you all does for de wagon wheels? 'Pears to me, you all am a mighty no-account nigger not to remember wot I'se done said 'bout 'lebenty-four times!"

Buzz-Planing Band-Sawn Work.

Some good buzz-planer practice was noted in this little southern shop. Some narrow hardwood pieces were being ripped from hardwood, wide, planks for repairs to a farm wagon, and as there were a considerable number of the pieces, and all had to be gotten out to pretty accurate dimensions, means were taken to dress out the pieces with very little waste of either time or material.

To do this, two pieces of plank were worked at the same time. Both pieces were straightened on the buzz planer, then a strip wa ripped off the plank with the band-saw, along the straightened edge. The sawyer then passed the plank over to an assistant who passed the plank again over the buzz planer and smoothed down the cut side. While this was being done the sawyer had ripped a piece from the other plank, then he passed that plank to the planerman and ripped another piece from the first plank.

Thus the two pieces of plank were passed back and forth between buzz planer and bandsaw, until the desired number of strips had been sawn off. By this method, one side of each strip was always dressed before it was sawn, and by exercising a bit of care, the other side or edge was easily and accurately dressed on the buzz planer. This is a very handy way of getting out dimension stuff where there is no planer for sizing the pieces.

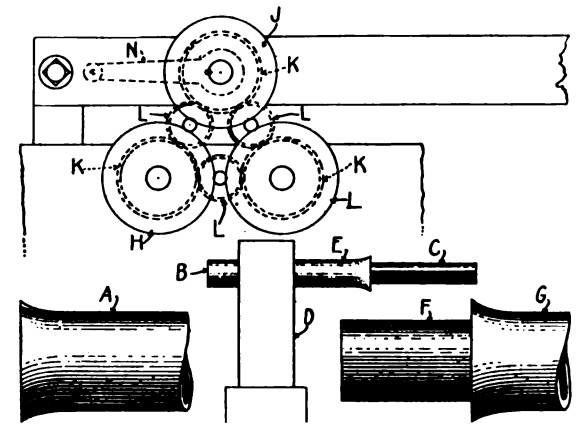


Fig. 2—Illustrating Method Used in Hand-Welding Boiler Tubes.

Just dress up two adjacent sides of each piece on the buzz planer, then gauge the pieces to exact width and thickness and with a bit of care, the pieces can be dressed to the gauge marks with sufficient exactness. To work to the gauge mark when the piece is wider at one end than at the other, "grain" the piece, letting that end go ahead, which will cause the planer to cut the smoother, then, if the wide end of the piece happens to be ahead, run the piece partly past the cutter head, remove and take another cut, part way as before. Repeat this action until the edge of the piece seems to average parallel with the gauge mark. Then run the entire length of the piece, watching very closely to see that the jointed edge keeps parallel with the gauge mark. If it does not remain parallel, run the piece part way as described until the cut becomes parallel to the gauge mark.

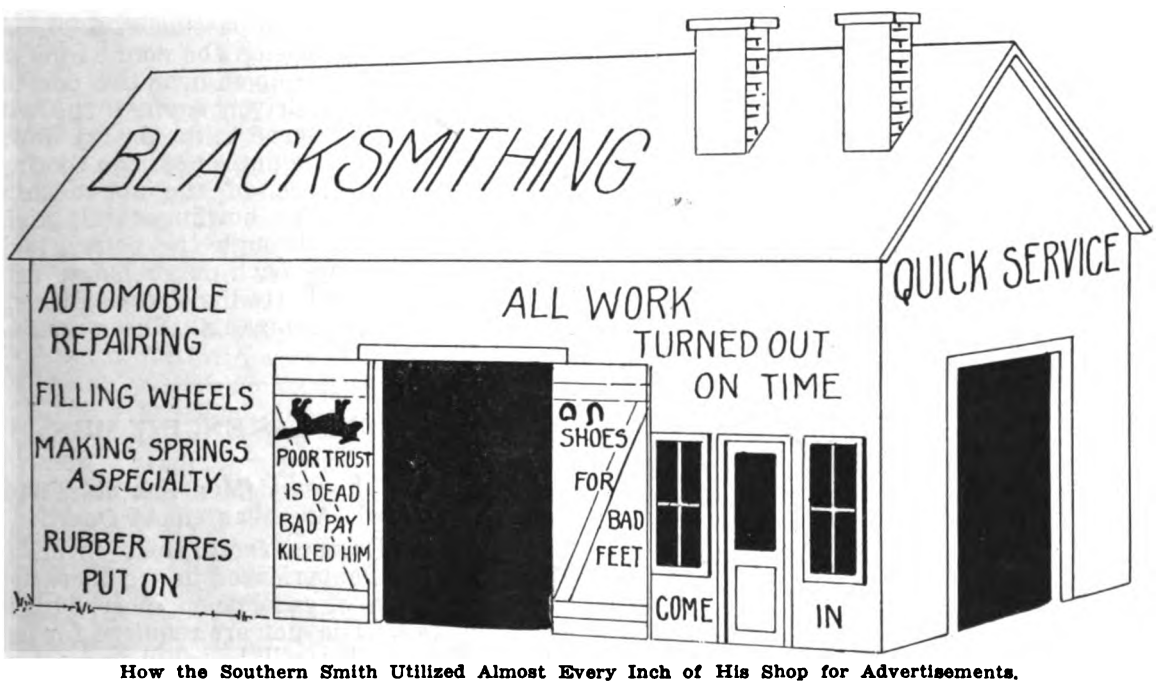
When it happens that the narrow end is ahead, instead of the thick end as above described, then a slightly different proceeding will be necessary. When the thin edge is ahead, place the forward end of the piece beyond the cutters, upon the front portion of the table. Then, push the rest of the piece over the cutter head and repeat until the thick portion, outside of the gauge mark, has been removed and said mark is parallel with the planer table, then run the strips whole length past the cutters as described.

As it is almost always easier to bring a piece to a parallel with or according to a gauge mark, when the narrowest end is ahead, the pieces should be run in that manner whenever the grain will permit, and as some pieces can be run as well one way as the other, the narrow end should be always run ahead whenever it is possible to do so.

A Traveling Menagerie.

One Southern smith had a portion of his shop partitioned off in which he kept an educated goose and one or two trick beasts, a dog, and if I remember rightly, an opossum. The smith who was a sort of wandering character, had built himself a wagon on which was placed a "hurdy-gurdy" operated by a small colored boy, and the wagon also contained space for the animal and goose cages, together with room for the man and his boy helper to ride.

There was also room for a tent and cook-



How the Southern Smith Utilized Almost Every Inch of His Shop for Advertisements.

Digitized by Google

ing tools, beds and other living necessities with which to camp by the wayside. With this outfit, the smith and his assistant went around the country, giving little shows at each town, village and cross-roads where he could collect a group of people. He made a bunch of money during the slack season of smith-work. Each animal and the goose had their parts "down pat," and it proved a money making scheme for the owner.

The smith shop was also fitted up for the accommodation of the "show," and a good many times, while business was going on, the smith gave a "turn" and brought in a good many dollars. In fact, his establishment became known far and wide and many farmers and others got into the habit of taking their work to the "Show Shop" so as to have a performance given while they were waiting for their smith work to be done.

Welding Boiler Tubes.

In a little "One-Horse" Railroad repair shop, the writer saw, while on his southern trip, a smith "hand-welding" boiler tubes in a manner which was good to see although the tools used were makeshift hand-made ones also. But the welds turned out seemed first-class and withstood steam pressures of 160 to 200 pounds per square inch with no fuss or failure.

The first step, after cutting off the bad ends of the tubes in a machine made for that purpose, where regular pipe-cutting wheels were squeezed against the revolving tube from three points, the tube end of the long piece which was to be welded, was heated and "banged" against and over the horn of the anvil a couple of times until the end of the tube had been opened or expanded as shown at A, Fig. 2.

Then, a piece of rod, pipe or smaller tube, which would slide easily inside the tube to be welded, was wedged tightly into one of the holes in the shop "sow," the latter being set on edge as shown at D, the small tube or pipe being visible at C, and one of the short ends of the tube to be welded on being visible at E, slipped on over the smaller tube C.

Next, one of the tubes to be welded, having its expanded end heated, was also slipped over tube C and one or two ram-like blows against short tube E, served to center and fix that short piece of tube firmly in the expanded end of the longer tube as shown at F and G, after which, the tube was placed carefully in the fire and a welding heat applied upon the junction of the two tubes.

The instant the welding heat was "on" the tubes being constantly rotated in the fire all the time while heating, the tubes were quickly passed into a set of three rollers, of about four-inch face, mounted as shown a H, I and J, upon the end of shafts about 30 inches long. Upon the other end of these shafts were placed the gears, K, K, K, with idler gears, L, L, L, in between, and with crank, N, attached to one of the gears, J, so that when the crank, N, was turned, all the rolls would revolve in the same direction.

The rolls H and I were fixed, while roll J, or its shaft bearing, was attached to a lever by means of which the rolls could be separated for the insertion or removal of a tube, and then squeezed together to perform the smoothing down of the tubes while they were at welding heat. Three or four revolutions of crank N served to weld a tube nicely, which was again returned to the fire, given another heat, and placed upon a pile of similarly welded tubes to cool slowly.

The last heating was for removing the welding stresses from the tube metal and allowing the tube to cool slowly, caused it to become annealed and soft. Some of the tubes, the smaller and shorter ones, the smith, after heating them for annealing, placed upright with their hot, welded ends buried in a tube of hydrated lime, where the tubes cooled very slowly indeed. "Air slacked" lime used to be the thing for cooling metals slowly during the annealing process. It is better than sand because of the large amount of air contained between the particles. But hydrated lime is fully as good as the "air slacked" variety and much easier to procure.

FIRST IMPRESSIONS.

The Centennial of the Concord Coach.

BY L. LODIAN.

The next decade will be the Centennial Anniversary of the first appearance of motor travel, of a sort, in America; for the first motor-drawn vehicles in the Union drew out of Baltimore (on a short stretch run of railroad) in 1830; while the first Concord coaches made their initial appearance just about a century ago, about 1817-18.

The first railroad cars were patterned somewhat after the old-style Concord coaches, so-called because they originated in Concord, N. H. This patterning can be proved very readily by referring to our illustration herewith.

Even some of the passengers traveled on the tops, or roof-seats of the earliest locomotive drawn cars, and this practice of second-story railroad carriage travel still prevails, to this day, on a few European railroads; as well as on the trans-kaspian Asiatic-Russia lines; but the roof-seats are completely housed in, or covered with appropriate glass windowed panels, to permit view of the surrounding country.



Even the Horses Were Surprised to See the First Steam Drawn Coach.

The old Concord coach, illustrated, is a faithful rendering of the famous vehicle itself. Many a New England old-timer, who happens to see the picture, will remember it. This old coach "stood up" under service wonderfully well and would stand a fearful amount of knocking about that would ruin a modern vehicle in a short time.

But the Concord coach kept pretty much to its domain or origin; the Hudson states; and down to the Mason-and-Dixie line. Beyond in the south another type of lighter vehicle prevailed; while the middle west had a peculiar conveyance which never acquired any fame but it did receive a certain notoriety for its rough travel ability, but that was manifestly due more to ill-kept roads (not kept at all, in fact) than faulty suspension.

The Concord coach was never known in use in the west. Pictures of the trans-Mississippi vehicles used up to the seventies show a very different type of conveyance. Nor did any part of the European continent ever see the Concorder on the road, although British mail-coaches (or imitations) have been seen from time to time in America.

While of course far quicker work is machine done nowadays, in the elaboration and turn-out of vehicle work, for solidity and durability of wheelwrighting, blacksmithing and coach-painting—nothing to beat the work done on those old Concord coaches! Who will say nay to this?

An illustrated technical encyclopaedia of carriages and coaches thus correctly defines the once-common Concord coach. "A heavy coach body hung upon leather thoro-braces, and having a detached driver's seat in front and a covered baggage rack at the rear."

The reproduction appearing herewith of the old timer is even better than those cuts printed in reference books, being more readily "sized up." Note also the provision made for carrying packages on top of the coach.

Little Concord of the granite state has, in its time, produced more items used in the vehicular world, which have become famous, than any other town in the Union. For we have not alone the Concord coach (true, "only a memory" to-day), but there has been handed down to posterity the Concord axle, the Concord buggy, and in the harness world the Concord hame; all manufactured originally in the snug little New Hampshire place.

And even to this day Concord "holds its own" in certain lines of vehicle construction. The descendants of those sterling conveyance builders who made the Concord coach famous are still doing their "bit" for the wheeled-vehicle world!

But the happy scene shown in the Concord coach picture meant also the "beginning of the end" for that historic vehicle. The passing motor-drawn Concord coaches, on wheeled trucks, seen in the distance, were to "spell the doom" of stagecoach travel.

And now a century later the road is "coming into its own again"—with motor contained vehicles.

Yet coach travel then-a-days had its decidedly "seamy side." A commercial traveller wrote, a century ago, a little book on "hints to drummers," a copy of which is in the Manhattan Public Library, possibly it was the first volume ever issued dealing specially with the works and ways of travelling commercial men.

He relates some of the miseries of winter time stagecoach travel then prevailing. "You are at a town inn—the only one at the place—and have left directions to be called at 3 a.m. to take the coach passing at 3.30. At 3 comes a vicious kick on the door from the ostler; and you wake up to hear the pouring rain furiously wind-driven against the window panes. You descend to the drafty downstairs; and in a few minutes hear the tooting-horn, in the distance, of the approaching coach. Then into the howling black night you make a dash, through the pelting cold rain, to the waiting coach maybe some fifty yards off, and enter it (to the obvious discomfort of the other occupants) like a soaked rat."

NAVY NEEDS GAS ENGINE MEN.

At Least One Thousand Men Familiar With Engine Work Are Wanted At Once.

The Naval Reserve force must enroll at once 1,000 men, experienced in the operation and maintenance of gasoline engines. This is an urgent call. The men are required for immediate duty. They will be rated as machinists' mates.

Age limits are eighteen to thirty-five inclusive. Applicants must be American citizens. Draft registrants with letters from their local boards will be accepted.

Apply at Naval Reserve Enrolling Office, 51 Chambers Street, New York, or any navy recruiting station.

Digitized by Google

What Various Farmers Throughout the Country Are Doing with Their Tractors

The High Cost of Living and Labor and the Existing War Conditions As Well As the Demand for Conservation Are Convincing Arguments in Favor of the "Iron Horse"

These are unusual times. These are war times. "Conservation," "Patriotism," "Increase Crop Production," are the topics of conversation and on everyone's tongue. We all fully realize that it is up to America to supply very largely the food needs of her allies fighting over seas.

The American farmer is facing his solemn duty of increasing crops to a maximum with a full knowledge of his responsibilities. He is asking himself, How can I produce more, with help so scarce? The answer comes back to him from thousands of other farmers, "Buy a tractor."

There are scores of farmers that we know of, who have just about made up their minds to purchase a tractor but who are reluctantly holding off asking themselves the questions, "What will it do on my farm?" "What has it done on my neighbors' farms?" "Will it produce profits for Me?" and many other similar questions. We will endeavor to answer some of these questions in this short sketch by actual letters from successful tractor owners in various parts of the country.

An Interesting Letter.

Mr. George B. Hiscock, Appledore Farms, Skaneateles, N. Y., one of the best known farmers in that section of New York State and in whose confidence we can safely rely, writes as follows concerning his tractor:

"It is the first fall my horses have ever looked respectable after a season's work. In the past I have never been able to get sufficient grain in them while plowing and doing other farm work to keep them looking like anything but old cripples. This fall—thanks to the tractor, the horses are round as a dollar, and I haven't had to use the grain on them I have in other years.

"My little Case 10-20 tractor has done everything I was told that it would do, at the time I made the purchase, and some things besides. It pulls three 14-inch plows from seven to nine inches deep. My land is not the easiest land to plow. I find that the tractor will plow about eight-tenths of an acre per hour, using one and one-half gallons of gas in that time. There is a section of my farm, which is up-grade at the rate of 150 feet per four-tenths of a mile. On this land I plow at the rate of seven-tenths of an acre per hour, using two gallons of gas per hour. The oil consumption on such land is one gallon in ten hours.

"I did all of my harrowing with the tractor. It pulls a double disc harrow anywhere, set as deep as you can set it. The machine can be speeded up, so that it will disc 15 acres in ten hours, using 15 gallons of fuel. It pulls with ease six sections of spring tooth harrows under the same conditions. I have used the tractor to fill my silos and perform other farm work which in the past, has required a 15-h.p. steam engine.

"My experience has proved that the tractor is economical for farm work; and that it is an error to tie up a lot of money in horses, that eat all the year round, and are often sick at the times when you require their services. In conclusion, I wish to say, that I am pleased with the decision I made by selecting the tractor I did. I like the design of the machine; it has an excess of power; perfect cooling system; reliable under all conditions. It only eats when it works and costs nothing when idle."

This letter shows that a tractor is very economical to operate and that it is capable of doing rapid and good work. But plowing is not the only work which a tractor is capable of doing. It can be made to produce profits the year around, for when plowing is over it can haul the grain drill, then the mower, the hay rake and loader. During harvest time the tractor again comes into its own and is used extensively to pull the binder and to run the thresher. It is also a most satisfactory power for filling the silo, running the hay baler and the feed cutter.

Use a Tractor for Anything.

Even in the late fall and winter the tractor is put to good advantage in cutting the winter's supply of wood. Bear in mind this fact that when a tractor is not working it is not eating. Stop to figure out for a minute the amount of money it costs you to feed your horses and the actual number of days' work you really get out of them.

I have in my hand a very interesting letter from M. C. O. Cobb of Grant, Neb., in which he tells of the money he makes with a small kerosene tractor. He says in part:

"My three-plow tractor has proved very satisfactory and is a money maker as you will note from the following: I bought this outfit June 2nd, 1917, and since that time have plowed with it (breaking prairie sod) 665 acres, for which I received $2,305.00; seeded 216 acres for which I received $216.00; disced 216 acres, for which I was paid $370.00, and cut 510 acres hay, pulling four mowers and two dump rakes all attached to the tractor by a home-made hitch and putting the hay in windrows. I finished this haying job in about ten days and received $970.00, making a total earned for outside work of $3,861.00.

"The expense of operating was very reasonable, in the early part of the season I used about two gallons of kerosene per acre for breaking. In breaking the last 370 acres I pulled a heavy packer behind the plows and, of course, it took more fuel and oil.

My tractor and plows are in good shape now, have cost me nothing for repairs and a you can see from the above, does not owe me anything, and are ready to go into the field next season and repeat the performance."

Many farmers now are keeping very accurate cost records showing exactly what every piece of machinery, every animal and every inch of ground really produces. One of these progressive farmers is Mr. Oliver Bettenhausen of Wiskek, North Dakota, who has kept close cost records on the actual expense of upkeep of his tractor. His letter is printed herewith:

"I am enclosing a true report of plowing and breaking done by myself this year, plowing a total of 266 acres. I wish to say that I am perfectly satisfied with the outfit. My repair bill amounted to but 30 cents up to date. Have cleaned spark plugs only twice although I burned kerosene continually. I have just put in a new feed grinder and the way the outfit works is really worth seeing. To my estimation my 10-20 kerosene tractor is without doubt the most powerful engine of its rating manufactured. At any rate I will put my tractor up to any one of its size and pull just as much or in fact more at less expense.

"Below is my report of plowing done by myself on my farm, 178 acres, taking 10 acres as my average in plowing on old ground:

Kerosene, 20 gallons, at 12 cents	$2.40
Gasoline, ½ gallon, at 30 cents	.15
Gas engine oil, ½ gallon, at 42 cents	.21
Gear oil, 1 gallon, at 9 cents	.09
Total fuel and lubricants	$2.85
My wages, at 40 cents per acre	4.00
	$6.85

"Wish to state that I also pulled a 5-foot harrow attached to plow. I changed plow shares every 30 acres. The following is my report on breaking:

Total acres, 88.
Average, 6 acres per day.

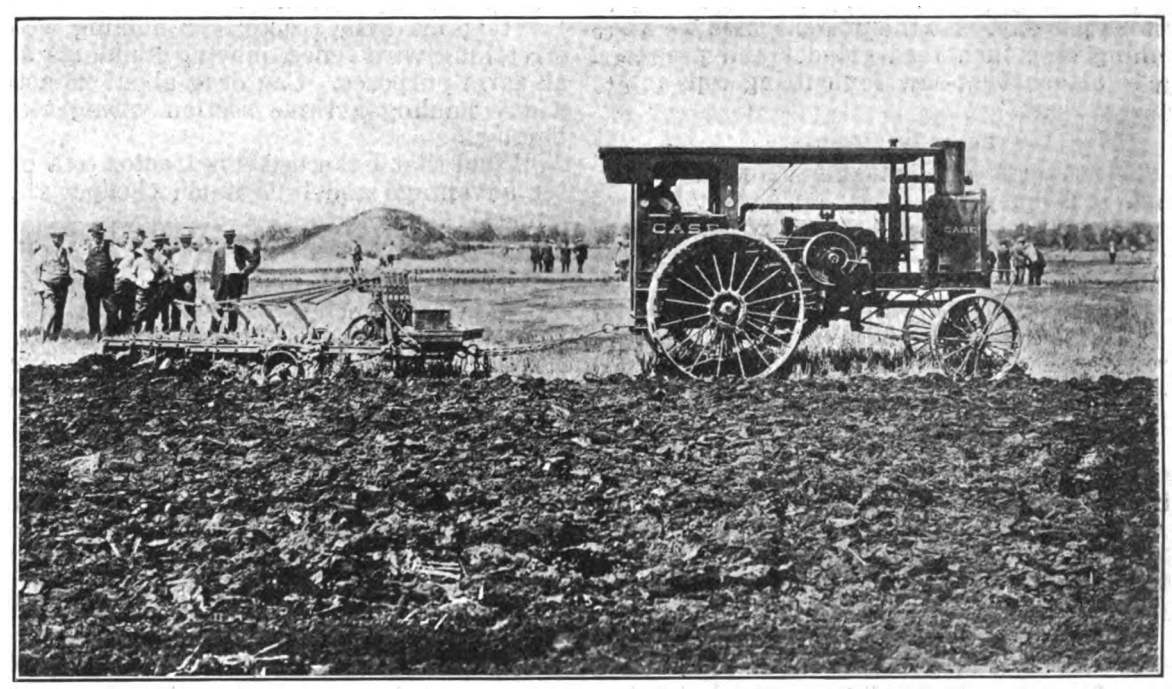
24 gallons at 12 cents per gallon	$2.88
½ gallon at 30 cents	.15
½ gallon of gas engine oil at 42 cents	.21
1 gallon gear oil at 9 cents	.09
Fuel and lubricants	$3.33
Wages, 40 cents per acre	2.40
Total expenses per 6 acres	$5.73

Changed plow shares every 20 acres."

Two Things at Once.

One point about a tractor that is well to keep firmly in mind is that it will do so many operations at one time, whereas with horses one would have to go back and cover the field several times. I will let a letter from C. A. Wagy & Son, Summit Station, Licking County, Ohio, explain this point. He has the following to say:

"Concerning our experience and the variety of work done with our tractor will state we find that it will handle a three-bottom 14-inch plow very nicely wherever the ground is in proper condition to be worked. However, we like to use two bottoms and attach a 16-inch disc harrow behind, which is the same as discing before and after plowing. It handles this load easily, plowing 8 inches deep. In this manner we have worked 5 acres in 9 hours at a cost of $1.10 per acre, counting gasoline, oil and time for one man at $3.00 per day. This field was a clover sod. In preparing ground for wheat, after being plowed we used a double disc harrow, followe



The Case 20-40 Is Shown Here Doing Its Big Bit in Breaking Heavy Land.

Digitized by Google

by a 10-foot three-plank drag, set at an angle and carrying a 200-pound weight; with an 800-pound roller attached behind these, the ground was put in fine condition at one operation for the drill.

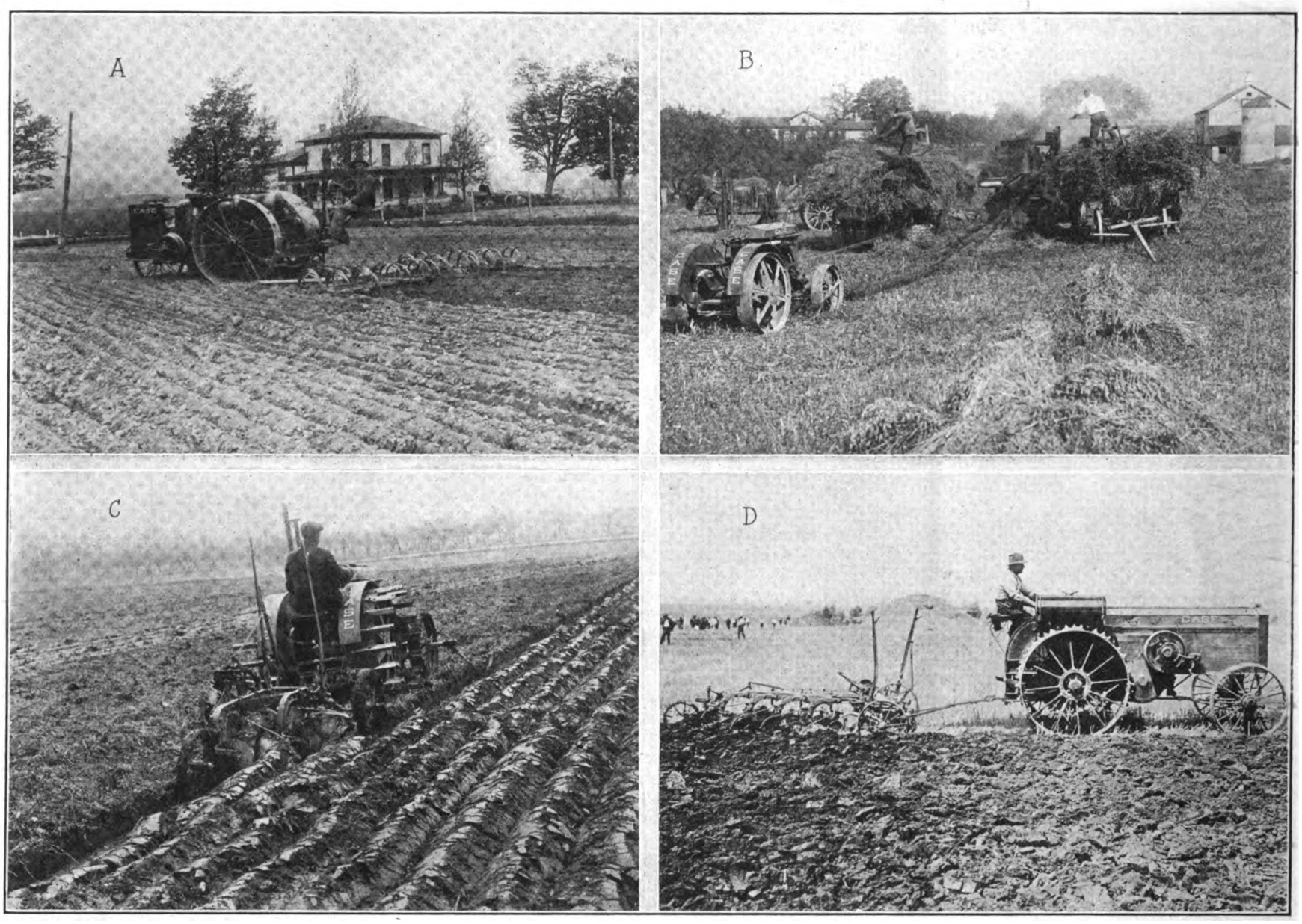
"Have also used my tractor for grading private road, using three plows set respectively 2, 4 and 6 inches deep. Where ground was very hard and dry we found it did the work without hesitation. For pulling the grader we found it excellent.

Mr. Herman Thiel, of Chesaning, has a small kerosene tractor which his 10-year-old son drives. I will quote his letter here in full:

"I purchased a 9-18 oil and gas tractor and a two-bottom 14-inch engine gang plow the first of May from our local dealer at Chesaning, Mich. I have plowed about 40 acres of land which consisted of June grass sod, heavy clay and sand. Tractor did this with perfect ease. Could plow about six acres per day and used only 16 gallons of kerosene. I

from a farmer in Illinois. He states that he can do anything with his tractor that can be done with horses. This letter is from Robert Turnbull, of Speer, Ill., under date of February 22, 1918. He says in part:

"We have used our 9-18 tractor for everything that we would use two, four, six or eight head of horses. We have cut oats with two binders, hauled manure with two spreaders, also hauled tile and feed at the rate of five or six ton loads.



Four Views of the Case Machines and What They Can Do. A, Case Model 10-20; B, Case 9-18; C, Case 9-18; and D, Case 12-25. The Machines Shown in Cuts B and C Are Type B.

"We have also used it for filling the silo, pulling a 16-inch cutter to its full capacit Have run hay press, baling at the rate 20 tons per day. At the present time we are running on 8-inch feed grinder and preparing to attach buzz-saw for cutting tops int furnace wood."

Tractor Is Tireless.

The tractor is a peak load machine, that is, when it is busy it is very busy. At these times many farmers have greatly increased their production by using their tractor day and night.

I have a letter from Edwin Stolson, of Fargo, N. D., in which he tells of making his "iron horse" do that which a "flesh and blood horse" could never do, that is work all the time. Mr. Stolson says in part:

"This spring I purchased a Case 20-40 kerosene tractor with which I have been breaking this spring at Van Hook, N. D. I ran it 45 days in all, 29 days day and night and 16 days during the days only. I have broken 900 acres and have recommendations from my customers of doing a good job.

"I have had only one little mishap, which was of very little importance. The engine runs from morning until night, or all the time if we wanted it to, without any trouble. Has lots of power, goes up and down hill pulling the plows the same depth. Have not tightened up a crank nor bearing yet. Am well pleased with my tractor."

Simplicity is an ideal toward which all manufacturers of tractors have been striving for years. The tractor of today is a comparatively simple machine to operate. In fact, during these war times many of them are being driven by women and young boys.

hauled a double disc on high speed and have a son who is 10 years old who runs the tractor when pulverizing.

"Have used the tractor for hauling wood, stretching wire fence, moving buildings and all farm purposes. Can drag about 28 acres a day hauling a three section spring tooth harrow.

"I find that I can use this tractor to a better advantage and it is much cheaper than horses."

On a Fruit Farm.

Tractors are not only being used on the large wheat ranches of the West but are now coming into general use on fruit growers' farms. I have a letter from the Sodus Fruit Farm, Sodus, N. Y., in which they tell of their tractor which covered more than enough to travel from New York to 'Frisco and back in one season. They are so pleased with their tractor that they intend to purchase more next year. Here is a part of the letter:

"In reference to our tractor it gives us great pleasure to be able to give you this information. We have used our tractor one whole season, sometimes fourteen hours per day, and always found her ready to turn the trick. It does more work for us than four teams can do and one man can operate the tractor and plow or drag, so consequently we can send three more men to Pershing.

"In fact, we like it so well that we are buying two more just like it this season. We are glad to say that our tractor has stood up under constant wear. This tractor covered 6,000 miles on our 550-acre farm during 1917 without making it necessary for us to spend one dollar for repairs."

In conclusion we quote just one more letter

"We have paid out ninety cents for repairs for one year's use."

Brother Blacksmiths, you have read these letters for yourselves and therefore you should realize that the farmers throughout the country are waking up; soon every large farmer will own a tractor for he cannot afford to be without it. Many farmers will own three or four tractors. Get into the game, sell tractors. If you are in a farming community you will have no more trouble selling tractors than the grocer has in disposing of sugar.

CARRIAGE BUILDERS EXHIBITION.

In Cincinnati, Ohio, from September 23rd to 27th, inclusive, the Carriage Builders' National Association will give their annual exhibition and hold the regular convention. The Executive Committee, the Members Association, and the Secretary, have arranged for the exhibition hall and for necessary details.

A ticket will be provided free to all members of the Association and also to all carriage, wagon, sleigh, automobile and motor car builders who are not members of the Association. Admission will be charged manufacturers and dealers in accessory goods who are not members of the Association. All exhibitors will be provided with badges for themselves and their attendants, and these badges will be delivered to them on the day when the exhibition opens. Anyone desiring to obtain space or apply for membership should address Mr. Henry McLear, Secretary, Mt. Vernon, New York.

Digitized by Google

Annealing, Forging, and Hardening High Speed Steel

This Kind of Steel Is Being Used Almost Universally and the Smith Should Become Familiar with It.

BY J. F. SPRINGER

The first thing to do is to get a clear idea of what is meant by high speed steel. The old time steel used for cutting metals on lathes and other machines is known as carbon tool steel. This steel is in general use and will probably not be entirely supplanted by the more recent article, because of its own peculiar good qualities.

The ordinary carbon tool steel is theoretically partly a compound and partly a mixture of just two things and no more than two things. These are iron and carbon. This is, however, only theoretically true. Practically, it is impossible to produce a commercial steel with no other ingredients. Other substances are present whether wanted or not. Sulphur, manganese, phosphorus, etc., are pretty sure to be there, some or all of them. They are regarded as impurities—things we would like to be rid of but can't be rid of.

High speed tool steel—or simply high speed steel—contains, in addition to carbon and iron, a third or a third and fourth substance. Frequently, one such other substance is tungsten—the same metal that is used in making certain recent varieties of electric bulbs, the tungsten being the filament. Tungsten is an ingredient that is wanted, and is not to be rated amongst the impurities. High speed steel, just like carbon steel, will contain very small percentages of substances not wanted, but of which it is impossible to be rid.

Test for Tungsten.

It is very easy to tell whether a piece of steel contains tungsten or not. All we have to do is to hold a specimen against a rotating emery wheel. If red sparks are produced, the steel contains tungsten; if there are no red sparks, there is no substantial percentage of tungsten present. However, we must not conclude that a tungsten steel is necessarily a high speed steel. Probably we are justified in saying that in nine cases out of ten, a tungsten steel will be a high speed steel; but we must remember the one case out of ten also.

In high speed steels in general, there is usually or often a percentage of chromium. This material produces the property of air hardening.

Air hardening is a notable quality of high speed steels. A chromium steel heated up to light red or higher will usually harden if simply allowed to cool off in the air. A steel that hardens in this way is often called a self-hardening steel.

From what has now been said, it will be clear that high speed steel differs from the ordinary article in respect to the substances contained in it. The blacksmith may learn from this fact that it is impossible to make a piece of carbon steel into high speed steel by simply heating and quenching it differently. The difference between the two is deeper than that.

High speed steel gets its name from the fact that it will cut metal on a lathe or other machine at a high rate of speed. The nose of the tool may get hot, may in fact get to a low red or nearly that hot, and it will still keep on cutting the metal. One would expect the temper to be all gone and the tool useless. But such is not the case. This is the reason that this steel may be used with high rates of speed. The friction which increases with speed means that the tool gets hotter and hotter. If the tool is of ordinary carbon steel, the speed, friction and consequent heat will soon become great enough to put the tool out of use. If the tool is of high speed steel, we may increase the speed, friction and consequent heat to a still further degree without spoiling the tool.

We have in all this the reason why high speed steel is popular. We are able to do more work in a given time. This results in freeing the lathe or other machine for other work and cuts down the cost of labor. On the other hand, high speed steel is expensive. The machine must often be heavier to stand the work and this requires a greater investment. There are advantages and disadvantages. Nevertheless, machine people have been and are deciding in favor of using high speed steel to a very large extent. It hardly can be said that it is driving carbon steel off the market. Each steel has its proper field. This is becoming understood. We shall probably continue to have tools of both kinds. It is, consequently, up to the blacksmith to forge, harden and temper both kinds. He has been working with the ordinary carbon steel all his working life; and presumably knows a good deal about it. High speed steel, on the other hand, is something comparatively new; so that it will be well for him to study up on it.

High speed steel is in great use for lathe tools, planer tools, shaper tools, milling machine tools, drill press tools, etc. It is even finding its way into use on machines which drill holes in rock for the reception of dynamite or other explosive. The blacksmith working for a machine shop, or doing jobs for such shop, or working for mines, quarries and other concerns engaged in blasting rock, is apt to have high speed steel brought to him. Even a blacksmith doing general work may have to accept or refuse work connected with high speed steel. The smith would do well to learn all he can, whenever he can, about this steel.

Forging High Speed Steel.

The forging of high speed steel is quite important. Some tools are made of this steel and nothing else. That is to say, the whole tool—shank and nose—is made from a bar

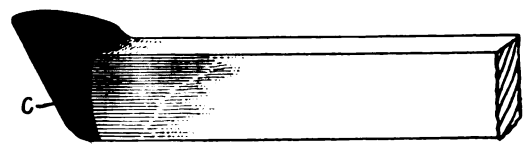


Fig. 1—A Lathe Tool with a Piece of High Speed Steel Welded to It at C.

of this material. But the very expensiveness of this steel has driven men to see what they could do in the way of reducing the quantity. After all is said and done, the peculiar qualities of high speed steel are chiefly useful at and around the cutting point. Who cares what the shank is made of, so it does its proper work of holding the tool nose to its job?

One thing that has been done is to make tool holders. These are essentially shanks that are so formed that a small piece of high speed steel may be held securely at one end. This small piece may be taken out when worn and replaced by another. The whole thing—holder and small piece for cutting—are the equivalent of the ordinary tool made from a single piece of the bar. The amount of high speed steel is wonderfully reduced. Naturally, it is the blacksmith's job to forge and harden the small pieces whenever they need it.

Another method of doing pretty much the same thing is to weld a small piece of high speed steel to a shank of ordinary steel as in Fig. 1. This operation may itself be done in two ways: The welding may be done along ordinary lines or it may be done by means of the oxy-acetylene blowpipe. But the smith must know how to do the work.

One of the first things to learn is to use only annealed stock. High speed steel can be bought ready annealed from the maker. One authority says: "The hard bars can of course be forged; but even in this case it is much better to use annealed stock, for several reasons, the most important of which is that annealing relieves the internal strains set up in hammering or rolling and decreases the liability to future flaws or cracks. Also, the structure of the steel becomes uniform, homogeneous, and tenacious; and according to the testimony of some, its life is increased." If the blacksmith is, unfortunately, in the position of having to accept unannealed stock, either because it was bought by some one else, or for some other reason beyond his control, then he is up against the problem of annealing the material himself, if he wants the best results.

Annealing High Speed Steel.

The annealing is not necessarily difficult. A muffle oven is desirable. The high speed steel which is to be annealed is put in and the temperatre brought up to 1,500 degrees Fahrenheit. That is, the heat is brought up to a light red, but not to orange. Let the heating be done gradually so as to make sure that one part is not much hotter than another. If convenient, it will be well to let the oven, the fire and the steel all cool off together. The cooling should go on slowly. It is understood that the annealing of high speed steel should occupy from twelve to eighteen hours.

Here is a method of annealing recommended by high authority. Secure an iron box or a piece of iron pipe. The steel to be annealed is to be packed in this receptacle, the packing material being any one of the following three: powdered charcoal, fine dry lime or mica. No piece of high speed steel should be allowed to come into contact with the iron wall of the receptacle. One-half inch of the packing material should protect the work on all sides from such contact.

It will not be necessary to keep one piece of high speed steel from contact with other pieces, but only from contact with the iron. If the box has a suitable cap, put it on. There should be no cracks. In fact, the joint between cap and box should be air tight. If the ordinary way of arranging the cap is insufficient to produce this degree of tightness, then we may use a mortar made of fire clay and effect a good tight seal.

If a piece of pipe is used instead of a box, some method should be devised to cover the ends and make them air tight. The receptacle with the work inside is now heated up until a full red heat is obtained. This will require from three to six hours. The heating is to be done slowly. When the full red is obtained, it should be kept hot for a period from two to eight hours.

If the high speed steel in the shop is in the form of annealed bars, the smith should ordinarily have little or no difficulty in breaking off a piece of the length required. He simply nicks the bar at the proper point and breaks the piece off. But breaking high speed steel is not considered a very good thing to do. "Breaking, however, is not advisable, for it is likely to cause a disarrangement of the structure of the steel near the fracture, sufficient to damage the tool at that place. Frequently fine cracks are started which later develop and eventually spoil the tool."

Instead of breaking, it will be well to heat and then cut off in the usual way. No one but an expert should attempt to nick and break, if the steel is of heavy section. It may often be convenient to forge the end of the bar and afterwards cut off to proper length.

(To Be Continued)

War Savings Stamps help provide that "Force, force to the utmost, force without stint or limit, the righteous and triumphant force which shall make right the law of the world," which President Wilson says must be used against our enemies.

Do not forget that War Savings Stamps are not for children only. Most of the squandering is done by the grown-ups.

Digitized by Google

THE BLACKSMITH & WHEELWRIGHT

The Pioneer Journal of Its Class in the World.

Member of the Audit Bureau of Circulations.

PUBLISHED MONTHLY BY

M. T. RICHARDSON COMPANY,

71-73 MURRAY STREET, NEW YORK.

POST OFFICE BOX, 654. TELEPHONE—7377-7378 Barclay.

CHICAGO OFFICE, 608 SOUTH DEARBORN STREET.

Entered as second-class matter at the Post Office in New York City.

M. T. RICHARDSON, President and Treasurer — F. R. WHITTEN, Secretary

M. T. RICHARDSON, Editor

FRANK L. AVERY, Managing Editor

F. R. WHITTEN, Advertising Manager — H. F. LUDINGTON, Western Representative

GEO. A. SMITH, Eastern Representative

FRANKLIN MYERS, Art and Copy Dept.

FOREIGN AGENTS:

NEW ZEALAND

MR. R. HILL, Matlock House, Davenport, Auckland, New Zealand.

GREAT BRITAIN

ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance.....$1.00
One Copy, six months, in advance.....60 cents
Single Number.....10 cents
Canadian subscriptions.....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English Money.

Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

ADVERTISING RATES SUPPLIED ON APPLICATION.

SPECIAL NOTICE

Subscribers failing to receive their magazine regularly will favor us by giving us notification to that effect.

CHANGE OF ADDRESS

Subscribers who desire the address of their paper changed should send us the old as well as the new address.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

If You Want Your Capital To Grow, Keep It In Circulation.

KEEP your money in circulation. There is a big lesson wrapped up in this sentence. If every person in the United States puts his money away in a stocking or hides it under their pillow, spending it only for necessities of life, we will soon find that the whole country is upset. Money is worthless unless it is circulated. Money earns interest only while it is being used. You may say that you can put your money in a bank and get interest from it without spending it except for necessities. But remember this fact that the bank is investing your money in railroad bonds, mortgages, or stock of some sort. You may live in a small village and some morning wake up to find that the bank has failed. Investigation may show that the bank holds considerable stock in the small manufacturing plant in the town which has been forced to the wall because of the fact that no one will buy its products. If you do not go into a bank and do something foolish, things will go on as usual. Save all the money you can and invest it in war saving stamps or Liberty Bonds. Don't be penurious.

Read This Number Through Three Times, Then Think It Over.

BROTHER BLACKSMITHS: We want you to look over the Blacksmith and Wheelwright three times this month. First, we want you to read it through and get new ideas from it. Then we want you to go over it carefully again and learn what you can from its pages of instruction. Finally, look it over again and see just what part you are interested in most. Undoubtedly there will be some particular department which will interest you more than the others. You may find in this issue one article which saves you the price of subscription in money. One of your brothers from another state may bring forward a suggestion that lifts your head above water, so to speak. Don't you think that you owe something to your brother? You have willingly paid the price of your subscription, but that does not mean you have settled the debt which you owe him. There is one way and only one in which you can show your appreciation. Write us a letter or give us some suggestion which you think will benefit him. Possibly you know how to shoe a horse a certain way. Possibly you know some particular little kink for putting on tires. Possibly you have a special tool which you have made yourself which is of interest. Send us a letter or a sketch and we will publish it in the magazine. In fact we will do more than this. We will send you our book entitled "Steel Working and Tool Dressing." Don't you think this is a pretty good bargain?

Every Resident In This Country Owes America His Allegiance.

PATRIOTISM is a great thing and every person who has lived in America, even one year, owes America something. Every person who was born in America owes the country still more. Everyone living in this country owes the country more than they can ever repay. There is no country in the world today where living is as easy as it is here. Our taxes are low in comparison with many of the countries, while our wages are high. It is to keep these conditions the best in the world that we are fighting for today. We are trying to prevent the Hun from forcing his kultur upon us. If he is civilized we don't want his kind of civilization. We want to feel that each one of us is as good as anyone else. We want to feel that we were all born free and equal. We do not admit, nor will we ever, that there is one man in the country capable of ruling us all, whose brain power is as great as that of all the people in the country combined. We don't want to give any one man the chance to put his selfish interests above the interests of the nation and for that reason we are fighting the Kaiser. The Kaiser stands for despotism. His word is law in German. The individual is nothing more or less than a stepping stone for the Kaiser's foot. Individualism is smothered and individual prosperity is impossible. Germans in Germany are no better than animals in this country. They are slaves to the Royal Family. Let us all rally round the flag as we have done in the past and fight for freedom. Let us not admit that there is the slightest possibility that we will lose the war. We have the right on our side and we must conquer at any cost. Do your part in turning the black cloud inside out and don't allow anyone to be a calamity howler near you.

Order Your Coal Now So That Dealers May Plan For the Future.

THE outlook at the present time seems to indicate that there will be a shortage of coal this winter and unless we are careful, we will find ourselves in serious trouble. There is only one way to anticipate the shortage of coal and that is to order coal NOW. Don't make a mistake and order twice as much as you expect to need for the winter. On the other hand don't make a mistake and order only half enough. If you have room to store all of your winter's coal, by all means do so. The coal dealers are doing all in their power to equalize the distribution of coal at the present time. If they know just how much is required they can plan out ahead of time just how to distribute it. If you and your neighbor and his neighbor all wait until next fall to put in your order, you may find that you cannot obtain coal at all. There is another mistake which may be made and that is to go into a panic and order three or four times as much coal as you expect to use. Every pound of coal that you order over and above what you intend to use means that you are robbing someone else of their proportion. It means also that you are taxing the railroads needlessly. It is an unpatriotic act and if conditions appear serious during the winter it is very possible that you will lose a large proportion of your coal because the Government has no sympathy with those selfish persons who try to get more than they deserve. If you wait until next fall to buy your coal, and you are forced to go without fire this coming winter you have no one to blame but yourself.

Farmers Urged To Order Their Fall Fertilizers Early.

THE United States Department of Agriculture issues the following:

Farmers are urged by the United States Department of Agriculture to place orders at once for fertilizer needed for fall wheat. It is very important, according to W. W. Mein, assistant to the Secretary of Agriculture, in charge of the licensing of fertilizer concerns under the food-control act, that dealers and manufacturers know farmers' needs as soon as possible, so that orders can be combined and car space used to the best advantage. Transportation difficulties require that freight cars be loaded to their rated capacity. Delay in ordering, it is said, may result in a repetition of last spring's experience, when many farmers failed to receive their mixed fertilizer and acid phosphate until after planting time.

In Order To Cultivate Land the Farmer Must Use Tractors.

PRACTICALLY every farmer in the country is confronted by a serious state of affairs. The Government is calling upon him to cultivate all of his land, yet at the same time the Government is taking away his labor. Upon first appearances this would seem unjust, but it is not. There is absolutely no reason why a farmer should have a great number of hired men working for him. The hired men can do war work in the factories where hand work is necessary. The farmer can use machinery upon his farm and replace men and horses. There is no excuse today for the farmer who leaves uncultivated a part of his land. When he does this he is a miser. He is putting his capital in the ground and then failing to get the interest on his money. This is both foolish and inexcusable. There is no reason why he should not invest in farming machinery, particularly in trucks and tractors. A tractor will do the work of four or five horses and two or three men. It will do it in less time and at a lower cost. The tractor requires fuel only while it is being used. During the winter it costs nothing. It can be placed in the shed and will require no attention. Horses on the other hand require food daily, whether they work or not. An idle horse consumes as much and sometimes more food than he does when he is working. If one were to make comparison between the costs of tractors or tractors and horses they should average the cost for a full year, not for the two or three months in which the horses are being used the most. The farmer today requires awakening and we look to the blacksmiths to give him the jolt that will make him open his eyes. Do your best, brother blacksmiths, to sell tractors. There is big money in these machines. In addition to the commission which you receive upon the sale of the tractor, remember that if you care to you can do practically all of the repair work. Make yourself an authority on tractors. Write to the manufacturers and study them all that you can. Don't be afraid to "try your hand" on repairing them, for if you are any sort of a blacksmith you must be a good mechanic. Remember the more things you can do the more chance there is for you to tide over the dull seasons of the year.

We Must Save Money But We Must Not Stifle the Industries.

THE President has asked every loyal American to do his part in conserving necessary articles and to do without all possible luxuries. Let us not take this advice too literally. We must not hoard our money, nor must we allow all of the industries to perish.

Suppose for instance, every person in the United States decides that he or she will not

Digitized by Google

purchase any more candy. Candy is entirely unnecessary as everyone will admit. It is one of the so-called luxuries. If no one purchased candy all of the candy manufacturing plants would be forced to close down. This would mean an enormous loss to the country in many ways. The candy manufacturers could not pay taxes. They as well as the country would lose money and their property and machinery and many thousands of working people would be thrown out of their positions. It is true that these working people might be able to get positions for war work, but it would not be true in every case. Other positions are not obtainable at a moment's notice, even in these times. In many cases these people would be obliged to work for a much lower salary than they are getting at present. This would mean that they could not afford to purchase Liberty Bonds or invest in war savings. Let us find out now just what the gain would be. We might say that these people who do not spend their money for candy would invest it in bonds or war savings. Are we sure of this, however. Would not these people invest just as much money in bonds and war saving stamps anyway? We feel that they would. Every person in the country, or at least every loyal person, is doing his best and furnishing as much money as he can. We cannot live happily or do our work efficiently without some luxuries and some amusement. This has been proven by the fact that our soldiers in France fight better when they have tobacco and when they can attend moving picture shows and theatres. At the present time every industry dovetails into every other industry. Our manufacturing plants might be likened to a number of dominoes placed on end center to each other. One goes down and affects the next one to it. That one also follows and presently the full number have toppled over.



We want to make this department one of the biggest in the magazine, but we cannot do it without the help of our subscribers. It is carried on by the readers who may have some interesting ideas or practical suggestions that they are willing to give to our other readers. We feel that it is one of the most interesting parts of the magazine, and we know that many of our readers get a great deal of help from the suggestions which they see in this department.

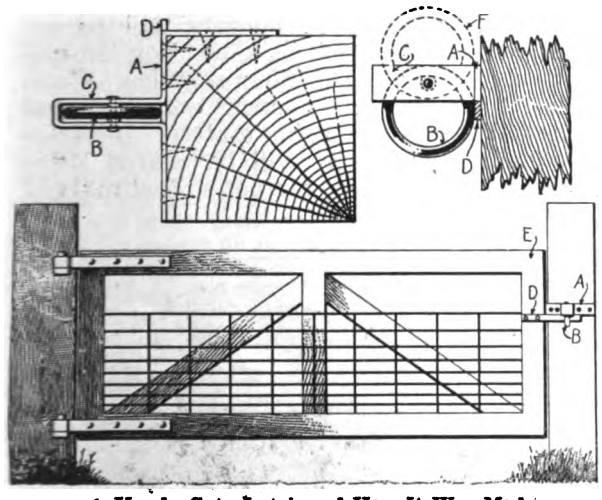
Remember that someone must send in the suggestions before you can read them. Don't you think, therefore, that you should do your part and send us a letter? Don't worry if your sketches are rough or if your English may be poor. We will look out for that. If your letter is printed we will be glad to send you our book entitled "Steel Working and Tool Dressing."

A Handy Gate Latch.

From J. R. Byrd, Virginia.—I am enclosing a sketch of a gate fastener or latch which I made, and if you can understand it, you may use it in the Blacksmith and Wheelwright, as it may be a benefit to some of the readers.

We are using these latches on three of our gates on our farm, and as the gate sags down, the latch may be moved downward, so that the latch on the gate will just go under the bow and ring of the fastener.

The portion A can be made to fit any size post, and the larger the ring B, the longer the bow C. This fastener is made for a gate to hang inside the posts. I use 1½ inch by



A Handy Gate Latch and How It Was Made.

10 wood screws to fasten it to the post and two 5/16-inch bolts to fasten the latch D to the gate.

To open the gate the ring is raised as shown in the dotted line F, and the gate may then be opened. To close it just give it a push and the latch on the gate will raise the ring, then the ring will drop back into place, locking the gate.

Where the rivet passes through the bow I usually insert a piece of ½-inch pipe. The pipe holds the bow open and strengthens it.

Welding Boiler Flues.

From W. S. Owen, South Dakota.—In answer to the inquiry of how to weld boiler flues, will say in the first place that this can be done with a common blacksmith's forge. It is a big job if you have not a power blower, otherwise one smith and a helper are enough.

First see that the flue is sound and clean, next cut the end to be welded off square, then cut the tip or piece to be welded on, square and hammer it to a short bevel edge. Bevel inward, then bevel the tip outward so that you get about one-half an inch top, then place your swedge block or any piece of iron back of your fire for a butt block.

Then heat both pieces and drive them together tight, and place them in the fire with the end of tip against the butting block, then slowly bring up to a welding heat and use plenty of powdered borax for a flux.

When you get a welding heat have the helper strike on the long end of flue moderately with a two or three pound hand hammer, so as to practically make a jump weld, and at the same time slowly turn the flue around in the fire and tip the edges of the top down with a light long-handled hammer of about four ounces.

I have welded hundreds of flues this way and never had a failure. Care must be taken not to overheat or underheat. Just a good sparkling light, yellow heat and then strike hard enough with the light hand hammer to dent the flue, but don't strike too hard so as to kink or buckle the flue, as they are quite thin and when at a welding heat they will dent or buckle pretty easily. The above method, if closely followed, will always prove a success on any size of flue. The tip should not be more than six inches long, but four inches will do.

If you have an oxy-acetylene machine get a long box of 2 x 2 angle steel and just cut the flue off with a roller pipe cutter, and the tips the same way, and lay the ends together in the trough of an angle steel bar and throw your stream of fire in the groove made by the cutting rollers.

When the weld commences to catch just fill your groove full with your welding rod and slowly turn the flue until you get clean around and the job is done, better and quicker than any other method on earth, I believe. A 2½ inch flue can be welded in one minute after you first apply the torch, and the channel or angle steel trough will keep them straight and you can weld the center of the flue or any other length that you may desire from two inches up.

I would advise the use of powdered borax in this work in the absence of a good steel welding flux made especially for the welding outfits. Said flux can be had from most dealers in these goods.

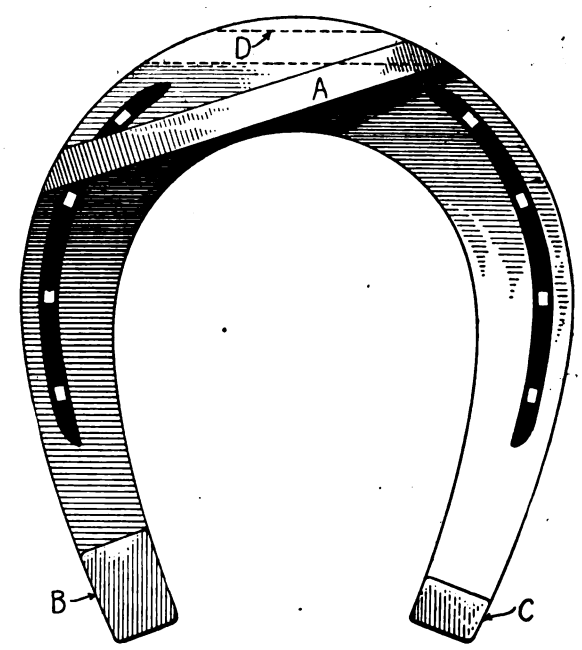
Stock for an Ellipse.

From Ralph Bradley, Kansas.—To measure length of stock for an ellipse, my method is: Diameter plus one thickness of stock squared, multiplied by 3.1416, divided by 2, equals half of circumference or one end. Apply this method to both ends and add length of two straight sides.

To bend angle iron—Heat the angle to the bent edgewise in a small fire (the smaller the circle the smaller the fire) to control the length each heat. Heating the flange to be bent flatwise as little as possible, and use small hammer, anvil and levelling block; size of circle being struck on block. This is a slow operation and cannot be hurried successfully.

A Shoe That Will Wear Level.

From Harry Babcock, New York.—Last summer I was called upon to shoe a livery stable horse that wore his shoes out upon the outside toe and heel, but didn't wear out the inside of the shoe at all. For the benefit



Showing How to Make a Shoe That Will Wear.

of my blacksmith brothers I am sending a sketch of the shoe, showing the way I shod the horse.

The illustration shows the right front shoe. A, shows the position in which I placed the toe calk, B is the block heel, C is a straight heel a little higher than the block heel. Do not make this straight heel too high, however. D, shows where the toe calk would be placed on an ordinary shoe.

To give credit where credit is due, this is one of the many things I learned at that great institution, the Cornell School, at Ithaca, N. Y., and I could write many more.

You will notice that I set the toe calk the same as on any shoe, at one end; making it square across the toe of the shoe at first, then I swung it toward the heel, until the end of the nib was between the toe nail hole and the second nail hole.

To do this properly, the toe calk must be made a lot longer than ordinarily, so as to reach to the edge of the shoe.

Your common sense will tell you that you cannot buy now all the things you bought before we had a war to win. Your buying must be restricted and your savings invested in War Savings Stamps.

The Government needs your money; you need the stamps.

Digitized by Google

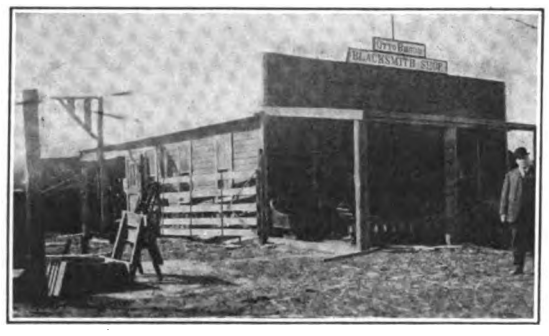
We Still Have Photographs Entered in the Prize Contest

We still have in this office a number of photographs which have not as yet appeared in the Prize Contest, so if yours is one of these don't worry, as all the pictures which we received prior to June 1st will appear in the magazine and the prizes will not be announced until every one has seen all of the pictures.

This contest we feel has been very interesting and has, to a certain extent, brought together many of our friends. A picture from far-off California is always interesting to a reader on the Atlantic Coast. If you have not sent in a photograph, send one in today and we will hold it for our next contest, which we hope to start in a few months.

Prize Photo No. 31.

From Otto Brodd, Iowa.—I am sending you a photo of my shop, which I built last year. This shop measures 26 by 46 feet and is fully equipped with up-to-date machinery. In it there are a number of machines, a trip-



Outside of Mr. Brodd's Smith Shop.

hammer, an emery wheel, a saw, disc sharpener, corn grinder, a pump, and a blower, all run by a nine horsepower "Ingeco" gasoline engine.

In addition to the regular equipment I have an electric welding outfit with which I do a good business. I have been in the business here for over twenty years and at the present time have more work than I can do.

I have been a reader of The Blacksmith and Wheelwright and find many useful hints in it.

Prize Photo No. 32.

From H. H. Hubbard, New York.—I have been very much interested in the different pictures and also what the boys have to say. I started to learn my trade in 1888 and was then a husky lad of seventeen. This was in the Rocky Mountains at Pinos Altos, New Mexico. I am now 47 years old, so you can see that I have driven some nails in my time.

I began my apprenticeship with the firm of Shutes & Meyers. This shop was located between two saloons, and it was no unusual thing to hear one shooting up the town, as those were wild times in that part of the country.

I worked faithfully until I had finished a three years' apprenticeship and from that time on I have worked in many different places and in all kinds of shops, getting different men's ideas in regard to horseshoeing. I had a man ask me the other day why I had such good success shoeing colts.

My answer was this: "When a man brings a colt to my shop, after the colt gets inside and has had ample time to look around and sees nothing that will hurt him, I go up to the colt and speak to him kindly and ask him if he came to get shod. I rub him on the nose and over his shoulder and down along his back, then reach down and rub his leg good and hard, and in a few seconds the colt will pick up his foot. I will pat the bottom of his foot and put it down and then go to the next one until I have gone around him. I then start with the foot I first picked up, pare it, fit the shoe and nail it on."

I never use ropes or whips on colts. After I get all through I pet the colt and tell him to come again. It's generally the case when a colt goes by the shop that I have shod the first time to want to stop and come in.

I have shod a good many colts with no one around but myself and always got along all right. Kindness will conquer quicker than harshness.

This picture was taken after the busy part of the day was over and what rigs were there were moved to get a good view of the shop.

My motto is "To speak well of my neighbors and keep a clean, respectable place of business."

The boy in the picture is my side partner, not my own, but a boy across the way, and is generally on the job.

Prize Photo No. 33.

From H. A. Sommars, Iowa.—I wish you would publish this letter in the Blacksmith and Wheelwright and enter the enclosed pictures of my shop in the Prize Photograph Contest.

As you will see by the picture, I am a young man, being but 34 years of age. My father



Mr. Sommars in Front of His Shop.

is 73 years old and still working. I do all kinds of blacksmithing as well as wagon work. I also do horseshoeing and repair work on automobiles as well as tire repair work.

I have an S. H. Power International upright engine, two Royal Chief forges, one for hand, the other for power, one turning lathe, a Little Wonder disc sharpener, one drill with two speeds, and a saw.

I make practically all of my own doubletrees and cut wood directly from the log. The saw and the turning lathe came from the junk pile. I can saw a log 12 feet long in the machine. Here are my prices for horseshoeing. Shoes reset, 35 cents each; common shoes, 60 cents each; steel plugs, 75 cents each; Never Slip, 75 cents each.

I read your paper regularly and could not get along without it.

Prize Photo No. 34.

From Julius Gattsch, California.—I want to enter some photographs of my shop in the prize contest and so am sending them herewith, you may use those that you think are best.

The shop measures 32 by 40 feet and has three large sliding doors, as well as three windows. I have an electric blower and a 2½ horsepower gasoline engine for driving a drill and other machinery.

Most of my work at present is plow work, but last year I built twelve five-gang plows for use with caterpillar tractors.

Prize Photo No. 35.

From Fred A. Coughlan, Pennsylvania.—I am enclosing a photograph of my shop, which I wish you would enter in the prize



A View of the Busy Shop of Mr. Coughlan.

contest. I think a great deal of the Blacksmith and Wheelwright because I find so many helpful hints in it—the January number alone had one article which repaid me for my subscription price; I refer to Brother Hansen's "Tire Tool."

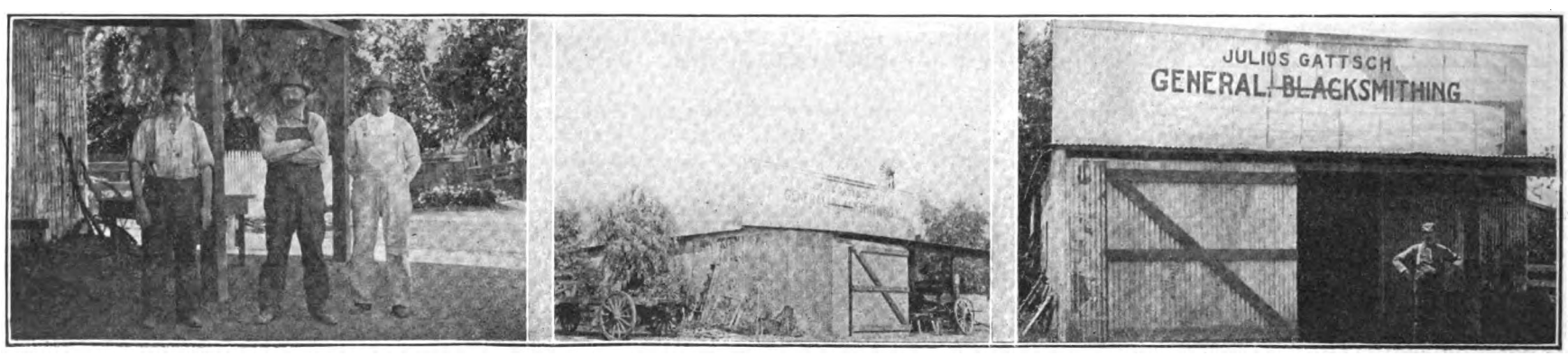
Canada Compels Hoarders to Disgorge.

The Canadian Food Board has made a quiet investigation of many cases of flour hoarding, and has issued a warning that all above the amount needed for 15 days' sup-

Mr. H. H. Hubbard's Smith Shop.

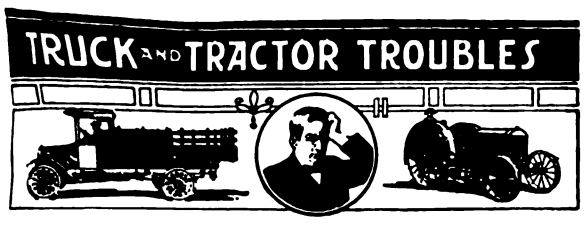
ply must be returned to the source from which it was received. A typical case of this sort was given wide notice in Ontario last week. This householder had purchased 200 bags of flour at $6.50 per bag, and upon discovery of this large supply was compelled to return the flour to his dealer at the present market price, which was considerably under what he paid, and pocket the loss himself. As one Canadian paper said, "Needless to say, no sympathy is felt anywhere for this food hog. If anything, his punishment is too light."

This same paper, commenting editorially upon this case, said, "Canada is determined that no one within her borders will be allowed to place himself in a position of advantage with respect to flour supplies. Canadians must take their chances with the rest of the allied peoples in this matter. If there is to be a shortage it will be shared here equally with those who are not so fortunately placed."



Showing Julius Gattsch and His Two Helpers Together With Two Views of His Blacksmith Shop.

Digitized by Google



Two-Wheel Trailer Car.

From C. P. J., Canada.—I would like to have some one of your blacksmith readers send me the drawings or sketches of a good trailer for an automobile. A two-wheel type is preferable. How should the trailer be fitted or hitched to the automobile, to the frame or axle? I want to build a car that will carry about 800 pounds.

Wants Suggestions on Radiator Repairs.

From F. R. Wineberger, New York.—Will some of my brothers give me some hints regarding radiator repair work? What kind of soldering flux should I used? How does one get a soldering iron inside the radiator? What kind of a soldering iron can I use? I will be very grateful if anyone will give me some pointers on this work.

How Can I Make an Engine-Stand?

From an Illinois Reader.—I wish that some of my brothers who have gone into the automobile business would tell me how to make an engine-stand. What I want is a sketch or drawing of a device to which I can clamp a Ford or other engine and turn the engine over or sidewise as I please, so that I won't be obliged to crawl beneath the car when I want to repair the engine.

An Air Strainer for a Tractor.

From J. L. McCormick, Nebraska.—I am very glad to see that you are starting a truck and tractor trouble department; it is just what we blacksmiths need, for we must begin to do lots of truck and tractor repair work.

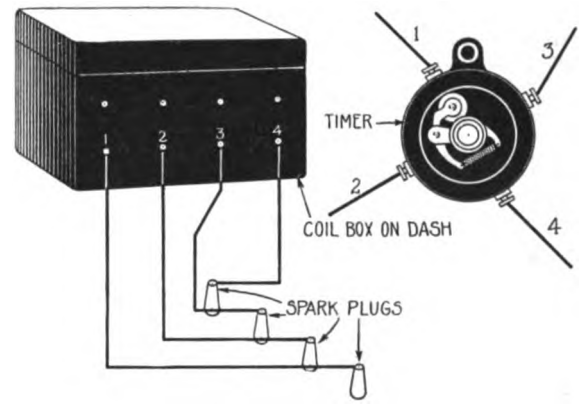
In this town where I live there are a number of tractors and some of them have open carburetors. By this I mean that there is no means whereby the air entering the carburetor can be strained to remove the dirt and dust. I wonder if any of my brothers have designed an air strainer which works all right? If any of your readers can give me a rough sketch to work with I may be able to make some of these filters and sell them to the tractor owners. for I often hear them complain that the dust is ruining the cylinders and bearings.

Over Oiling in Ford Engine.

From A. E. Thomas, Wisconsin.—I have in my shop a Ford engine which is causing a lot of bother. Nothing I can do seems to prevent the oil from leaking into the first two cylinders. I have put in new rings and bored some holes in the pistons as instructed in various text books but the engine still causes trouble. Is there any way to prevent this oil leakage?

Ford Wiring.

From L. L. Ott, California.—I wish that you would call Mr. Myers' attention to this sketch, showing how to wire a Ford car ignition system. The timer wire for number four should be longer than number three, number three longer than number two, and so on, and all connected in order with the coils. The wires from the coil should go to the timer



Showing How to Wire a Ford Car.

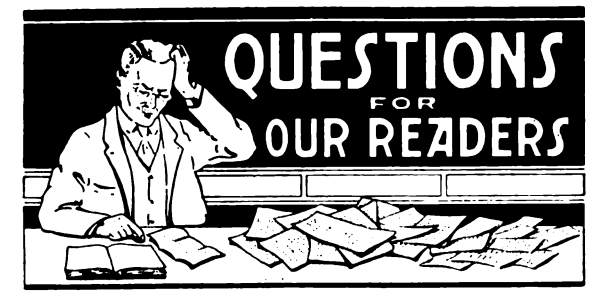
and be connected in the order 1-2-4-3.

I am glad to see Mr. Myers tackle the game, and if I can be of any assistance to him, let me know.

An Answer for Mr. Oetting.

From R. H. Rad, North Dakota.—In regard to Mr. Oetting's question in the May number, will say that his trouble is caused by the oil in the crank case working up past the rings of the piston in such quantities that it can not be consumed. If the walls of the cylinder are in fairly good condition this can be stopped.

First remove the piston and remove the rings. Place cylinders in lathe chuck and cut a groove about an inch and a half from bottom of piston 3/16 inches wide. Now bore six holes 1/8 inch in diameter in the groove space around cylinder. Next place two new rings fitted to cylinder and a leak-proof at the top. It's possible these rings will have to be oversized on account of age of motor.



Somehow or other, during the summer months, our blacksmith readers do not seem to ask many questions. Perhaps it is because they are too busy to spend their time in writing a letter, or perhaps they hope to solve their problems for themselves. This may not always be a good plan. Everyone is apt to make a mistake, and mistakes are costly. If you have any problem or question puzzling you, sit down and write us about it.

The letter will be published in this department and the answer in our Work Shop Experience Department. In this way one is able to get the opinion of his blacksmith brother from other parts of the country. Surely it is worth the small effort and the cost of the three-cent stamp. This service is free to all of our readers.

What is a Scotch Horse Shoe?

From F. C. Moore, Oregon. Will some kind brother smith please explain how a Scottish horseshoe is made?

What About Substitutes for Coal?

From H. A. O'Neil, Vermont.—Last winter, for a long time, we had rather a big job to obtain suitable coal for our shops and forges, and as I believe in being prepared I would like to install an oil or gas attachment to my forge, if such a thing is possible. Have any of the other blacksmiths in the country tried such a device, and with what results? If so, I wish that they would write me.

ADVANCE SCIENCE.

"You scientific fellers know a heap, I s'pose; but I'll bet you can't tell me how to save that big pile of pertaters," said the farmer. "The rot's got into 'em."

"N—o. They are past saving," observed the scientist.

"They are, eh? Well, I'm goin' to eat them pertaters."

"Impossible."

"No, it ain't. I'll feed the pigs on 'em, and then eat the pigs."—Country Gentleman.



Anthony Rocker Dumping Body.

Our readers who are interested in special bodies for carrying sand, rock, coal ashes, etc., should investigate the Anthony Dump Rocker Dumping Body manufactured by the Anthony Co., Inc., Streator, Ill. These bodies are designed for application to Ford machines which have been adopted to carry loads of one ton or over. The body is automatic in action, the dumping being accomplished simply by releasing the latch. The centre of gravity of the load automatically consists in tipping the body backward. Upon disposal of the load, the body is instantly restored to the horizontal position. It is possible to arrest the body movement at any angle and hold the body in that position.

In the same manner the body movement may be so retarded that the final dump is accomplished easily and without excessive strain to any of the parts. In connection with this feature, road material, such as crushed rock, gravel, cinders, can be spread by holding the body at the proper angle and opening the tail-gate a certain amount. The full angle of dumping is greater than that secured in many bodies and varies from 48 to 50 degrees. For accomplishing any of the operations, the operator need not leave his seat. The body is well designed and the weight is ahead of the rear axle.

About Scars on Horses.

There are thousands of horses throughout the country with scars whose owners would like to have scars removed and the appearance and value of the animal increased. It is not generally known that it is possible to remove an old scar tissue and heal with hair on and leave no blemish. Absorbine, however, will do the work, and detailed instructions for effecting cure are given in pamphlet "How To Remove Blemishes" which is packed with every bottle of Absorbine or will be mailed you postpaid upon request. Mr. L. C. Anderson of Maysville, Ky., writes under date of January 5, 1909: "I cured a very badly dew-poisoned ankle, restored new hair to an old scar by using Absorbine."

Absorbine is $2.00 per bottle at dealers or sent express prepaid upon receipt of price. W. F. Young, P. D. F. 55 Temple St., Springfield, Mass. Horseshoers are wanted everywhere to act as agents for this remedy.

Bailey Ball Thrust Bearings.

A good opportunity for the blacksmith to make considerable extra income is offered by Geo. D. Bailey Co., 1120 Michigan Ave., Chicago, Ill., manufacturers of the Bailey Ball Thrust Bearing. This is an article which readily sells to car owners and blacksmiths who are doing repair work. If they will merely suggest this improvement to their customers, they will generally make a sale. This bearing is especially adapted for such cars as the Ford and Chevrolet. Ford owners who instal this frictionless bearing practically eliminate the possibility of broken rear axle gears. It being a ball bearing, it does not wear away thin, hence it keeps gears in proper mesh, thereby preventing breakdowns that may mean being left helpless on a jammed street, on a railroad crossing or miles from home. The manufacturers of this specialty offer an excellent profit to the dealer and correspondence from our readers is earnestly invited.

Standard Horse and Mule Shoes.

The "Standard" brand of horseshoes is already known favorably to a great many of our readers. These shoes are sold by leading dealers from Maine to California. Readers who are interested should write to the Standard Horse Shoe Company, 131 State Street, Boston, Mass. for their new catalog No. 7 which fully describes and illustrates this line of shoes.

An Addition to Their Plant.

To meet the constantly increasing demand for its product and particularly to care for the requirements imposed by the war, the Metal Hose & Tubing Company, Brooklyn, N. Y., makers of Triplex Gasoline Hose, have started construction on an addition to its plant. The building is of permanent construction in brick. The new space will give 5,000 square feet more for manufacturing purposes and the factory will immediately require all of it.

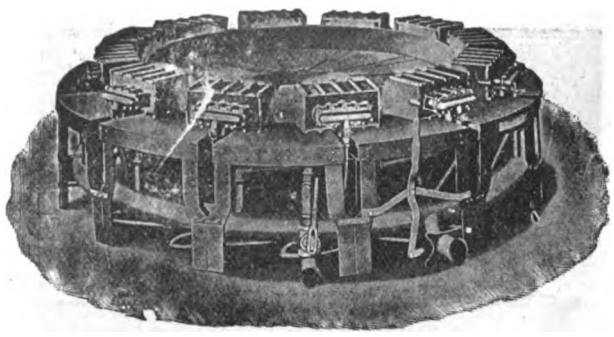
Imperial Welding Catalog.

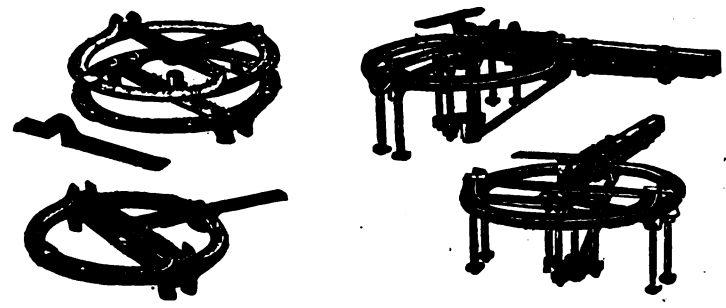
The Imperial Brass Mfg. Co., 520 South Racine Street, Chicago, Ill., have issued their latest catalog No. 142, in which is described in detail the full line of Imperial Welding and Cutting Equipment as well as the Imperial Lead Burning Outfits. In this catalog the history of welding and cutting is reviewed and its relation to the model industries is taken up. All of the various industries which utilize the oxy-acetylene welding and cutting apparatus are illustrated and a detailed account is given of the many ways in which welding devices may be utilized. Every reader who is interested in the possibilities of welding or who intends purchasing welding or cutting apparatus or who does storage battery repair work should send for this catalog.

Phoenix Horse Shoes and Calks.

The constant demand for the Phoenix horse shoes and Bull Dog calks, both manufactured by the Phoenix Horse Shoe Company is perhaps the best proof of the high quality of these products. Both the shoes and calks are practical to the highest degree and are made of unexcelled material. The Bull Dog calk will hold firmly to the shoe, will never jump out when set and is easy to drive in shoe and perfect in every detail. These goods are for sale by all dealers but the Phoenix Horse Shoe Co. urges our readers to write for samples direct to the main office of the company at Chicago, Illinois.

Digitized by Google





TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.

OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.

Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE GOGEL MFG. CO., TOLEDO, OHIO.

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

will be inserted under this head at 3 cents a word, including the address, for each insertion, payable in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York.

PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT.

Patents

PATENTS FOR INVENTIONS.

H. W. T. JENNER, patent attorney and mechanical expert, 622 F Street, Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trade-marks registered.

PATENTS.

C. L. PARKER, attorney-at-law, and solicitor of patents. American and foreign patents secured promptly. Handbook for inventors sent free upon request. McGILL BUILDING, Washington, D. C.

For Sale

FOR SALE.

Heavy punch and shear, suitable for blacksmith and wheelwright work; price, $150.00. Send for photograph and description. J. L LUCAS & SON, Inc., Bridgeport, Conn.

FOR SALE.

Blacksmith and wagon repair shop doing good business. Reason for selling, cannot stand the heavy work. For particulars and price address BOX 111, Deepwater, Mo.

FOR SALE.

Power blacksmith shop; stock and tools in Big Sandy, Montana. Large territory. Good town. Shop 24 feet by 56 feet. Tools consisting of Little Giant Trip Hammer; 3 fires, 3 anvils, 3 vises, 1 power blower for 3 fires; 1 hand blower; 1 Buffalo Electric Blower for 1 fire; 1 emery stand; 1 No. 16 Post Drill; 1 tire shrinker; 1 shoeing vise; 1 5 H. P. electric motor; small tools for 3 fires, and woodworking tools, and about $400 worth of stock. Will sell shop and tools for $1,500 and sell stock at invoice, or will sell tools and stock and rent shop. FRED LITTLEFIELD, Big Sandy, Montana.

FOR SALE.

Our shop, lot and tools. Shop 40 by 20. Office at rear 10 by 10. Only shop in town. Good location, good town, good water, good school, three churches, two garages. Good reason for selling. CADDICK BROS., Bristol, Colo.

FOR SALE.

Shop and garage, well equipped for all kinds of work. Work for two men. Good big territory to draw from. Will sell a new Barcus shoeing stock and shoeing vise separately. CHAS. O. MORRIS, Sand Springs, Montana.

FOR SALE.

Blacksmith and woodworking shop with tools and machinery. Good trade. Farming country. Would trade for small farm. Reasons for selling, cannot work at shoeing myself and cannot get help. LOCK BOX 86, East Otto, N. Y.

For Sale

FOR SALE.

A Brooke's welding outfit, same as new. Will sell cheap and a half interest in shop 24 by 40; engine power, drill, emery jointer, two fires. N. R. HOOD, Sparks, Okla.

FOR SALE.

No. 4 scientific cold tire setter, hydraulic, hand or power, cheap. Sets tires up to 4 inches. Owner retiring from business on account of age. Write J. H. TUTTLE, Lake Charles, La.

FOR SALE.

One old style lather, good order, complete with gears, chuck, etc., size 18 by 7, $1.50. BICKNELL MFG. & SUPPLY CO., Janesville, Wisconsin.

FOR SALE.

Oak lumber, tongues, reaches, bolsters and axles, also mill run 1 and 2 inch red oak. BICKNELL MFG. & SUPPLY CO., Janesville, Wisconsin.

FOR SALE.

Forty acres maple timber main road, R. F. D., opposite cheese factory, Central Wisconsin; good location for blacksmith shop. H. S. BICKNELL, Janesville, Wisconsin.

Miscellaneous

AUTO TIRE VULCANIZING PLANTS.

We buy, sell or exchange. Catalog is free—you save 30%. Instruction book on Vulcanizing, 75c. EQUIPMENT CO., 360 Eighth St., Cincinnati, O.

PRINTING FOR BLACKSMITHS.

Write for prices on printed letter heads, envelopes, statements, etc. NEWS PRINTING CO., Stockton, Ill.

Wanted

WANTED.

Second hand House Cold Tire Setter, with punch and shear, or with shear. Must be cheap. J. L. SCOTT, 4048 Laclede avenue, St. Louis, Mo.

WANTED.

Good all-around blacksmith. Young married man preferred. Top wages for right man. Address M. W. ABTS, Morrill, Nebr.

WANTED.

Salesman: Calling on quarries, mines, mills, factories and railroads to handle our Damascus Tempering Solution. Used by the largest railroads and steel industries. EMPIRE CHEMICAL CO., Huntington, W. Va.

Wanted

WANTED.

All round man in a general shop in the State of Washington. Write W. H. CHAMBERS, 54 Fifth St., S. E., Linton, Ind.

WANTED.

Second-hand Barnes No. 4 or combined rip saw. Must be cheap and in good working order. JOHN F. RICE, Centralia, Trinity Co., Texas.

WANTED.

Blacksmith and blacksmith helpers. FISCHER & DACKERMAN, East Broad and Chestnut Sts., Elizabeth, N. J.

WANTED.

To buy a good blacksmith stand with from ten to forty acres of land, with some fruit. Address with particulars to L. L., box 33, Prairie View, Ill.

Tires

DOUBLE TREAD TIRES

GUARANTEED

SPECIAL OFFER TO AGENTS. Write for Catalogue

Get our special price on new tires

M. LIBEN & CO.

205-AK West 48th St. New York City

Double Tread Tires

Notice Our Prices Before Going Elsewhere

PRICE LIST

Size	Plain	Size	Plain
30x3	$5.00	35x4	$9.00
30x3½	5.50	36x4	9.50
32x3½	6.50	36x4½	10.00
32x4	7.00	36x5	10.00
33x4	7.50	37x4½	10.00
34x4	8.00	37x5	10.50
34x4½	8.50		

For Non-Skid, 50 cents more on all sizes.

We Carry a Full Line of New and Used Tires & Tubes

GINSBERG & BERKOWITZ, Inc.

236 WEST 48th STREET, NEW YORK

Gears

GEARS & SHAFTS

Transmission gears and shafts, differential gears and axle shafts in stock for over 125 makes (500 models) of pleasure cars and trucks. Obsolete, Orphan and Current models.

Dealers and repairmen, send for our 125-page price list and make a good profit on your repair work.

AUTO GEAR CO., Inc.

844 Eighth Avenue, New York, N. Y. 1461 S. Michigan Ave., Chicago

275 Marietta St., Atlanta, Ga.

NO SECOND-HAND PARTS OR JUNK

Tires

BUY EARLY AND SAVE MONEY

Double Tread Tires and Tubes

GUARANTEED

Come to the Tire Clearing House—here are prices—clear cut and plain as daylight. We buy wholesale the best "try out" Tires—and you get the benefit—you want truthful tires, and truth is never crushed to earth if given a square deal—real truth is puncture proof—

SO ARE OUR TIRES.

Size	Plain	Non-Skid	Tubes
28x3	$4.40	$4.95	$2.00
30x3	5.50	6.05	2.00
30x3½	6.60	7.15	2.50
32x3½	7.15	7.70	2.75
34x3½	8.25	8.80	3.00
30x4	7.70	8.25	2.75
32x4	8.80	9.35	3.00
33x4	8.80	9.90	3.50
34x4	8.80	9.90	3.50
35x4	9.90	11.00	3.60

Get your order in quick for goods listed here—by all means get in touch with us for further information about our special process—it means money in your pocket. Get in right—write today—yes—today.

Look up rating in Dunn's or Bradstreet's.

Size	Plain	Non-Skid	Tubes
36x4	$9.90	$11.00	$3.60
32x4½	9.90	11.00	3.75
34x4½	11.00	12.10	4.00
35x4½	11.00	12.10	4.10
36x4½	11.00	12.10	4.25
37x4½	12.10	13.20	4.35
34x5	11.00	12.10	4.50
35x5	13.20	14.30	5.00
36x5	13.20	14.30	5.00
37x5	13.75	14.85	5.00

For (non-skid) sizes up to 32x4, 50c extra; all other sizes $1.00 extra.

For rebuilding your old tires we charge you 60% of the above prices.

B. LIBEN & COMPANY

261-A West 54th Street NEW YORK CITY 112-A East 110th Street

THE HOME OF DOUBLE TREAD TIRES

Automobile Agents Wanted.

It often happens that a blacksmith can largely increase his income by taking the agency for some good automobile. A corporation called the Birch Motor Cars, Department 548, 86 East Madison Street, Chicago, Illinois, is advertising to obtain blacksmiths as agents for the Birch automobile in country towns. Their plan of selling is very interesting and any of our readers who think they may be interested, should address Ralph Birchard, Pres. Birch Motor Cars at the above address.

Standard Toe Calks.

The Standard toe calks are manufactured by the Franklin Steel Works of Joliet, Ill. The quality of these calks is famous wherever calks are used. Owing to the high price of steel this year, the blacksmith can make a big saving by purchasing these calks. This will be explained to you if you will take the trouble to write a letter of inquiry direct to the main office of the Franklin Steel Works at Joliet, Ill.

We Can Ship Promptly

RIMS



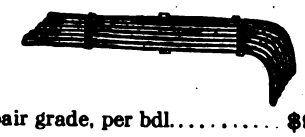
$1.60 and up.
We Carry All Sizes.

SPOKES



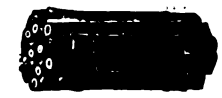
1 1-16 Sar. Pat., per 100.... ....$4.80
Other sizes in proportion.

BUGGY SHAFTS



Repair grade, per bdl..... $9.00

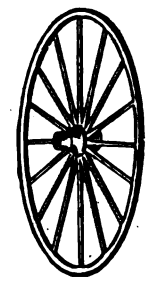
WOOD HUB SPOKES



Market prices.

LIGHT WHEELS

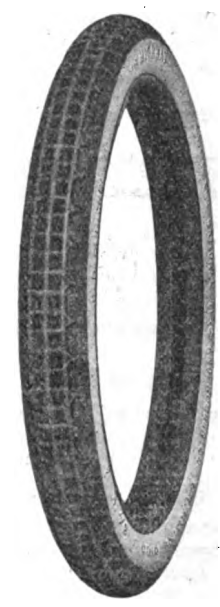
With Steel Tire on, $7.80 and up.
With Rubber Tire on, $16.80 and up.
We make all sizes.
We make Wheels up to 4-inch tread.



AUTO SEATS—Top Seats



Seat.....$3.56 and up
Cushion and back ..... 7.63 and up
Top ..... 12.84 and up



A 5,000 Mile Tire

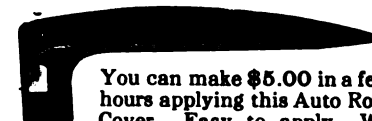
30x3½
NON-SKID

$14.25

Parcels Post Paid up to 3rd Zone

Other Sizes in Proportion

AUTO TOP RE-COVERING



You can make $5.00 in a few hours applying this Auto Roof Cover. Easy to apply. We furnish instructions.

Roadster, $7.20 Touring, $9.00
Others up to $25.00

Parcels Post Paid

B. Wheel, Top & Hardware Co.

128 East 8th St., Cincinnati, O.

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

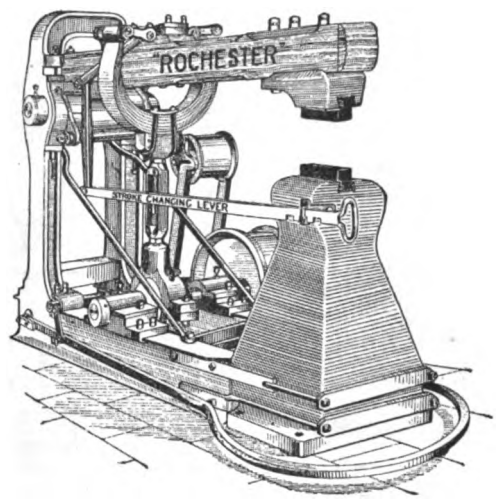
Digitized by Google

AN INFERIOR TOOL PUTS WRINKLES IN THE FACE

THE ROCHESTER HELVE HAMMER

The one big bet in American Helve Hammers. Quick-change stroke,—light or heavy, just as the operator demands. Sound as a rock. Pays for itself and does the job quicker and better. Notice that superior look on the mechanic operating the "Rochester"

6 SIZES
2 Styles of Frames



WEST HYDRAULIC SHELL BANDING MACHINES

SEND A CARD TO THIS ADDRESS FOR OUR CATALOGUE AND PRICES

WEST TIRE SETTER CO.
ROCHESTER, NEW YORK


ED. H. WITTE

I WILL SELL YOU AN ENGINE

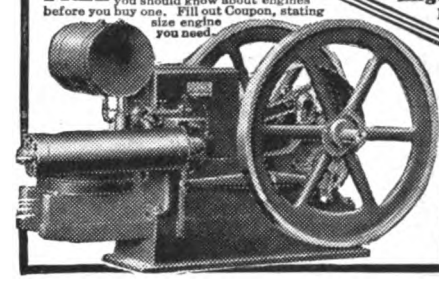
On Practically Your Own Terms

ALL CASH, PART CASH, or NO CASH DOWN

Any worthy, creditable person, anywhere in the U. S. can buy on these terms. Anyone can order without risk. I guarantee safe delivery to your station. All WITTE Engines sold on 5-year guarantee, 2 to 30 h-p. My factory is the largest exclusive engine factory in the world, selling direct to the user, any style—Stationary, Portable or Saw Rig. **I Ship Your Engine Quick.** You choose engine and plan of payment. WITTE Engines are best-looking, best balanced, easy to operate. **Money Back If Not Satisfied on My New 90 Day Engine Offer—FREE.**

—ED. H. WITTE, Pres.

"How to Judge Engines" FREE My new book explains what you should know about engines before you buy one. Fill out Coupon, stating size engine you need.



SIGN HERE FOR FREE BOOK

WITTE ENGINE WORKS
2446 Oakland Avenue
Kansas City, Mo.
244 Empire Bldg.,
Pittsburgh, Pa.

Name .....
Town .....
State .....
Mail to Witte Engine Works

Index to Advertisers

Aetna Nut Co., horseshoe calks....Front cover
Akron-Selle Co., gears....194
Akron Rubber Mold & Machine Co., tire repair outfits....3d cover
American Calk Co., calks....Front cover
Anti-Borax Compound Co., welding compounds....173
Armstrong Mfg. Co., bolt dies....194
Armstrong-Blum Mfg. Co., punches and shears....Front cover
Barcus Mfg. Co., horse stocks....179
Barnett, G. & H., Co., files and rasps, Front cover
Bertschy-Bermo Co., welding plants, Front cover
Bicknell Mfg. & Supply Co., dies....194
Birch Motor Cars, motor cars....194
Bradley, C. C., & Son, shaft coupler....178
Buchanan, C. G., Chemical Co., industrial chemicals....Front cover
Buffalo Forge Co., blacksmiths' tools....179
Buraen Iron Works, horseshoes....3d cover
Bush Motor Co., automobiles....194
Butterfield & Co., taps, dies and screw plates....180
Campbell Iron Co., supplies....4th cover
Canedy-Otto Mfg. Co., blacksmiths' tools....195
Capewell Horse Nail Co., horse nails, Front cover
Champion Blower & Forge Co., blowers....175
Champion Tool Co., blacksmiths' tools....176
Childs, S. D., & Co., steel stamps..Front cover
Columbus Forge & Iron Co., anvils....174
Columbian Hardware Co., vises....195
Cortland Welding Compound Co., welding compounds....4th cover
Cray Bros., blacksmiths' tools....195
Crescent Machine Co., woodworking machinery....179
Diamond Calk Horseshoe Co., horseshoes....194
Edwards, C. D., Mfg. Co., shears....194
Electric Blower Co., blowers....173
Electric Wheel Co., wheels....4th cover
Empire Mfg. Co., wheels....194
Felton, Sibley & Co., paints....173
Firestone Tire & Rubber Co., tires....196
Fisher & Norris, anvils and vises....180
Franklin Steel Works, toe calks....173
General Welding Co., welding outfits....195
Gogel Mfg. Co., tire heaters....192
Greenfield Tap & Die Corporation, screw plates and blacksmiths' machinery....196
Gwilliam Co., ball bearings....4th cover
Hart Mfg. Co., stocks and dies....4th cover
Harvey Spring & Forging Co., auto springs....174
Hay-Budden Mfg. Co., anvils....4th cover
Heller Bros., horse rasps, tools, etc....180
House Cold Tire Setter Co., tire setters, hollow and spoke augers....4th cover
Jenner, H. W. T., patents....192
Kerrihard Co., hammers....4th cover
Kimball Tire Case Co., tire protectors....195
Lemoine, N., Co., hoof packing....Front cover
Linde Air Products Co., oxygen....180
L. S. P Calking Machine Co., calking machines....180
Macgowan & Finigan Cordage Co., hammers....4th cover
Mayer Bros. Co., hammers....178
Mechanical Hammer Co....2d cover
Ness, Geo. M., Jr., steel stamps....Front cover
Nicholson File Co., files and rasps....3d cover
Oneida National Chuck Co., chucks, Front cover
Ottawa Mfg. Co., kerosene engines....194
Parker, C. L., attorney....Front cover
Parks Ball Bearing Machine Co., woodworking machinery....3d cover
Peck, Stow & Wilcox Co., pincers....196
Phoenix Horseshoe Co., horseshoes and toe calks....177
Porter, H. K., bolt clipper....4th cover
Prentiss Vise Co., vises....4th cover
Rosewater Electric Co., blowers....179
Shaler, C. A., Co., vulcanizers....194
Sheldon Axle & Spring Co., axles....176
Schwarzkopf, S., tuyere irons....194
Standard Horse Nail Co., horseshoe nails, 4th cover
Standard Horseshoe Co., horseshoes..3d cover
Star Mfg. Co., agricultural implements....180
Stokes Bros. Mfg. Co., rasps....Front cover
Superior Oxy-Acetylene Machine Co., welding outfits....Front cover
Thompson Tuyere Iron Co., tuyere iron, 4th cover
Union Horse Nail Co., horse nails....
United States Horseshoe Co., horseshoes..178
West Tire Setter Co., tire setters, hammers....193
Wheel, B Top & Hardware Co., supplies..192
Whisler Mfg. Co., nut splitters, jointer heads....194
Witte Engine Works, engines....193
Young, W. F., veterinary remedies....194

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co....180

Anvils
Columbus Forge & Iron Co....174
Fisher & Norris....180
Hay-Budden Mfg. Co....4th cover

Attorneys
Parker, C. L....Front cover

Automobiles
Bush Motor Co....194

Automobile Springs
Harvey Spring & Forging Co....174

Axles
Sheldon Axle & Spring Co....176

Blacksmiths' Tools
Buffalo Forge Co....195
Butterfield & Co....180
Canedy-Otto Mfg. Co....179
Champion Blower & Forge Co....175
Champion Tool Co....176
Cray Bros....195
Heller Bros. Co....180
Nicholson File Co....3d cover
Peck, Stow & Wilcox Co....196

Ball Bearings
Gwilliam Co....4th cover

Blacksmiths' Machinery
Greenfield Tap & Die Corporation....196

Blowers
Buffalo Forge Co....195
Champion Blower & Forge Co....175
Champion Tool Co....176
Electric Blower Co....173
Rosewater Electric Co....179

Bolt Dies
Armstrong Mfg. Co....194

Bolt and Rivet Clippers
Porter, H. K....4th cover

Calking Machines
L. S. P. Calking Machine Co....180

Calks, Horseshoe
Aetna Nut Co....Front cover
American Calk Co....Front cover
Diamond Calk Horseshoe Co....194

Calks, Toe
Franklin Steel Works....173

Chemicals (Industrial)
Buchanan, C. G., Chemical Co....Front cover

Chisels
Champion Tool Co....176
Peck, Stow & Wilcox Co....196

Chucks
Buffalo Forge Co....195
Oneida National Chuck Co....Front cover

Dies
Bicknell Mfg. & Supply Co....194

Disc Sharpeners
Mayer Bros. Co....178

Drills
Buffalo Forge Co....195
Champion Blower & Forge Co....175

Engines
Ottawa Mfg. Co....194
Witte Engine Works....193

Farriers' Tools
Barnett, G. & H., Co....Front cover
Champion Tool Co....176
Heller Bros. Co....180
Peck, Stow & Wilcox Co....196

Files and Rasps
Barnett, G. & H., Co....Front cover
Nicholson File Co....3d cover
Stokes Bros. Mfg. Co....Front cover

Forges
Buffalo Forge Co....195
Champion Blower & Forge Co....175

Gasoline Engines
Witte Engine Works....193

Gears
Akron-Selle Co....194

Hammers
Champion Tool Co....176
Kerrihard Co....4th cover
MacGowan & Finigan Cordage Co....4th cover
Mayer Bros. Co....178
Peck, Stow & Wilcox Co....196
West Tire Setter Co....193

Hollow Augers
House Cold Tire Setter Co....4th cover

Hoof Packing
Lemoine, N., Co....Front cover

Hoof Parers
Champion Tool Co....176

Hoof Nippers
Champion Tool Co....176

Hoof Shears
Champion Tool Co....176

Horseshoes
Burden Iron Works....3d cover
Diamond Calk Horseshoe Co....194
Phoenix Horseshoe Co....177
United States Horseshoe Co....178

Horseshoe Calks
Diamond Calk Horseshoe Co....194

Horseshoe Nails
Capewell Horse Nail Co....Front cover
Standard Horse Nail Co....4th cover
Union Horse Nail Co....

Horse Stocks
Barcus Mfg. Co....179

Kerosene Engines
Ottawa Mfg. Co....194
Witte Engine Works....193

Motor Cars
Birch Motor Cars....194

Nut Splitters
Whisler Mfg. Co....194

Oxygen
Linde Air Products Co....180

Paints and Varnishes
Felton, Sibley & Co....173

Patents
Jenner, H. W. T....192
Parker, C. L....Front cover

Pincers
Peck, Stow & Wilcox Co....196

Punches
Champion Blower & Forge Co....175

Punches and Shears
Armstrong-Blum Mfg. Co....Front cover
Peck, Stow & Wilcox Co....196

Screw Plates
Butterfield & Co....180
Champion Blower & Forge Co....175
Greenfield Tap & Die Corporation....196

Shaft Coupling
Bradley, C. C., & Son....178

Shears
Edwards, C. D., Mfg. Co....194

Spoke Augers
House Cold Tire Setter Co....4th cover

Steel Stamps
Childs, S. D., & Co....Front cover
Ness, George M., Jr....Front cover

Stocks and Dies
Butterfield & Co....180
Champion Blower & Forge Co....175
Hart Mfg. Co....4th cover

Supplies
Campbell Iron Co....4th cover
Wheel, B Top & Hardware Co....192

Swages
Champion Blower & Forge Co....175

Tires
Firestone Tire & Rubber Co....196

Tire Bending Machines
Buffalo Forge Co....195
Champion Blower & Forge Co....175

Tire Heaters
Gogel Mfg. Co....192

Tire Protectors
Kimball Tire Case Co....195

Tire Repair Outfits
Akron Rubber Mold & Machine Co..3d cover

Tire Setters
Buffalo Forge Co....195
House Cold Tire Setter Co....4th cover
West Tire Setter Co....193

Tire Shrinkers
Buffalo Forge Co....195
Champion Blower & Forge Co....175

Tire Upsetters
Buffalo Forge Co....195
Champion Blower & Forge Co....175

Tongs
Champion Tool Co....176

Tool Grinders
Phoenix Horseshoe Co....177

Trucks
Akron-Selle Co....194

Tuyere Irons
Buffalo Forge Co....195
Champion Blower & Forge Co....175
Schwarzkopf, S....194
Thompson Tuyere Iron Co....4th cover

Veterinary Remedies
Young, W. F....194

Vises
Butterfield & Co....180
Columbian Hardware Co....195
Fisher & Norris....180
Prentiss Vise Co....4th cover

Vulcanizers
Shaler, C. A., Co....194

Wagons
Akron-Selle Co....194

Welding Compounds
Anti-Borax Compound Co....173
Cortland Welding Compound Co....4th cover

Welding Outfit
General Welding Co....195
Superior Oxy-Acetylene Machine Co., Front cover

Welding Plant
Bertschy-Bermo Co....Front cover

Welding Supplies
Linde Air Products Co....180

Wheel Dishers
House Cold Tire Setter Co....4th cover

Wheels
Electric Wheel Co....4th cover
Empire Mfg. Co....194

Woodworking Machinery
Buffalo Forge Co....195
Crescent Machine Co....179
Parks Ball Bearing Machine Co....3d cover

Wrenches
Champion Tool Co....176

Wrenches (Knife Handle and Pipe)
Peck, Stow & Wilcox Co....196

Do You Repair Auto Tires?

We frequently have called the attention of our readers to the opportunity to increase the revenue in any country blacksmith's shop by putting in an outfit for repairing auto tires. The average blacksmith can learn the details of this business in a very short time as the successful repairing of tires depends upon heat control and of course blacksmiths are accustomed to controlling the heat in the work at the forge right along. The Akron Rubber Mold & Machine Co., 937 Sweitzer Ave., Akron, Ohio, manufactures a line of tire vulcanizing machinery which is practical and dependable in every respect. If your income from horseshoeing and carriage and wagon repairing has decreased owing to the automobile business, you can more than make up for this loss by taking up tire repair work. This is a matter which every one of our readers should investigate by writing to the Akron Rubber Mold & Machine Co. for their free booklet entitled "Tire Repairing the Business of the Times."

Digitized by Google

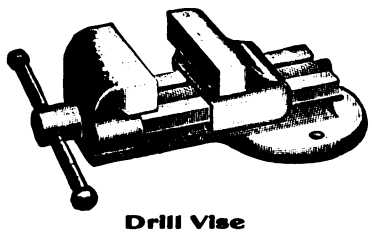
Good Files and Horse Rasps.

The line of files and horse rasps manufactured by the Nicholson File Company of Providence, Rhode Island, has a world-wide reputation for quality. These files and rasps are forged, annealed, ground and cut by expert workmen who have made the needs of the blacksmith and machinist a lifetime study. You can get Nicholson files and rasps from any good dealer, but if there is any question which you want to ask in regard to style, quality or price the Nicholson File Company will be glad to send you their complete literature for details in regard to their product.

Northwestern Horse Nails.

Every horseshoer knows the importance of using good nails. The Northwestern horse nails made by the Union Horse Nail Company of Chicago, Illinois, have a high reputation for quality. These nails are perfect in form and finish and will hold the shoe firmly to the horse's hoof. The reinforced point makes this nail one of the easiest to drive and a safe one to use. Write for samples and prices direct to the main office of the company in Chicago.

BICKNELL'S DRILL PRESS VISE



Drill Vise

Holds Rounds, Squares and Flats

Saves its cost every year in drills alone.
Base, bed and jaws fully machined.
Swivels to any position on Drill Table, or can be used as a Bench Vise.

For sale by the jobbing trade.

Write for circular.

BICKNELL MFG. & SUPPLY CO., JANESVILLE, WIS.

THE ARMSTRONG MFG. COMPANY

BRIDGEPORT CONN., U.S.A. — **NEW YORK OFFICE 248 CANAL STREET**

like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



"Makers of the Genuine ARMSTRONG Stocks and Dies."

OTTAWA KEROSENE ENGINES

Latest design. Durable, Powerful, Reliable, Massive. Built to do hard, heavy work—to give lasting service. Uses Cheapest Fuel. Pulls 25 to 50% more H-P. than rated. Shipped on three months' trial. Easy terms. Sizes 1½ to 22 H-P. 10-Year Guarantee. Book free—postal gets it.



OTTAWA MFG. CO. 1781 King St., Ottawa, Kans.

FREE BOOK

"GEARS AND WAGONS"

Selle Gears

Forty years of success has placed "Selle Gears" and Wagons in the hands of the largest wagon users in the world. Express and Transfer Companies, Department Stores, etc., specify "Selle Gears" and will take no other after once tried. **230 Page Catalog Free.**

THE AKRON-SELLE CO. Akron, Ohio

Edwards Shears

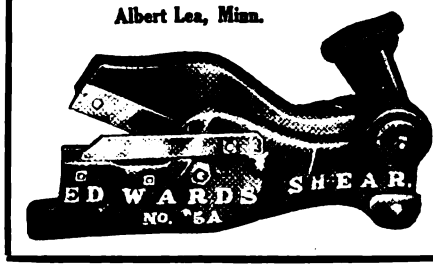
For twenty-four years the **Two Leading Low Priced Shears** in the U. S., representing the **Greatest Value** for the **Least Money.**

No. 5, weighs 200 lbs., cuts 4x½ inch soft steel.
No. 10, weighs 430 lbs., cuts 4x¾ inch soft steel.

At their price you should have had one long ago. **Order one** from the first iron man that calls on you. **They All Sell Them.**

Write for descriptive circular and prices.

C. D. EDWARDS MFG. CO.
Albert Lea, Minn.



ABSORBINE

TRADE MARK REG. U.S. PAT. OFF



Reduces **Strained, Puffy Ankles, Lymphangitis, Poll Evil, Fistula, Boils, Swellings; Stops Lameness** and allays pain. Heals **Sores, Cuts, Bruises, Boot Chafes.** It is a **SAFE ANTISEPTIC AND GERMICIDE**

Does not blister or remove the hair and horse can be worked. Pleasant to use. $2.50 a bottle, delivered. Describe your case for special instructions and **Book 5 R free.**

ABSORBINE, JR., antiseptic liniment for mankind, reduces Strains, Painful, Knotted, Swollen Veins. Concentrated—only a few drops required at an application. Price $1.25 per bottle at dealers or delivered.

W. F. YOUNG, P. D. F., 55 Temple St., Springfield, Mass.

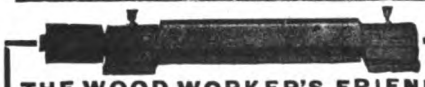
Get This Car



And The AGENCY For Your Territory

Drive a new 1918 Model Birch Motor Car. Pay for it out of your commissions and make big money on sales. Special offer now. Write quick for Big Free Book and full information. Address Ralph Birchard, Pres.

BIRCH MOTOR CARS, Dept. 547 81 E. Madison St., Chicago

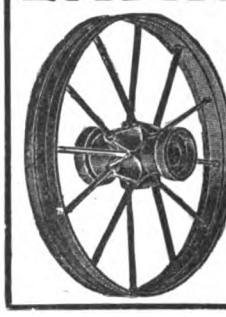


THE WOOD WORKER'S FRIEND

Get directions for building table and operating our Jointers. This information is valuable to wood workers. We manufacture 20 styles and sizes. Try a Jointer Head 30 days, if you are not pleased, return at our expense. Get prices.

Manufactured by WHISLER MFG. COMPANY, Gibson, Iowa

EMPIRE STEEL WHEELS

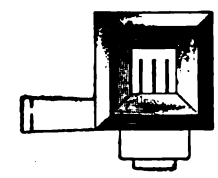


Plain or Grooved Tire
To Fit Any Wagon.

FARM TRUCKS
All Standard Types

Write today for Proposition to Blacksmiths

EMPIRE MFG. CO.
P. O. B. 208
QUINCY, ILL.



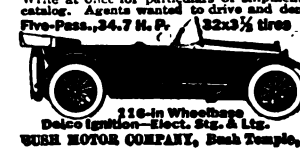
The S. S. TUYERE IRON

Can't Be Beat. Parts that burn out can be taken off the top. Give this iron a trial. It saves coal. Ask your dealer for them, if he can't supply you send to

S. SCHWARZKOPF,
Toledo, Ohio. Price $6.00

Shipped on Approval

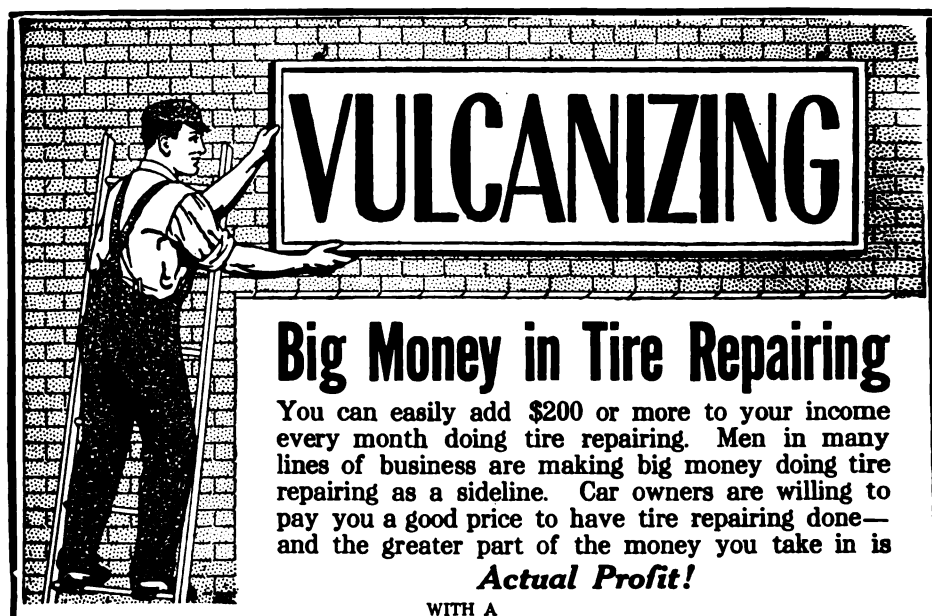
Write at once for particulars of shipments and my 48-page catalog. Agents wanted to drive and demonstrate the Bush Car. Opportunity to pay for it out of your commissions. Agents making money. Shipments are prompt. Bush cars guaranteed to make good. 1918 models ready. Addr. J. H. Bush, Pres. Dept. G-7



BUSH MOTOR COMPANY, Bush Temple, Chicago, Illinois

Do you want anything? Is your shop for sale, or do you want to buy a shop or hire a man? If so, a "Want" advertisement in THE BLACKSMITH AND WHEELWRIGHT will bring you good results. See terms at the head of the "Want" Department on another page.





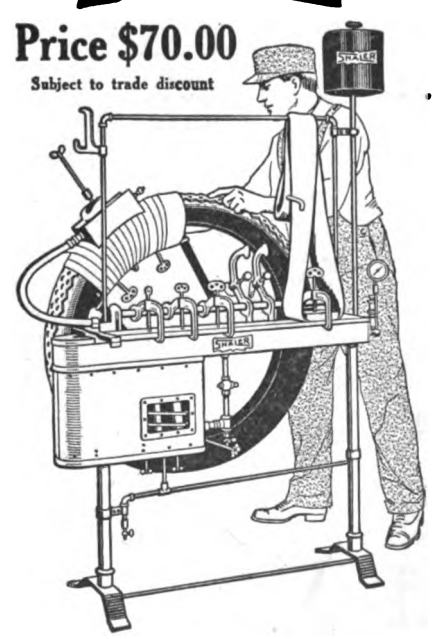
Big Money in Tire Repairing

You can easily add $200 or more to your income every month doing tire repairing. Men in many lines of business are making big money doing tire repairing as a sideline. Car owners are willing to pay you a good price to have tire repairing done—and the greater part of the money you take in is ***Actual Profit!***

WITH A

SHALER Vulcanizer

Price $70.00
Subject to trade discount



it is a simple matter to turn out perfect jobs. You don't need experience—your regular help can easily vulcanize any size or style of tire—either casing or inner tube.

The SHALER Vulcanizer is a thoroughly practical vulcanizer—and will do all that the highest priced machines will do. It handles up to 200 tubes and 12 casings a day—and does perfect work.

It is the only vulcanizer that has automatic heat control, which makes explosions impossible and prevents overheating or damaging tires.

SHALER Vulcanizers can be supplied for either gas, gasoline or electric heat.

Send for Catalog

which explains every detail about the SHALER Repair Shop Vulcanizers, the principle of the approved SHALER Wrapped-Tread method of mending casings, and tells about our "Money-Back" Guarantee. Don't delay, write at once.

C. A. Shaler Company
1803 Fourth Street, WAUPUN, WIS.
Oldest and Largest Manufacturers of Vulcanizers.

Digitized by Google

COLUMBIAN

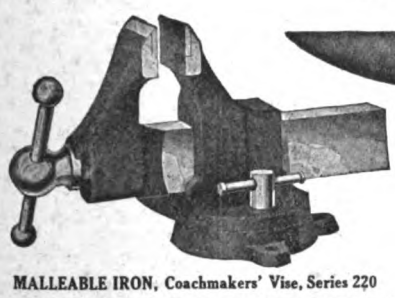
Vises and Anvils



Forged Steel, Solid Box Leg Vise, Series "X"



MALLEABLE IRON, Series 500



MALLEABLE IRON, Coachmakers' Vise, Series 220



Standard Weldless One-Piece Anvil

THE COLUMBIAN HARDWARE CO., Manufacturers, CLEVELAND, OHIO



Free 512 PAGES OF BARGAINS

POST PAID

WE WANT TO SEND YOU THIS 512 PAGE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

Tells how you can work up a profitable auto supply and repair business.

Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories

1117 W. 11th Street, Cleveland, Ohio, U. S. A.

The Better Your Equipment The Bigger Your Profits

Buy CANEDY-OTTO

AND INCREASE YOUR INCOME

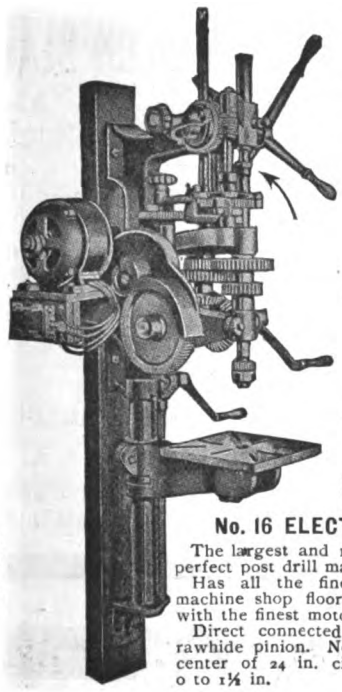
Once Tried, Always Used : There's a Reason—Quality



No. 19 DRILL

A low-priced combined hand and power self-feed drill.

Drills to center of 16½ in. circle.



No. 16 ELECTRIC DRILL

The largest and most mechanically perfect post drill manufactured.

Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.

Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1½ in.

OVER 200 DIFFERENT STYLES

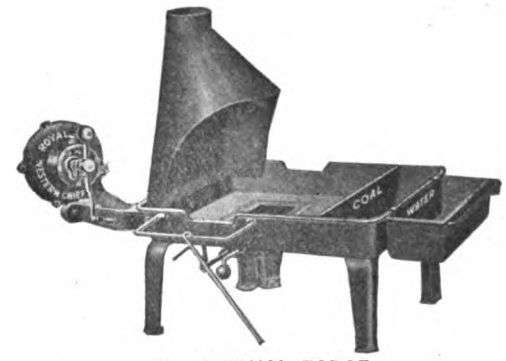
SEND FOR CATALOGUE No. 12



No. 100 ROYAL FORGE

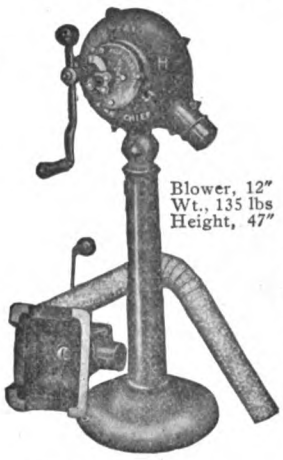
The most popular forge ever made.

Fan, 12 in. Hearth, 31½x45½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x50 in. Blower, 12 in.



Blower, 12"
Wt., 135 lbs
Height, 47"

ROYAL BLOWER

(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.

Fire pot is 8x9 in. inside.



No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.

All machines are tested before leaving the factory, and guaranteed in every respect.

Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

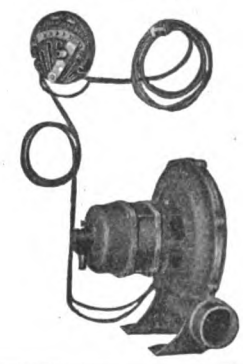
Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS



No. 1 1/2 SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



No. 8 ELECTRIC BLOWER

The best outfit money can buy.



IF YOU WANT A FAT BANK ACCOUNT

And an extra good paying side line to your business, the

IDEAL Welding Outfit

Will do the trick.

Cold weather causes more breaks in metals than any other cause, so if you are equipped with our "IDEAL" welding outfit to repair breaks in axles, gear cases, chassis, cylinders, and other parts, you will reap the cream of business.

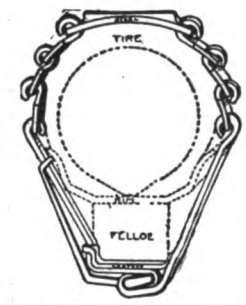
Come in *now* and beat the other fellow to it.

Write *today* for full particulars

General Welding Company

363 14th St., Hoboken, N. J.

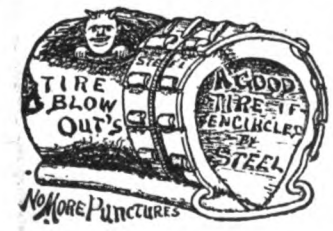




MUD CHAIN

Can be put on in a jiffy with one hand while standing on the run board. If you get in a mud hole, you will laugh out loud. Hook the ends together and pull the little lever and they are on tight. One or two will take you out of a hole, but it is better to use about 6 for continuous running. Good for blow-outs.

STEEL TIRE PROTECTORS



Tires can't wear out if covered with **Steel.** Try a few sections over any old blow-out. Tires are as flexible as ever. **Can't Skid.**

Special Inducements to Those in New Territory

KIMBALL TIRE CASE CO.

175 Broadway Council Bluffs, Iowa

Each Section 2 inches Wide, ⅛ inch Thick

Write for Prices and Full Particulars



Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google



Massive in Appearance Light in Weight



Cushion

IT is the generous measure of rubber that gives Firestone Carriage Tires the width and thickness which add so much to the appearance of the "turnout."

It is the quality of the rubber that allows extra size and resiliency without extra weight.



Internal Wire

Firestone Carriage Tires give thorough satisfaction in comfort, wear and appearance, so uniform that they wear evenly to the channels.



Side Wire

Firestone Dealers win new buyers who become regular customers. Write for attractive proposition to dealers.

Firestone Tire & Rubber Co.
Firestone Park Akron, Ohio
Branches and Dealers Everywhere

Firestone Carriage Tires



SCREW PLATES FOR THE MODERN BLACKSMITH

With an O. K. Combination Screw Plate ***Your*** shop is equipped to cut all the common sizes of both United States and S. A. E. (Automobile) Standard Threads.

This means you are not only prepared quickly to handle the thousand-and-one odd threading jobs which come to your shop but you can also get into the automobile and tractor repair business—a business which is growing by leaps and bounds.

Don't let your share go to the next man.

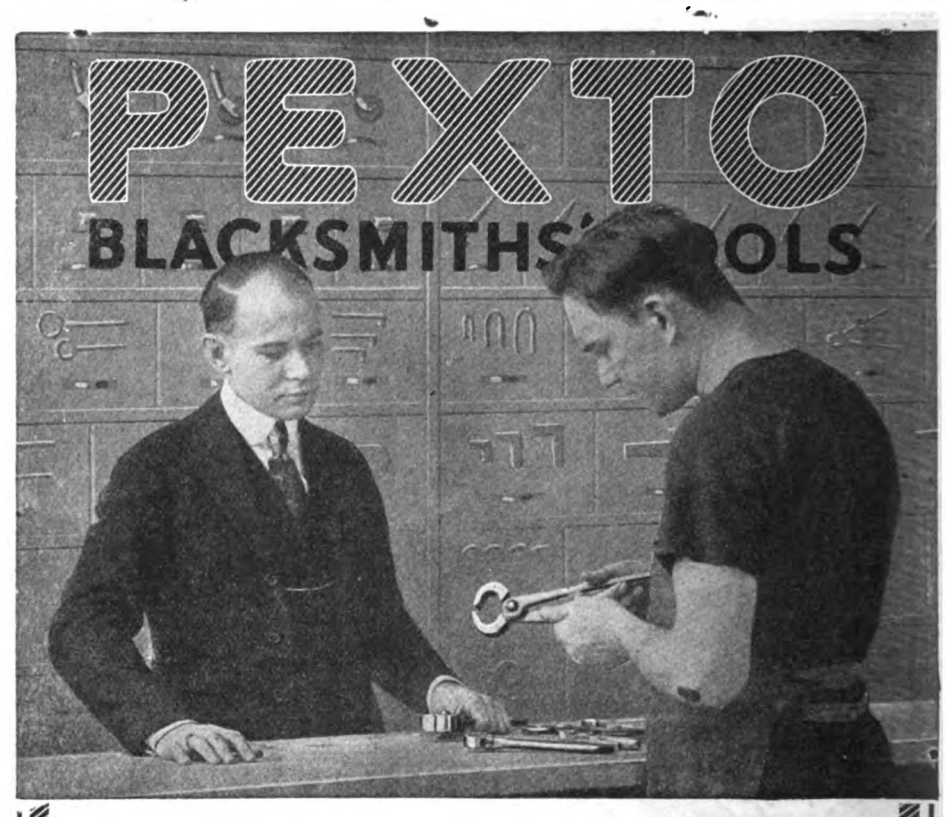
Write for latest G. T. D. Catalog and Discount

GREENFIELD TAP AND DIE CORPORATION

GREENFIELD, MASSACHUSETTS, U. S. A.

NEW YORK, 28 WARREN ST., -:- CHICAGO, 13 SOUTH CLINTON ST.
Canadian Plant, WELLS BROS. CO. of CANADA, LTD., GALT, ONTARIO

44



How Can You Tell?

You're buying a pair of shoeing pincers or hoof parers and the salesman spreads out an assortment of different kinds on the counter. How can you tell which is the best buy?

Appearances are not a safe guide, for poor tools often masquerade behind a handsome exterior.

Price is not a safe guide, for inferior tools often cost you more than good ones.

But there is a safe guide, and that is to know who made the tool.

When the salesman says "This is a pair of PEXTO Shoeing Pincers" or "PEXTO Hoof Parers," you know that they have been made by a responsible concern with 100 years of tool-making experience and with a reputation for the excellence of its product.

Buy tools by name and see that the name is Pexto. If your dealer can't supply you, write us.

The Peck, Stow & Wilcox Co.

PEXTO Mfrs. Mechanics' Hand Tools, Tinsmiths' and Sheet Metal Workers' Tools and Machines, Builders' and General Hardware.

Southington, Conn. Cleveland, Ohio

Address correspondence to
209 W. Center St., Southington, Conn.

Digitized by Google

ESTABLISHED 1880

The Pioneer Journal of its Class

THE BLACKSMITH & WHEELWRIGHT

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U. S. Patent Office.

Vol. LXXVIII. No. 2 NEW YORK, AUGUST, 1918 TERMS: One Dollar a Year. Foreign, $1.50. (6s. 3d.)

EMPIRE STEEL WHEELS



Plain or Grooved Tire
To Fit Any Wagon.

FARM TRUCKS
All Standard Types

Write today for Proposition to Blacksmiths

EMPIRE MFG. CO.
P. O. B. 208
QUINCY, ILL.

STEEL STAMPS
BURNING BRANDS
RUBBER STAMPS
STENCILS
GEO. M. NESS, JR.
61 FULTON ST. NEW YORK
Send for price list.

"GEARS AND WAGONS"
Selle Gears
Forty years of success has placed "Selle Gears" and Wagons in the hands of the largest wagon users in the world. Express and Transfer Companies, Department Stores, etc., specify "Selle Gears" and will take no other after once tried. 230 Page Catalog Free.
THE AKRON-SELLE CO. Akron, Ohio



SUREGRIP CALKS
American Calk Co.
DETROIT, - - MICH.

For Horseshoers

the best investment in horse nails is undoubtedly "The Capewell."

In the Capewell you have a nail which will save you money because there is

no waste
no lost time
no work to be done over.

Capewell nails are sorted with the utmost care. The waste is thrown out before packing.

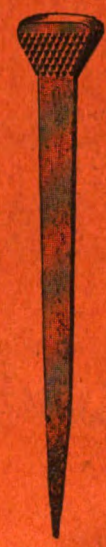
The time of your men is not lost selecting nails fit to drive.

Nor do you have to do work over for nothing—something which is often necessary where cheap inferior nails are used.

You can get Capewell nails in the size and style required for any kind of shoeing.

The world's best nail at a fair price—quality considered the cheapest by all odds.

Best Nail to Drive



"The Capewell"

The Capewell Horse Nail Co.
Hartford, Conn.
Largest Makers of Horse Nails in the World

SEND US YOUR NAME
and Address and you'll get information worth while regarding this splendid Shear and Punch.



THE MARVEL
A Double Lever Machine.
One man does all the machine is capable of and he faces his work all the time.
ARMSTRONG-BLUM MFG. CO.
340 N. FRANCISCO AVE., CHICAGO, ILL.

STEEL STAMPS
LETTERS and FIGURES
For Marking Your Tools and Your Product
NAME PLATES OF ALL KINDS
S. D. CHILDS & CO.
DEPT. 2
136 S. CLARK ST. CHICAGO



THE WOOD WORKER'S FRIEND
Get directions for building table and operating our Jointers. This information is valuable to wood workers. We manufacture 20 styles and sizes. Try a Jointer Head 30 days, if you are not pleased, return at our expense. Get prices.
Manufactured by WHISLER MFG. COMPANY, Gibson, Iowa



CRESCENT Wood Working Machines

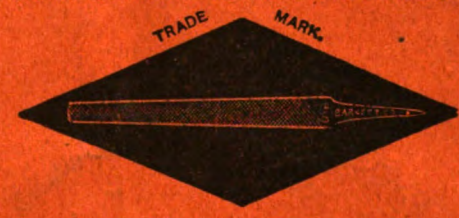
will always satisfy those particular users who want the highest quality at reasonable price.

Send today for catalog of band saws, saw tables, shapers, jointers, variety wood workers, planers, planers and matchers, swing saws, cut off table, disk grinder, borers, hollow chisel mortiser, Universal wood workers.

THE CRESCENT MACHINE CO.
203 Main Street
LEETONIA, OHIO, U.S.A.

THE TEETH IN
BLACK DIAMOND RASPS
ARE MINGLED
So as to Cut Clean and Free and Leave no Furrows in the Work

Twelve Medals of Award by Jurors



At International Expositions

G. & H. BARNETT COMPANY
Black Diamond File Works, PHILADELPHIA, PA.
Owned and Operated by NICHOLSON FILE CO.
Copy of Catalog sent Free to any interested file users upon application.

AETNA STEEL TOE CALKS
Made by THE AETNA NUT CO., Southington, Conn.
BLACK HORSE BRAND

BEST SHAPE
BEST SPUR
TO DRIVE
BEST STEEL



TOE AND HEEL CALKS

SOLD BY ALL DEALERS

Stokes Bros.' Improved Horse Rasps
Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A.

Shipped on Approval
Write at once for particulars of shipments and my 48-page catalog. Agents wanted to drive and demonstrate the Bush Car. Opportunity to pay for it out of your commissions. Agents making money. Shipments are prompt. Bush cars guaranteed or money back. 1918 models ready. Adv. J. M. Bush. Free, Dept. H-5



BUSH MOTOR COMPANY, Bush Temple, Chicago, Illinois

OTTAWA KEROSENE ENGINES
Latest design. Durable, Powerful, Reliable, Massive. Built to do hard, heavy work—to give lasting service. Uses Cheapest Fuel. Pulls 25 to 30% more H-P. than rated. Shipped on three months' trial. Easy terms. Sizes 1½ to 22 H-P. 10-Year Guarantee. Book free—postal gets it.

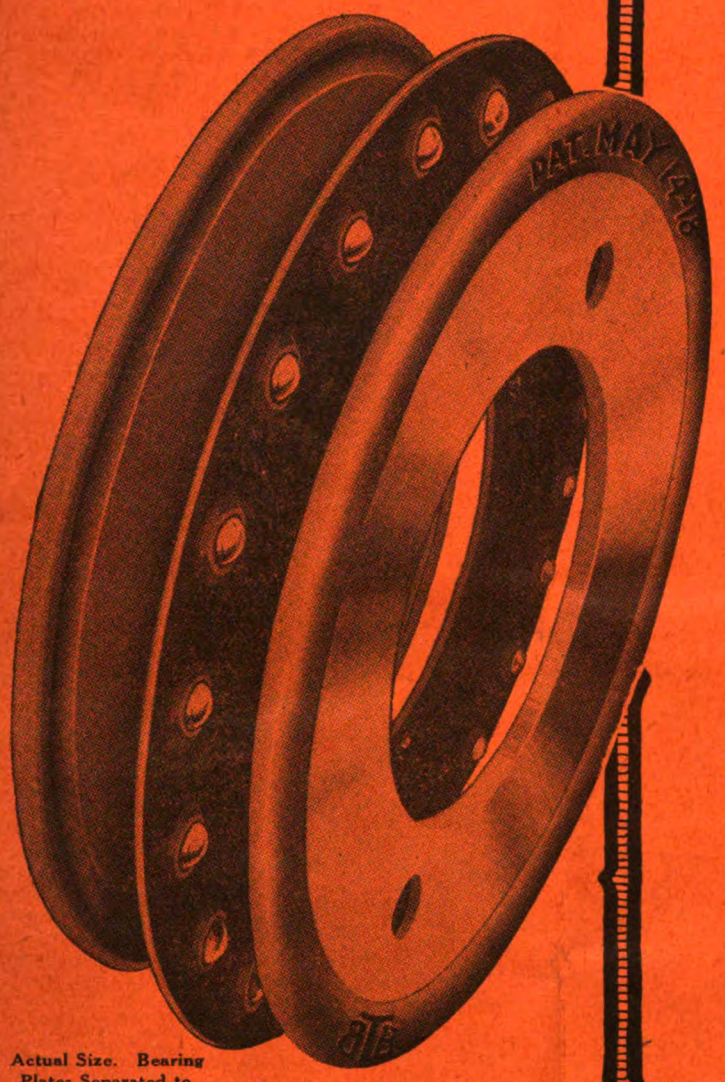


OTTAWA MFG. CO.
1201 King St., Ottawa, Kans.



BUYERS' GUIDE AND INDEX TO ADVERTISEMENTS, PAGE 217

Prevents Rear Axle Trouble in Fords—



Actual Size. Bearing Plates Separated to Show Ball Retainer.

The Bailey Ball Thrust Bearing replaces to the 1/1000th part of an inch, plain washers (parts 2528-29) at left side of Ford and Chevrolet 490 differentials—eliminating all trace of sliding or grinding contact and minimizing friction that results. Bailey installation does away with the danger of noisy or broken gears, due to ordinary washer construction.

Being a ball bearing it does not wear thin and consequently keeps gears in proper mesh.

Selling Points For Blacksmiths on Bailey Ball Thrusts

Plain washers having a friction creating, sliding contact, instead of a frictionless rolling contact as in a ball bearing, wear with these results:

1- The ring gear and pinion get away from the proper mesh and allow a contact of the teeth at the weakest point. Result is broken gears.

2- The lack of proper meshing of gears causes humming or noise in the axle. Bailey keeps gears meshed—hence no noise or breaks.

3- The friction of plain washers heats the oil and grease to such an extent that the lubrication qualities are destroyed.

4- The fine metal ground away in the wear of plain washers is bound to get into the bearings and hasten the deterioration of such parts.

5- When you get the heaviest thrust you get most friction—and friction means loss of power. The Bailey eliminates friction.

6- The Bailey Ball Thrust bearing having highest grade frictionless steel balls must affect a cut in fuel consumption.

The Bailey Ball Thrust is heavily advertised in the Saturday Evening Post and other national magazines. The field for blacksmiths to enjoy profitable returns is unlimited. Practically every jobber in the U. S. and Canada carries this bearing in stock. Blacksmiths everywhere find it little or no trouble to sell car-owners Bailey Ball Thrusts. Don't wait until all Ford owners in your locality have installed Baileys. Get this business now. Write your jobber or us for discounts.

Price, $3.75

GEO. D. BAILEY CO.

Factory and General Offices:

4506 N. RAVENSWOOD AVE. CHICAGO, ILL.



With Bailey Ball Thrust

Gears properly meshed—ball bearing stands up under pressure and holds the gears snug. Drive is exerted firmly on strong part of two teeth instead of on one, no noise, no lost power, no jerky "back-lash" and no stripping or breaking of gears.

With the Ordinary Washers

Gears partly out of mesh because washers at left side have worn thin due to gear thrust. This results in drive being taken on one tooth only, and on weak part of that tooth—resulting in loss of power, noisy gears, jerky "back-lash" and stripping of gears.



BAILEY BALL THRUST

Digitized by Google

"F-S" PAINTS



"F-S" Products Are the Result of 50 Years' Experience— You Can Rely on Them

Only the very best materials are used in making "F-S" Superfine Automobile and Coach Colors, extra Automobile and Coach Japan, Gloss Automobile and Wagon Paints, Raven Gloss Automobile and Carriage Paints, and Automobile and Carriage Dressing.

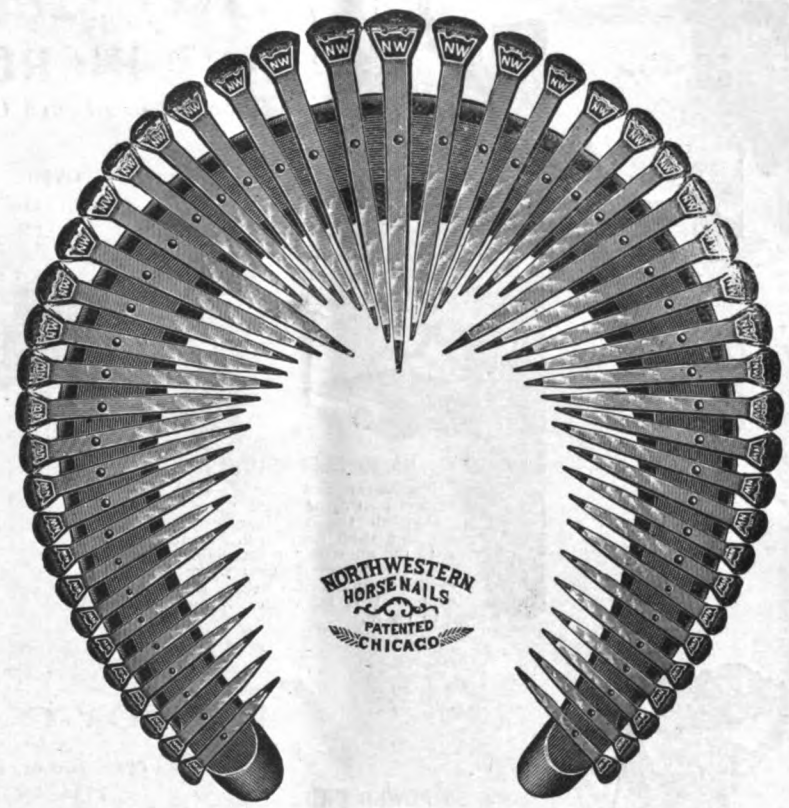
FELTON, SIBLEY & CO., Inc.

Manufacturers of Colors, Paints, Varnishes since 1863

136-140 North Fourth Street, Philadelphia

(152)

NORTHWESTERN HORSE NAILS



MADE OF THE BEST QUALITY MATERIAL

The most perfect in form and finish and will hold a shoe longer than any other nail made.

THE RE-ENFORCED POINT makes it the easiest to drive and the safest to use.

UNION HORSE NAIL COMPANY

Manufacturers

CHICAGO **ILLS.**

JOB WANTED



An able bodied workman seeks a position in some good blacksmith or machine shop.

He is an old acquaintance and friend of the Editor of the Blacksmith and Wheelwright, to whom he is permitted to refer.

He is not particular as to what locality he works in, provided he has plenty of good hard work to do, and his employer honest and careful.

With such a boss, he agrees to never touch intoxicants or indulge in other dissipation. He agrees to be on hand ready for work at seven o'clock in the morning, or any earlier hour the shop opens. He will work overtime without grumbling, even to twenty-four hours daily for as long a period as may be necessary.

He will agree never to strike, ask for higher wages, or even want to go fishing or take a holiday.

He will board himself and remain in perfect health indefinitely. He has no family cares to worry about. He and his brothers, older and younger, are of the well known L. G. P. HAMMER clan, world renowned for skill, integrity and ability.

He is willing to work for twenty cents a day and agrees to do more work than any six skilled men at $3.00 per day. After his wages have been paid for twenty months, he agrees to work for nothing during the remainder of his natural life, which he estimates at fifty years.

He agrees to come on trial, and after thirty days' work, if his boss is not satisfied he will return home without any charge for his services.

He guarantees that he will relieve his employer from all drudgery, so he can spend more time with his family, and not be so eternally tired that he can get no enjoyment out of life.

He will treat all customers so pleasantly and do their work so skillfully that they will always bring their work to his shop, and advise their friends to do likewise.

He is not subject to enlistment or draft, and is ready to leave at once and begin work immediately on arrival.

ADDRESS:

LITTLE GIANT

103 Rock Street

MANKATO, MINN., U. S. A.

MAYER BROTHERS COMPANY MANKATO MINN U.S.A. LITTLE GIANT



ADVANCE OF THE GRAND ARMY

NAPOLEON'S name fills more pages in the world's solemn history than that of any other mortal. The advance of the Grand Army into Russia is the turning point of his career and marks the beginning of his downfall. Mighty armies are once again marching over the same battlefields where Napoleon fought a hundred years ago. All the causes of this mighty struggle may be learned from the pages of history. The one complete, accurate, authoritative and reliable history, containing the rise and fall of every empire, kingdom, principality and power, is the world famed publication,

Ridpath's History of the World

Dr. Ridpath is universally recognized as America's greatest historian. Other men have written histories of one nation or period; Gibbon of Rome, Macaulay of England, Guizot of France, but it remained for Dr. Ridpath to write a history of the **entire World** from the earliest civilization down to the present. We offer the latest edition, 4000 pages, 2000 illustrations, brand new, down to date, beautifully bound in half morocco.

At a Great Sacrifice in Price

We will **name** our **special low price** and **easy terms** of payment only to Blacksmith and Wheelwright readers and in direct letters to all who mail the coupon printed on the lower corner of this advertisement. **Tear off the coupon,** write your name and address plainly and **mail now.** Our **plan of sale** enables you to buy by saving only about ten cents a day for the ensuing year. Mail the coupon now before you forget it. The sample pages are free.

32 Page Booklet Free

We will mail you 32 free sample pages without obligation on your part to buy. These will give you some idea of the splendid illustrations and the wonderfully beautiful style in which the history is written. You can purchase this great history at the **lowest price ever offered** and pay for it in **small sums monthly** if you prefer.

Six Thousand Years of History

Ridpath takes you back to the dawn of history long before the Pyramids of Egypt were built; down through the romantic troubled times of Chaldea's grandeur and Assyria's magnificence; of Babylonia's wealth and luxury; of Greek and Roman splendor; of Mohammedan culture and refinement; to the dawn of yesterday. He covers **every race, every nation, every time** and holds you spellbound by his wonderful eloquence. **Mail the coupon.**

Western Newspaper Association

CHICAGO



FOLD HERE, TEAR OUT, SIGN AND MAIL

8
18
FREE COUPON

Western Newspaper Association
H. E. Sever, Pres.
140 So. Dearborn St., Chicago, Ill.

Please mail 32 free sample pages of Ridpath's History of the World, containing photogravures of Napoleon, Cæsar and other great characters in history, and write me all particulars of your special offer to The Blacksmith and Wheelwright readers.

Name .....

Address .....

Mail this Coupon

Digitized by Google

The Better Your Equipment The Bigger Your Profits

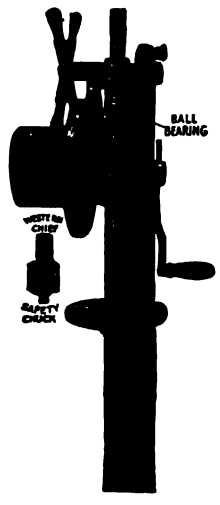
Buy CANEDY-OTTO

AND INCREASE YOUR INCOME

Once Tried, Always Used : There's a Reason—Quality

OVER 200 DIFFERENT STYLES

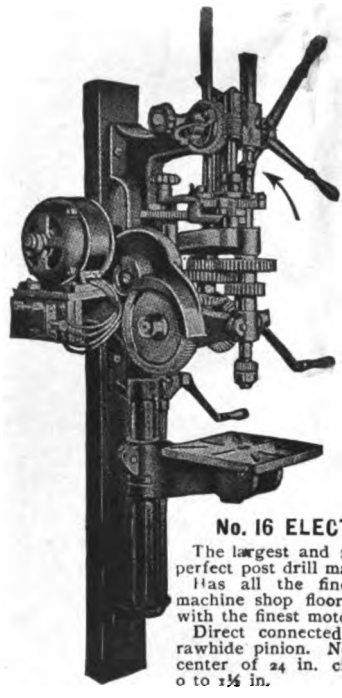
SEND FOR CATALOGUE No. 12,



No. 19 DRILL

A low-priced combined hand and power self-feed drill.

Drills to center of 16½ in. circle.



No. 16 ELECTRIC DRILL

The largest and most mechanically perfect post drill manufactured.

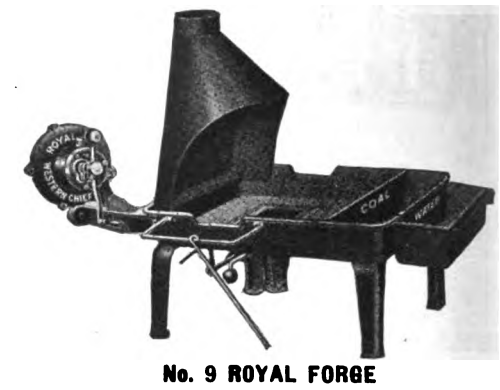
Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.

Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1½ in.



No. 100 ROYAL FORGE

The most popular forge ever made.
Fan, 12 in. Hearth, 31½x45½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x36 in. Blower, 14 in.



Blower, 12"
Wt., 135 lbs
Height, 47"

ROYAL BLOWER

(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.

Fire pot is 8x6 in. inside.



No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.

All machines are tested before leaving the factory, and guaranteed in every respect.

Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS



No. 1 1/2 SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



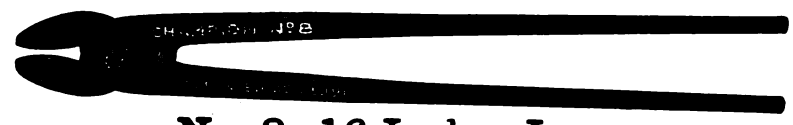
No. 8 ELECTRIC BLOWER

The best outfit money can buy.

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge

Nothing to get out of order.



Will hold securely any size of shoe.

No. 8 16 Inches Long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

Weights, 1¾ to 3 lbs.

This Hammer is the most popular Sharpening Hammer on the market.

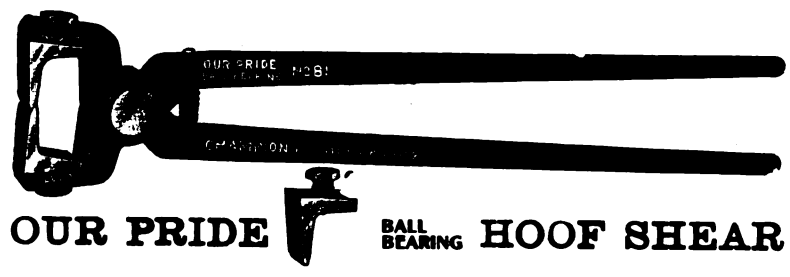


Corrugated Pein

IT GIVES RESULTS.

No. 12 ELECTRIC SHARPENING HAMMER

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.



Blades easily replaced when worn out.

All parts interchangeable.

OUR PRIDE BALL BEARING HOOF SHEAR

Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY, - Meadville, Pa., U. S. A.

THE LIVINGSTON CO., 131 E. 23rd Street, NEW YORK, Eastern Representatives

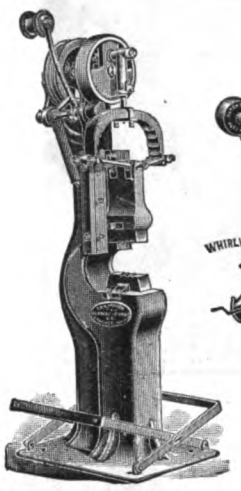
Digitized by Google

THE FAMOUS "CHAMPION" BLACKSMITH TOOLS



No. 400. Crank turns either way.

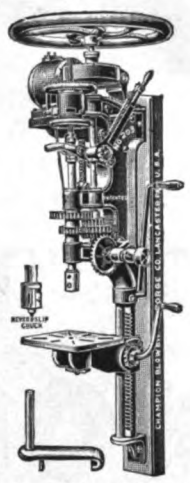
FAMOUS 400



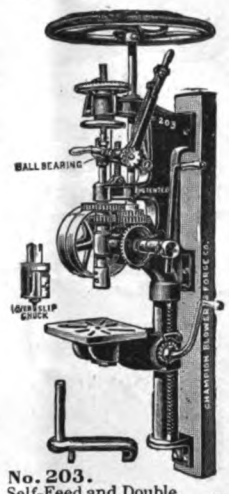
Hercules Patented Power Hammer. Weight of ram, 65 pounds.



No. 408. Steel Blacksmith's Forge.



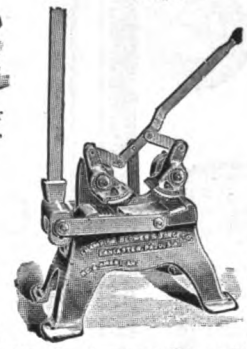
No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.



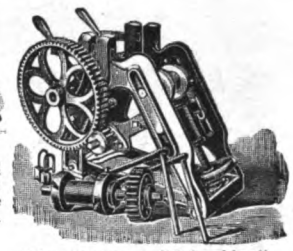
No. 203. Self-Feed and Double Compound Lever Feed Drill.



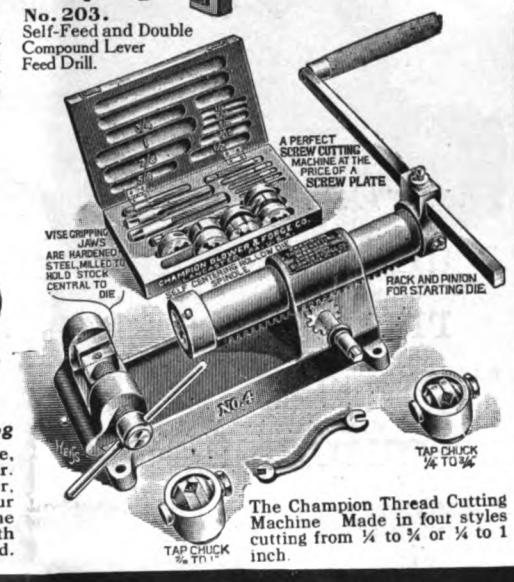
No. 200. Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



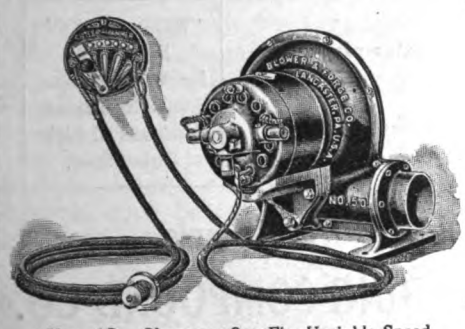
No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



The Champion "Columbian" Tire Bender. Made in 3 sizes.



The Champion Thread Cutting Machine. Made in four styles cutting from ¼ to ¾ or ¼ to 1 inch.



No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower.



No. 433. Cast Iron Blacksmith's Forge.

Don't Fail to Get Our 1918 Catalog

Before purchasing a Hand Blower, Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

INDIAN CHIEF VISES

Black-smiths' Horse-shoers'



BOKER CUTLERY & HARDWARE CO., Inc.
Sole Sales Agents
101-103 Duane Street, New York City

Solid Box – Solid steel drop forged jaws faced with crucible tool steel. Improved screw of one piece of forged steel. Built right throughout.

THE COLUMBUS FORGE & IRON CO., COLUMBUS, OHIO.

Would You Sell Your Life For $65?

You wouldn't part with even an arm or a leg for that figure, would you?

Yet every vicious horse you shoe is likely to do more damage in the twinkling of an eye than can be repaired at several times the cost of **Barcus Stocks.**

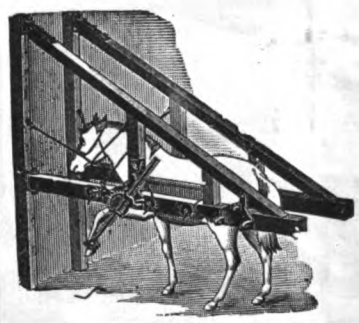
When you place a horse in a Barcus Stock, he is harmless—he cannot hurt either you or himself. Costing only $65 it is cheap insurance, indeed.

BARCUS STOCKS not only furnish the logical way to observe "Safety First," but they are also a positive aid to good shoeing. The BARCUS is a modern Stock—automatic working parts instead of the bothersome ropes, straps and blocks that made the old style stock almost more of a nuisance than a help.

If you don't know about **Barcus Stocks** you owe it to yourself and your family to write **at once** for the complete details.

The Barcus Mfg. Co.,

Wabash, Ind.

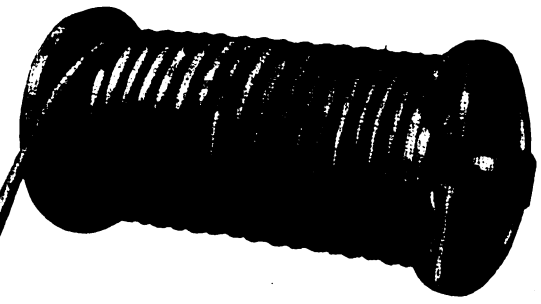


Please send me full particulars regarding your Horse Stocks without any obligation on my part.

Name.....

Town..... *State*.....

Digitized by Google



Tie Up to Firestone

—*because* vehicle owners all know that Firestone Carriage Tires give Most Miles per Dollar. Such is the equipment for you to offer now, particularly when people demand better service than ever and are buying with more care.

The quality of Firestone Carriage Tire makes it wear evenly down to the channel. It does not chip, crack and break. It wears down slowly and gives easy, resilient riding.

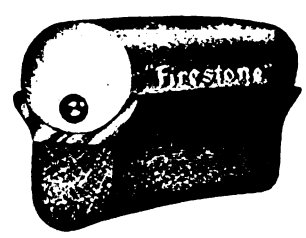


Internal Wire



Side Wire

Firestone carriage rubber combines full size with the lightness which makes it profitable equipment for you to apply. Write your jobber or us for our interesting proposition.



Cushion

FIRESTONE TIRE & RUBBER COMPANY
FIRESTONE PARK, AKRON, O.
Branches and Dealers Everywhere

Carriage Tire

FREE SAMPLE OF FLUX



WELD TRADE A MARK CAST

A SUPERIOR FLUX FOR

OXY-ACETYLENE WELDING

"WELD-A-CAST" Flux No. 1 for Welding Cast Iron.

Eliminates pin holes and blow holes, leaving the metal soft.

"WELD-A-CAST" Flux No. 3 for Welding Brass, Bronze, High Speed Steel, and all High Carbon Steel.

Prove it! Write for Sample.

CORTLAND WELDING COMPOUND CO.

CORTLAND, N. Y.

A *Little Giant* in the Garage

Saves Time—Labor—Expense

Make Your Own Threaded Parts!

Don't waste time in sending to the factory when a Little Giant Combination Screw Plate will put your cars back on the road in a fraction of the time otherwise required.

It is often possible to run over bruised threads without removing the part from the car. In close quarters, too cramped for the regular die stock, the Bit Brace Die Holder may be used—(the illustration shows a repairman cleaning up the threads on a spring shackle bolt).

Ask your dealer for No. 310 or 311 Little Giant Combination Screw Plate covering the sizes of U. S. S. and S. A. E. Standard threads commonly used in automobile construction—or write direct to Greenfield for catalog and discount.

Greenfield Tap & Die Corporation

Greenfield, Massachusetts, U. S. A.

New York, 28 Warren St. Chicago, 13 South Clinton St.

Canadian Plant:
Wells Brothers Company of Canada, Ltd.
Galt, Ontario



Digitized by Google

WAGON BUILDING

"Build me a wagon that will last forever."

"Sorry, Sir, but 'axle troubles' (due to wear—wear on the spindle, or on the box, or both) make it impossible."

You've often received a specification like that and been obliged to give that answer—haven't you?

The Sheldon "TON-DON"—an axle that will not wear, run hot or break—allows your meeting the requirements of the man who wants a wagon to last forever, **and we have told him so.**

The Sheldon "TON-DON" was originally made for buggies and carriages. Its success was so instantaneous and pronounced that we were deluged with requests for an axle embodying the same principle for use on Delivery, on Business and on Express Wagons.

Hence, the "TON-DON" CONCORD EXPRESS.
In EFFICIENCY—The HIGHEST.
In CONSTRUCTION—The SIMPLEST.
In SERVICE—The MOST SATISFACTORY.

The Spindle of the Sheldon Ton-Don Axle

Ordinary axles wear flat on the bottom of the spindle because the bottom side is the point of contact and where the wear of the spindle is concentrated. It takes a spindle of unusual hardness to resist this wear—greater hardness than any ordinary axle affords. The spindle of the "TON-DON" is hardened by a special process, producing a wearing surface of such hardness that a fine file makes no impression on it—yet the center remains soft or "natural."

The Phosphor-Bronze Lined Box

The peculiarity of this box lining is that while somewhat softer than the spindle, there is no perceptible wear after thousands of miles of running, but becomes harder and more wear-resisting with use.

Phosphor-Bronze (of a mixture which increases its toughness, smoothness under friction, and wear-resisting qualities) is a metal used for making the propellers of ocean steamships, bearings for locomotives, crank-shaft bearings for automobiles and other fine machinery. Imagine what a metal must be to meet such conditions, and you will grasp the advantages of applying such metal to axle purposes.

THESE AXLES CARRIED IN STOCK BY THE FOLLOWING JOBBERS AND CAN BE OBTAINED AT MANUFACTURERS' PRICES.

Baltimore, Md.....E. Scott Payne Co.	Providence, R. I...Congdon & Carpenter Co.
Boston, Mass.....E. P. Sanderson Co.	Rochester, N. Y.....Burke Iron & Steel Co.
Buffalo, N. Y.....H. D. Taylor Co.	San Francisco, Cal....Waterhouse & Lester Co.
Chicago, Ill.....E. D. Kimball Co.	Scranton, Pa.....Bittenbender & Co.
Cincinnati, O.....G. B. Schulte Sons Co.	Seattle, Wash.....Gray Bros. Co.
Indianapolis, Ind.....W. J. Holliday & Co.	Springfield, Mass.....Chas. C. Lewis & Co.
Los Angeles, Cal.....Percival Iron Co.	St. Louis, Mo.....Sligo Iron Store Co.
Milwaukee, Wis....Shadbolt & Boyd Iron Co.	Washington, D. C.....Louis Hartig
Pittsburgh, Pa.....McLean & McGinness	Wilmington, Del.....Delaware Hardware Co.
Portland, Oregon.....J. E. Haseltine & Co.	Bridgeport, Conn.....Chapman & Bangs Co.
Ft. Wayne, Ind.....Mossman, Yarnelle & Co.	San Antonio, Texas...Heusinger Hardware Co.
New Orleans, La.....Jos. Schwartz & Co.	

SHELDON

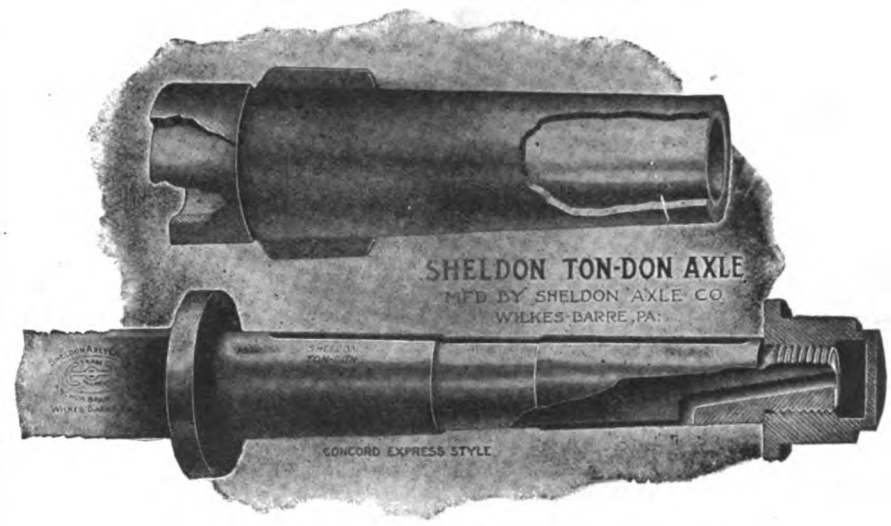
"TON-DON"

CONCORD EXPRESS STYLE

NOT A BALL OR ROLLER BEARING—BUT

ANTI-FRICTION—EVERLASTING—INTERCHANGEABLE

IT WILL NOT CUT, HEAT OR STICK



NOTICE THE PATENTED OILING DEVICE
HAS ALL THE ADVANTAGES OF FRICTION AND ANTI-FRICTION AXLES
WITHOUT THEIR DISADVANTAGES
"TON-DON" MEANS KNOWN QUALITY WITHOUT FANCY PRICE
MADE ALSO FOR BUGGIES AND SURRIES

SHELDON AXLE & SPRING CO.,
WILKES-BARRE, PA.

LARGEST AXLE FACTORY IN THE WORLD.

PHOENIX HORSE SHOES

Constant Demand is the Best Proof of Their Superiority.

Practical to the Highest Degree. Made of Unexcelled Material.

BULL DOG CALKS

Hold Firmly to the Shoe. Never Jump Out When Set. Easy to Drive in Shoe.
Perfect in Every Detail.

FOR SALE BY ALL DEALERS. WRITE FOR SAMPLES.

WE ARE THE LARGEST HORSE SHOE MANUFACTURERS IN THE WORLD.





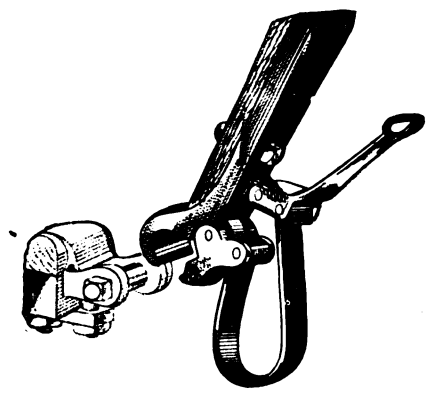
PHOENIX
Horse Shoe Company
CHICAGO, ILLINOIS

ROLLING MILLS and FACTORIES JOLIET, ILLINOIS; POUGHKEEPSIE, N. Y.

Digitized by Google

THE BRADLEY

Hold-Fast Carriage Coupler



PATENTS

April 3, 1900 Sept. 23, 1902
May 7, 1901 Dec. 18, 1906

When you get right down to bare ground, there is no carriage coupler—

USING THE REGULAR JACK WITH BOLT

that comes within a mile of touching the all-steel

Bradley Hold-Fast Carriage Coupler

One Size: Suitable for Buggies and Surreys

C. C. BRADLEY & SON

SYRACUSE, N. Y.

IT HURTS

When You Lose Large Orders

because you are not equipped to turn out quantity.

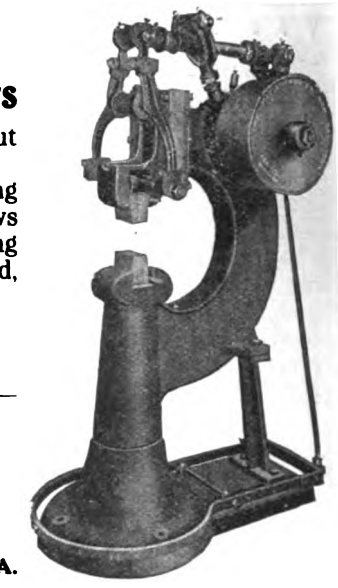
There are men so constituted that everything they touch moves, and everybody knows that when these men take hold of a thing it will go. They are success organized, natural pushers, thinkers, doers, achievers.

The Kerrihard Power Hammer

works hand in hand with these captains of industry—enabling them to do the almost impossible.

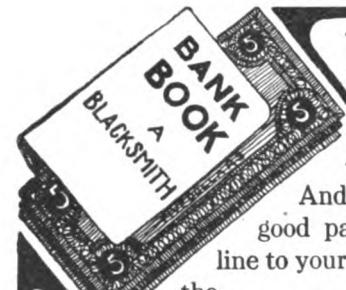
The Kerrihard Power Hammer does the work of four men.

Write for Full Information



THE KERRIHARD COMPANY

Kerrihard Station **Red Oak, Iowa, U. S. A.**



IF YOU WANT A FAT BANK ACCOUNT

And an extra good paying side line to your business, the

IDEAL Welding Outfit

Will do the trick.

Cold weather causes more breaks in metals than any other cause, so if you are equipped with our "IDEAL" welding outfit to repair breaks in axles, gear cases, chassis, cylinders, and other parts, you will reap the cream of business.

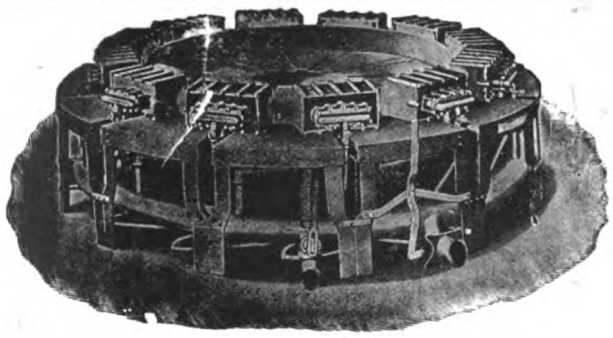
Come in *now* and beat the other fellow to it.

Write *today* for full particulars



General Welding Company

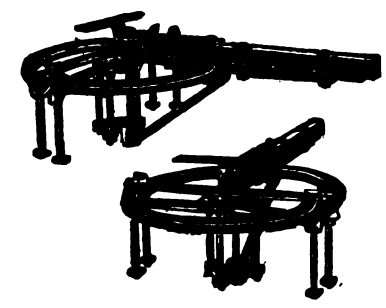
363 14th St., Hoboken, N. J.



TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.

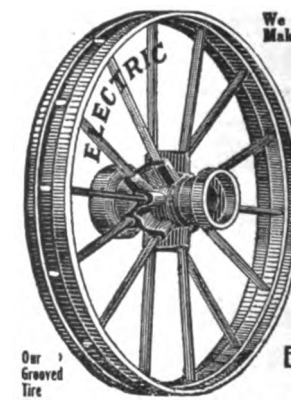
OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.





Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE COGEL MFG. CO., TOLEDO, OHIO.



Our Grooved Tire

We Make **STEEL WHEELS** To Fit Any Axle Plain or Grooved Tire

Steel or Hickory Axles Any Size

A Full Line of **Wood and Steel Farm Trucks** With Steel or Wood Wheels

Write for Large Catalog and Prices

ELECTRIC WHEEL CO.

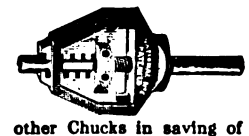
Box N, Quincy, Ill.

WELDING PLANTS, $25.00 to $300.00

Designed for all purposes. Small cash payment; balance, three to six months. Every mechanic and shop should have one.

BERTSCHY-BERMO CO. **OMAHA, U. S. A.**

"NATIONAL" BLACKSMITHS' DRILL CHUCK



Made especially for Blacksmithing and Carriage Work.

Positive, durable, strongest, self-cleaning, always works, quickest to change Drills, casts no shadow, will save its cost over other Chucks in saving of time. BUY THE BEST. Money refunded if not as represented. Ask your jobber for it, or send direct for prices and circular.

ONEIDA NATIONAL CHUCK CO., Oneida, N. Y.

PATENTS

C. L. PARKER

Ex-Member Examining Corps, U. S. Patent Office

Attorney-at-Law and Solicitor of Patents

American and foreign Patents secured. Trade marks registered. Searches made to determine patentability, validity and infringement. Patent suits conducted. Pamphlet of instructions sent upon request.

McGill Building WASHINGTON, D. C.

---

916 Pages instead of 824 **1918—SEVENTH EDITION** 3362 Illustrations instead of 2000

$3.82 prepaid **DYKE'S AUTO ENCYCLOPEDIA** $3.82 prepaid

Entirely re-written, hundreds of illustrations and many new subjects added. Practically a new book. A non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 50 Instructions—Simplified and Practical.

3362 Illustrations—the kind you understand at a glance.

2 Supplements, part printed in two colors, treating on the construction, operation, repairing and adjusting of the FORD and PACKARD—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.

778 illustrations and 279 pages on Electric Ignition, Electric Starters and Generators, etc.

51 pages and 79 illustrations on the Delco system alone.

60 pages and 254 illustrations on Adjustments, Tests, etc., of leading Electric Systems.

184 pages and 1189 illustrations on Repairing.

Oxy-Acetylene welding. Axle, Differential and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.

27 pages and 180 illustrations on Tires and Tire Repairing.

44 pages and 119 illustrations on Carburetion.

89 pages and 291 illustrations on Engines and Parts.

16 pages on Digest of Troubles.

6000 lines to the Index. This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. Index begins on colored paper, easy to refer to.

Dictionary is also included, which gives the meaning of motoring terms.

Inserts: There are five—printed in colors. New features you never before saw or heard of in one of the inserts.

Additions to the Seventh Edition:

TRUCKS, TRACTORS, MOTORCYCLES, AIRPLANES AND AIRPLANE ENGINES

HOW TO BECOME AN EXPERT AUTOMOBILE MECHANICIAN

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion subject so thoroughly, you can adjust any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical Automobile book in America. Price $3.82, prepaid.

Address all orders to

THE BLACKSMITH & WHEELWRIGHT

73 MURRAY STREET NEW YORK



It's worth ten times its cost if only placed on the shelf and used as a reference.

Digitized by Google



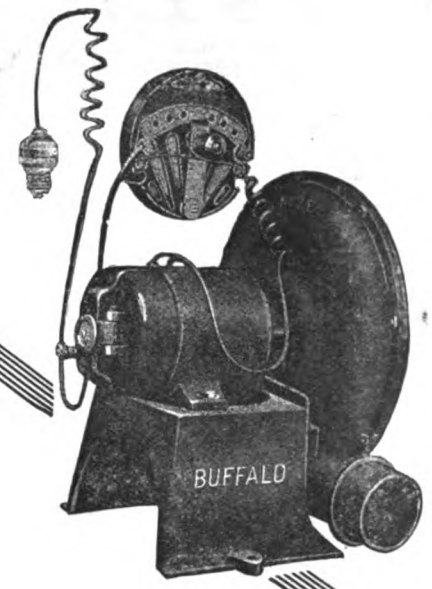
No. 228-E Forge

32 x 44 in. hearth. Suitable for practically all blacksmithing work.

Forty years of experience and knowledge of Blacksmith Shop requirements has placed Buffalo Tools so far ahead of any others, that once you see them you'll say "good-bye" to the other kind.

No. 2-E Electric Blower

Can be installed in any blacksmith shop—saves hand blowing.



"Buffalo"

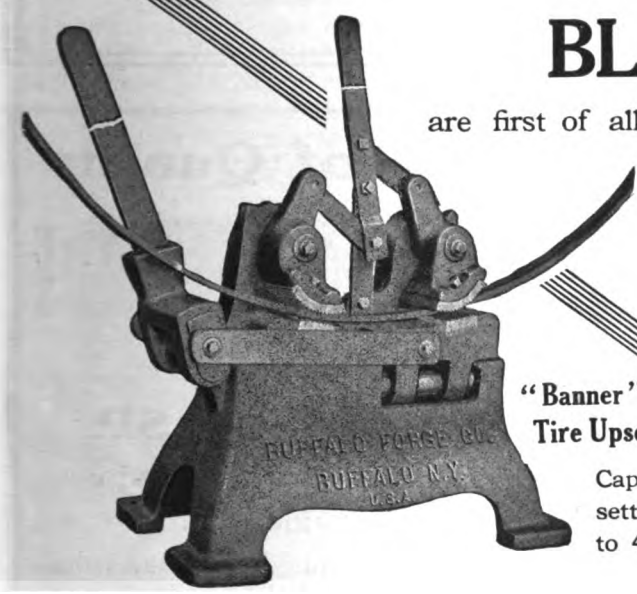
BLACKSMITH TOOLS

are first of all—dependable. They will stand up under continuous service—and hard service, too.
They are constructed of good material, by skilled workmen.

These are facts you should keep in mind, when buying Blacksmith Shop Equipment.

We'll be glad to mail you a copy of Catalog 179-6

Buffalo Forge Co.
Buffalo, N. Y.

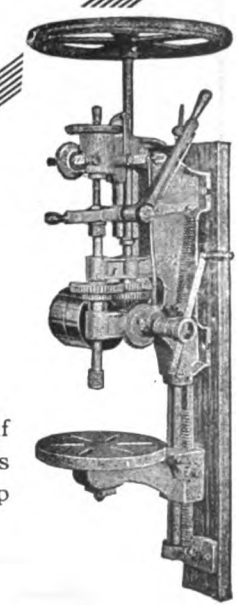


"Banner" Tire Upsetter

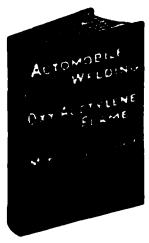
Capable of setting tires up to 4 x 1 in.

No. 221

Multi-compound automatic self and lever feed, 22 in. swing, drills to 1½ in. hole. Fitted with Suregrip chuck.



JUST PUBLISHED



AUTOMOBILE WELDING

WITH THE OXY-ACETYLENE FLAME

By M. KEITH DUNHAM

167 Pages **Price $1.00** Fully Illustrated

Sent Postpaid to Any Part of the World.

This is the only complete book on the "Why" and "How" of Welding.

EXPLAINS in a simple manner apparatus to be used, its care, and how to construct necessary shop equipment. Proceeds then to the actual welding of all automobile parts, in a manner understandable by everyone.

Gives principles never to be forgotten. Aluminum, cast iron, steel, copper, brass, bronze and malleable iron are fully treated, as well as a clear explanation of the proper manner to burn the carbon out of the combustion head.

AUTOMOBILE OWNERS, GARAGE AND SERVICE STATIONS, BLACKSMITHS AND MACHINE SHOPS, as well as industries using the oxy-acetylene flame, will find this book of the utmost value, since the perplexing problems arising when metal is heated to a melting point are fully explained and the proper methods to overcome them shown.

CONTENTS

CHAPTER I.—APPARATUS KNOWLEDGE.

Oxygen Supply—Care of Oxygen Cylinder—Acetylene Generator—Care of Generator—Regulators—Care of Regulators—Creeping Regulators—Gauges—Care of Gauges—Welding Torch—Care of Welding Torch—Effects of Heat—Hose and Goggles.

CHAPTER II.—SHOP EQUIPMENT AND INITIAL PROCEDURE.

Preheating Agencies—Welding Table—Location of Welding Outfit—Starting the Welding Outfit—Adjustment of Flame—Principle of Welding—General Welding Knowledge—Welding Rods and Fluxes—Choice of Tip—Expansion and Contraction.

CHAPTER III.—CAST IRON.

Simple Welding—How to Hold the Flame—Hard Cast Iron—Pin Holes and Blow Holes—Lug on Cylinder—Water Outlet—Cylinder Welding—Compression Head—Finishing and Testing—Scored Cylinders—Cylinder Parts—Fly Wheels—Pistons—Crank Cases—Babbitted Bearings—Valve Guides—Preserving Threads—Conclusion of Cast Iron.

CHAPTER IV.—ALUMINUM.

Use of Welding Knowledge—Puddle System—Flux System—Comparison of Systems—Welding Rod—Preparation of the Weld—Inlet Manifold—Arm of Crank Case—Welding the Arm Without Taking Out the Motor—Break in the Body of Case Welding Cold—Wrong Method of Setting Up—Lug or Boss Welding—Preheating the Case—Gas Preheating Flame—One Side or Both—Collapse of Weld—Broken Bearings—Direction of Welding—Shrinkage Cracks—Missing Parts—Finishing—Die Mould Castings—Body—Other Parts.

CHAPTER V.—STEEL

Welding Knowledge—What the Flame Does to Steel—The Welding Rod—Simple Welding—Position of Flame—Reinforcing the Weld—Frame Welding—Lengthening the Chassis—Tube Housings—Worn Parts—Gear Welding—Case Hardening—Light Metal Welding—Gasoline Tank—Welding Adjacent to Rivets—Shaft Welding—Construction of Parts.

CHAPTER VI.—MALLEABLE IRON COPPER, BRASS, BRONZE.

How to Detect Malleable Iron—Brazing Malleable Iron—Rear Housing—Reinforcing the Braze—Brazing Tube to Housing—Building Up Worn Parts—Copper—Brass and Bronze—Silver Soldering.

CHAPTER VII.—CARBON BURNING AND OTHER USES OF OXYGEN AND ACETYLENE.

Principle of Carbon Burning—Method of Operation—Lead Burning—Soldering—Case Hardening—Heating Uses.

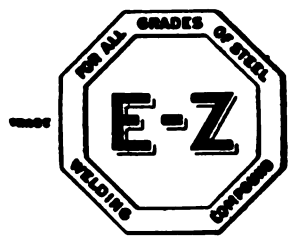
CHAPTER VIII.—HOW TO FIGURE COST OF WELDING.

Oxygen Consumption—Dissolved Acetylene Consumption—Torch Consumption Test—Acetylene Generator Consumption—Cost Card—Conclusion.

ADDRESS ALL ORDERS TO

M. T. RICHARDSON COMPANY, 71-73 Murray St., NEW YORK

"E-Z" WELDING COMPOUND



is the best **BECAUSE**

It works Equally good on all Kinds of steel.

It welds at **lower heat** than any other.

It **sticks** to metal at a **very low** heat.

It leaves **no scale.**

USE IT ONCE AND YOU WILL ALWAYS WANT IT

Crescent Welding Compound

MAKES SMOOTHER WELDS THAN ANY OTHER

It is fine for plow work or where parts are fastened together before welding, or for making split welds, finishing heats, or for welding under dies, etc., etc.

CRESCENT WELDING COMPOUND TRADE MARK

It insures smooth finish and perfect welds on Toe Calks.

"Money back" from any jobber if "E-Z" or Crescent does not give perfect results.

We will send samples free of charge.

MADE ONLY BY

Anti-Borax Compound Co.
FT. WAYNE, IND.

Digitized by Google

LINDE OXYGEN

From Coast to Coast 65 Producing Plants and Distributing Stations provide an unlimited supply of Linde Oxygen for users everywhere.

LINDE SERVICE means no investment except for oxygen actually received—no expensive overhead or upkeep charges.

Linde Oxygen may be obtained from any of the following Linde Plants and Distributing Stations where a large suppply of charged 100 to 200 cu. ft. cylinders is kept on hand constantly to insure immediate shipments.

Mail or telephone your order to THE LINDE AIR PRODUCTS CO., at the nearest point. **Shipments will be made on day order is received.**

PRODUCING PLANTS AND WAREHOUSES

Alabama
***Birmingham**
10th Ave. & 28th St.
California
***Emeryville, Oakland**
***Los Angeles**
1405 Mission Road
Colorado
***Denver**
S. B'way & Exposition Ave.
Connecticut
Hartford
1095 Main Street
District of Columbia
Washington
9th & Maryland Ave., S. W.
Georgia
***Alanta**
Plyant St. & Southern R. R.
Savannah
OgeecheeCanal,So.of BaySt.
Illinois
***Chicago**
3633 Wall Street
East St. Louis
6th & Walnut Ave.
Peoria
721-731 So. Washington St.
Indiana
***East Chicago**
S.E.Cor. Kennedy& 145th St.
Fort Wayne
414 E. Columbia Street
***Indianapolis**
2819 Roosevelt Ave.
Iowa
Davenport
118 Harrison Street
Des Moines
117 W. 5th Street
Kansas
Wichita
Rock Island Ave. & 2nd St.
Kentucky
Louisville
126 East Main St.
Louisiana
New Orleans
861 Fulton Street
Maryland
***Baltimore**
25th & Montebello Ave.

Massachusetts
Cambridge
25 Waverly Street
Springfield
Napier Street
***Worcester**
961 Southbridge St.
Michigan
***Detroit**
St. Aubin Ave. & Newton St.
Grand Rapids
Pearl Street by the Bridge
Minnesota
Duluth
Seventh Ave., West
***Minneapolis**
1809 Hennepin Ave.
Missouri
***North Kansas City**
14th & Charlotte St.
***St. Louis**
4218 Forest Park Blvd.
Nebraska
Omaha
1007 Jones Street
New Jersey
***Elizabeth**
Linden Ave.
Newark
354 Plane Street
New York
Albany
Montgomery & Colonie Sts.
***Brooklyn**
475 Driggs Ave.
***Buffalo**
155-183 Chandler St.
***Utica**
Walnut & Schuyler Sts.
Ohio
***Cleveland**
802 East 72nd Street
***Cincinnati**
Stanton & Mellish Aves.
Columbus
310 Dublin Ave.
Dayton
521 E. First Street
Lima
338 East High Street

Ohio
Toledo
441 South Erie Street
***Youngstown**
601-621 Jones Street
Oklahoma
Oklahoma City
27 E. Grand Ave.
Tulsa
1 North Boulder St
Oregon
Portland
15th & Hoyt Streets
Pennsylvania
Erie
1502 Sassafras Street
***Norristown**
***No. Philadelphia**
18th & Cambria Streets
Pittsburgh
16th & Pike Streets
***Trafford**
Tennessee
Chattanooga
212-238 King Street
Memphis
203 Washington St.
Texas
***Dallas**
Harwood and Coombs St.
Houston
Cedar & Baker Sts.
San Antonio
512 Dolorosa St.
Utah
Salt Lake City
112 West Second St., South
Virginia
Richmond
1709 E. Carey Street
Washington
***Seattle**
Henrietta St. & 8th Ave., So.
Spokane
121-123 S. Madison St.
Wisconsin
Manitowoc
810 Quay Street
***Milwaukee**
36th St. & National Ave.

(Star) * Designates Plants.

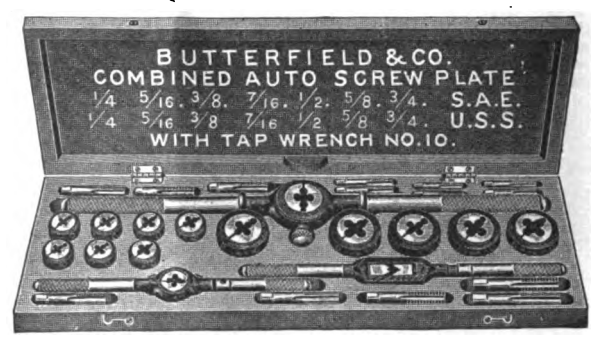
Other Plants and Distributing Stations are planned for other industrial centers throughout the country and will be established as fast as and wherever the local demand for oxygen warrants.

THE LINDE AIR PRODUCTS COMPANY

Largest Producers of Pure Oxygen in America

Forty-Second St. Building **NEW YORK**

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.
New York Store: 126 Chambers Street

The Horse Rasp of Quality



Ask your Dealer for the

IMPROVED HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, **"Slim," "Light," "Slim Light"** and **"Fine Cut."** Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial. New catalogue mailed free on application.

HELLER BROTHERS CO. *Established in 1836* **Newark, N. J.**



Yes! Its a Glass Hard Case and Produced with a Non-poisonous Chemical

FERRO CASE

For Case-Hardening

Is Something You Have Been Looking For

A NON-poisonous chemical that is used by sprinkling upon the red-hot steel, or in a cyanide melting furnace, same as cyanide has formerly been used.

Consumers, large and small, have used Ferro Case for years. So will you, after a trial.

Today is the Time to Write for Prices and Your Dealer's Name Will be Appreciated.

C. G. BUCHANAN CHEMICAL CO.

Makers of Industrial Chemicals and the only makers of Ferro Case

120 East Pearl Street - - - - Cincinnati, Ohio

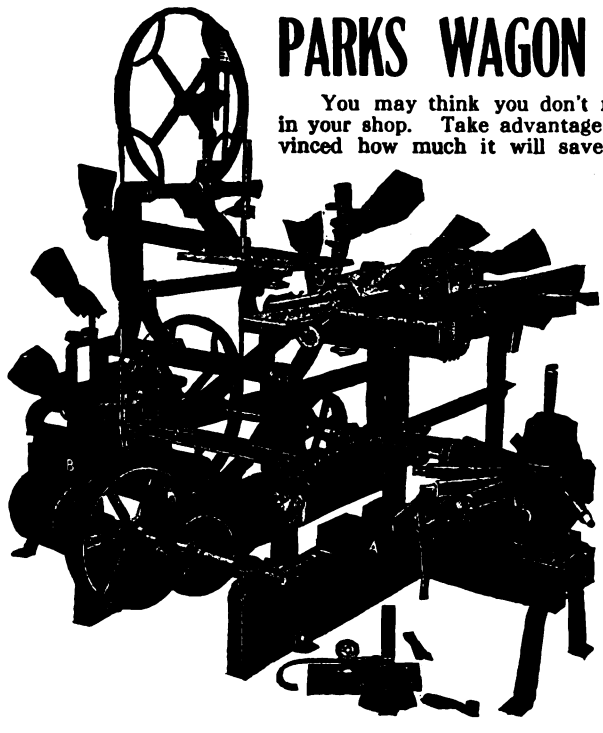
THE ARMSTRONG MFG. COMPANY

BRIDGEPORT CONN., U.S.A. **NEW YORK OFFICE 248 CANAL STREET**

like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



"Makers of the Genuine ARMSTRONG Stocks and Dies."



PARKS WAGON SHOP SPECIAL

You may think you don't need this practical woodworker in your shop. Take advantage of our trial offer, and be convinced how much it will save you. **Machines sent on trial anywhere in United States and Canada.**

Machine is a combination of Circular, Rip and Cross Cut Saws,
22" Band Saw,
12" Jointer,
Rim Rounder,
Felloe Borer,
Spoke Tenoner,

All ready for instant use. No Changing.

Light size takes 2 to 3 H. P., heavy size 3 to 4 H. P.

Write for catalog and full information about how a woodworker should be arranged to be convenient to operate.

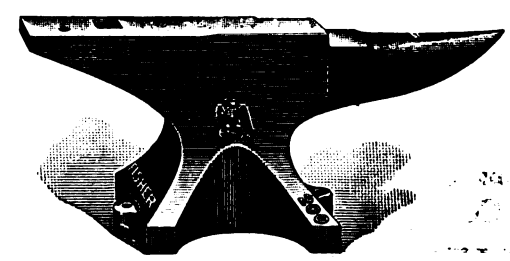
Parks Ball Bearing Machine Co.
North Side Station
Cincinnati, O.

1843 EAGLE ANVILS 1918
AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE
BLACKSMITH AND WHEELWRIGHT

Vol. LXXVIII. No. 2. NEW YORK, AUGUST, 1918. TERMS ONE DOLLAR A YEAR

Design, Construction, Operation and Repair of Automobiles and Motor Vehicles

Part VII—The Generation of Electrical Current Continued, and the Principles of Starting Motors, Generators and Regulating Systems

In our last installment of this article we found that the current was generated in a wire or coil every time that coil was cut by magnetic lines of force. We found that the magneto was the simplest form of generating apparatus. Now, obviously, it would be impossible for us to use the alternating current from the magneto to charge a storage battery. Alternating current may be used for light or for ignition purposes and in the latter case alternating current is much easier to use in secondary coils than direct current, but in charging a storage battery it is necessary to use current flowing in one direction only.

Suppose instead of connecting the magneto armature wires directly with the outside circuit, we connected them with some sort of mechanical device which would alter the connections at every half revolution of the armature. If this were the case the current would flow from the outside wire in a certain direction from the magneto. As the armature turned over and the current in the wire changed its direction, the automatic device would change the connections and in this way the current through the outside circuit would be kept running in one direction only.

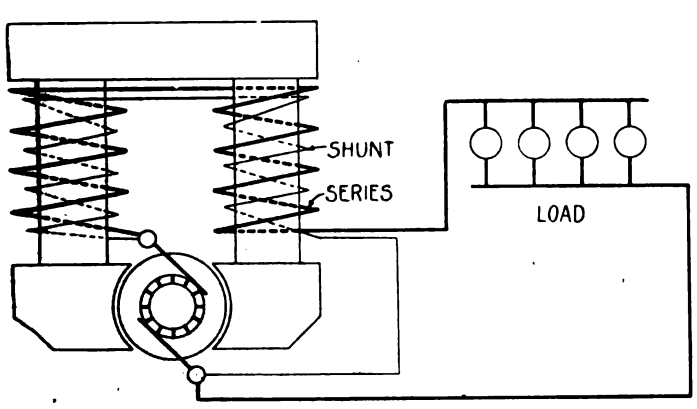


Fig. 25—Wiring Diagram of Compound Wound Generator.

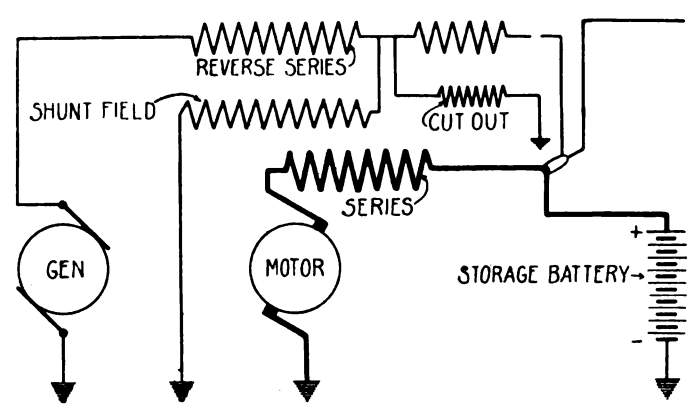


Fig. 26—Wiring Diagram of Reverse Series Wound Generator.

This automatic deivice is termed the commutator and is located usually upon the end of the armature shaft. It consists of a number of segments insulated from each other and turned to a true circle in a lathe. Each one of these segments is connected with a coil upon the armature. If the armature were of the shuttle type such as might be found in a magneto, the commutator would have but two segments. If this sort of a machine were used to generate current, one can see that the current would be irregular; that is, while the coil was cutting the greatest number of lines of force, the current would be at its maximum strength. As the number of lines of force cut, diminished, the current would drop until it reached zero, then it would reach the maximum point again. Obviously, the current of this type could not be used for storage battery purposes, and so the armature is wound with a great number of coils, then the collector brushes which rest upon the commutator are placed so that they will collect the current from the wires when the current is at its maximum strength.

In this way the current is kept running through the exterior wiring and this current will depend upon the speed of the armature providing it is not regulated by an outside means such as we will speak of later. When a magneto is used for ignition purposes only, it matters little whether the voltage and amperage rises and falls or not. However, the current must be continuous if it is to be used for charging the battery. One can see that if permanent magnets were used, sooner or later the permanent magnets would become demagnetized and the current output would be lessened. For this reason generators are usually fitted with electro-magnets rather than permanent magnets.

Now an electro-magnet consists of any piece of soft iron wound with wire. When a current passes through this wire, the soft iron core is magnetized and in a generator the terminals of this field magnet, as it is called, are connected so that the current from the line or from the machine itself will magnetize the core.

If the two brushes which rest upon the commutator are each connected with a terminal of the electro magnet, the machine is said to be shunt wound. In this particular case, as soon as the armature starts to revolve, it generates a certain amount of current. This current passes through the shunt winding and magnetizes the field magnets and as the field magnets grow stronger the current generated grows greater.

All of this current which is generated will not pass through the field magnet windings so by connecting wires with the two brushes, current may be carried to the storage battery or any electrical system. One can see with a machine of this sort that as long as the armature is being revolved a certain amount of current is being generated. If we were to connect one brush of the machine with one terminal of the field magnets; connect the other terminal of the field magnets with the outside circuit and connect the other brush with the outside circuit, current would pass through the outside circuit before it excited the field magnets, and we would term the machine series wound. It would be possible to make a combination of the two and if we did this, the machine would be compound wound. A diagram of the compound winding is shown in Figure 25.

The question comes up why it would not be possible to use either the shunt winding or a series winding machine for charging batteries. Suppose that a storage battery were connected in the line in either one of these machines. When the armature was revolved to a certain speed, the current generated in both cases might be equal to 6 volts and 10 amperes or just enough to charge the storage battery properly. The speed at which the armature traveled might mean an engine speed of approximately 1,000 turns per minute.

Suppose, however, the engine were speeded up, then the armature would travel considerably faster and the voltage would rise to perhaps 7 volts. This would overcharge the battery, and this is the reason for the compound winding.

Shunt winding of the compound generator is so arranged as to excite the field magnets to a certain polarity. The series winding is the reverse of this, however, and has a tendency to excite the magnets to an opposite polarity. As the current increases through either of these coils, it has a tendency to balance that passing through the others and the electro-magnet remains at a certain strength no matter what the voltage of the armature may be. See Figure 26.

This regulation, however, is not ideal. There is a certain amount of fluctuation which is too great for practical purposes and so an outside voltage regulator is made in many different forms.

One of the popular forms is termed the mercury well regulator. A soft iron bar is hung over a pool of mercury and upon the end of the bar is placed a small coil of high resistance wire. Surrounding the bar is a coil of coarse wire. As the current passes through this wire from the generator, the coil attracts the soft iron core, drawing it upward and away from the mercury. As this happens, more of the resistance wire is drawn out of the mercury and the resistance through the circuit is greater, thus preventing the current from increasing above a certain extent. If the current drops for any reason, the iron core drops also, reducing the resistance through the coil and permitting more current to pass into the circuit.

This type of current regulator is not universally satisfactory, however, because there are moving parts to get out of order. Then besides a frequent adjustment is often necessary.

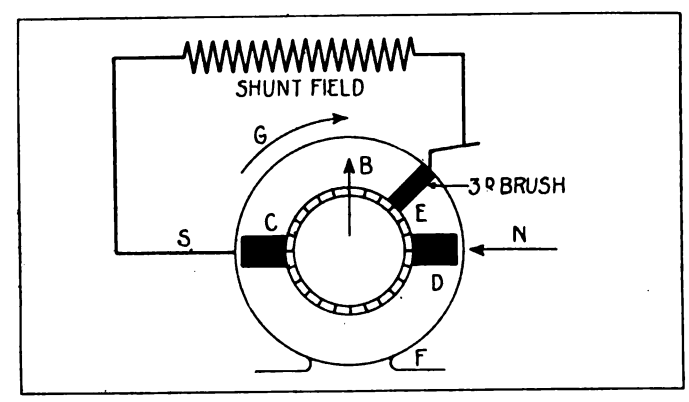


Fig. 27—Wiring of Third Brush Regulated Generator.

Another device which is still being used to a certain extent consists of a vibrator and coil, very similar to the vibrator coils de-

Digitized by Google

scribed in our last installment. The effect of the vibrator was to prevent the increase of current above a certain point for the current in generating through the coil had a tendency to back up upon itself to a certain extent. That is, one wire of the coil would throw off magnetic lines of force which

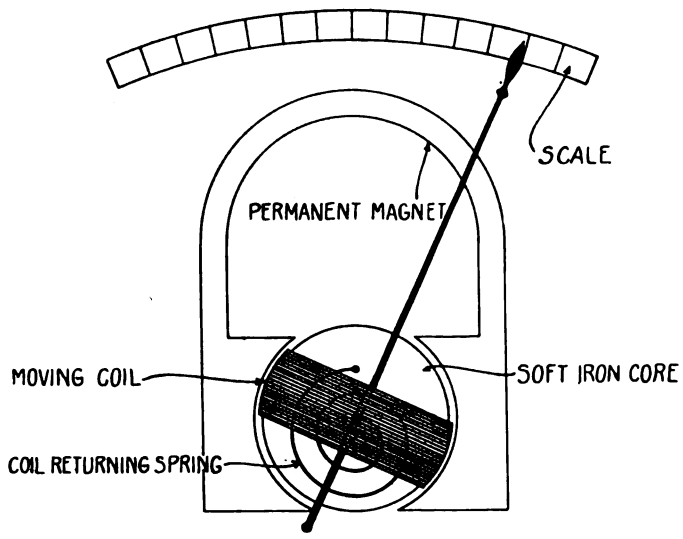


Fig. 28—Illustrating Construction of Ammeter

affected the next wire to it in the opposite direction. This type of regulator also has its drawbacks and we feel safe in saying that the popular type of regulator used to-day is the third brush. A wiring diagram of this is shown in Figure 27.

One of the brushes is connected to one terminal of the field magnets. The other terminal of the field magnets is connected with the third brush while the current for the line is taken from the main brushes C and D. Assuming that the current flowing from C and D is 6½ volts, then the current flowing through the shunt field between C and E which is through the third brush is not as great as that from the main brushes and averages about 5.

Now as the speed of the generator is increased, the voltage increases, and the voltage from C and D increases, and the passage of this current through the armature winding has a tendency to set up a flow of magnetism in the direction of the arrow B. This magnetism neutralizes the magnetism from the fields and decreases the voltage from C to E, thus decreasing the current passing through the shunt field and preventing the increase of current from C to D.

One can see that the nearer the third brush is to D the greater the output of the generator. Consequently one can regulate this machine by moving the third brush. To decrease the output move the brush away from D. To increase it move it toward D.

If we were to connect the two terminals of a generator directly with a storage battery, and if the generator were run at all times, we would have no trouble, but supposing we stopped the generator for some reason or other, then the current from the battery would flow back through the generator coils and discharge itself or run the generator as a motor. For this reason a device called the cut-out is put in the circuit. The cut-out is nothing more or less than an electro-magnet fitted with a movable tongue. The current passes from the generator through the electro-magnet and from the other terminal of the electro-magnet to the tongue, thence to the storage battery, through the storage battery back to the generator again. The current from the generator passing through the coil retains the tongue against the magnet completing the circuit. Around this heavy wiring is a wiring of very fine wire each terminal of which is connected with a terminal of the generator.

Now let us follow the current from the time the generator is put into motion. The generated current flows through the fine coil of wire back to the generator and as soon as it reaches sufficient strength to attract the tongue of the device the tongue is drawn forward toward the magnet completing the circuit to the battery. Part of the current travels through the fine wiring at all times, while the larger part of the current passes through the larger coil to the battery.

The fine wiring is in an opposite direction to the coarse. As soon as the generator stops the current flows backward from the battery and when this current balances the current flowing from the generator, the magnet loses its strength and the tongue returns to its original position, breaking the circuit of the battery and preventing battery discharge.

If the generator, regulator and cut-out were to work all right at all times, no other devices would be necessary. But suppose for any reason one of the units failed—the storage battery might be damaged. And so a device shown in Figure 28, called an ammeter, is put in the circuit between the cut-out and the battery.

An ammeter consists of a permanent steel magnet and a moving coil, the coil is so arranged that it will rotate partially upon a center and is connected with an indicating hand and a coil spring. The purpose of the coil spring is to return the coil to its original position. Inside the coil is a soft iron core.

Under ordinary conditions, when there is no current passing through the moving coil, the coil remains at rest, being held in that position by the spring. Since the coil is cut by lines of force from the steel magnet, any passage of current through the coil has a tendency to rotate it one direction or the other, depending upon the direction of the current.

This distance is limited by the strength of the spring and so a certain amount of current will turn the coil and the indicating hand a certain distance, depending upon the strength of the current. If a scale were placed beneath the hand, then, and calibrated, the amount of current could be determined. The manufacturer marks the scale to correspond with the current, so that if the ammeter is put into a circuit the current passing through it can be read upon the scale.

With an ammeter properly connected in a circuit all of the current passing through the circuit should pass through the ammeter. When the current is passing from the generator, through the ammeter to the battery, the hand is deflected from the center zero point toward the "charge" side. When the current is passing from the battery to the lighting or ignition circuits, it passes in the reverse direction through the ammeter and that instrument is deflected in the opposite direction indicating "discharge," provided of course the generator is furnishing less current than is being used in the outside circuits.

This completes the theory of the generator and its controlling devices. Practically every automobile to-day in addition to the generator, which keeps the battery charged and generates current for the lights and ignition, is fitted with a starting motor. Now a starting motor is nothing more or less than a generator. Let us explain. If the armature of a generator is revolved, magnetic lines of force are cut and current is produced. Suppose, however, we do not revolve the armature but pass the current through the wires in the reverse direction to which it was generated. We will find that the armature will revolve. This fact may be illustrated in the steam engine.

If one should pass steam into the engine, the engine would produce mechanical work. If, however, the flywheel of the steam engine were revolved one would find that a volume of air would be pumped back through the steam connection. Generators may be shunt wound, series wound or compound wound. However, starting motors are usually series wound, for the very reason that a series wound machine gives more power than does any other type when used with current such as is obtained from a storage battery. In a two unit starting and lighting system, then, we have a complete generating plant such as has been described above and an additional series wound machine through which we can pass current as desired. The terminals of this series wound machine are connected through the starting switch with the storage battery and when the starting switch is thrown into action the motor armature revolves, starting the engine.

Now the generator should be run every time the engine is operated, but it would be needless to keep the starting motor in operation except while the engine is being started and so some sort of a device must be arranged to disconnect this unit from the engine at all times except when it is in use. This is usually accomplished by various forms of gears.

The Bendix drive is perhaps the most universally used of all types. In this the motor shaft is fitted with a small gear which will mesh with gear teeth cut in the flywheel of the engine. This small gear is not fastened directly to the starting motor shaft but travels upon a coarse worm thread cut upon the shaft.

The gear is weighted upon one side so that it is slightly out of balance. When the starting motor is thrown into action and the armature revolves, the gear is not in mesh with the flywheel, but as soon as the armature starts to revolve, the gear travels along the worm, until it meshes with the flywheel gear. The weight upon the gear prevents it from revolving with the worm at first.

As the gear meshes with the flywheel gear, it reaches the end of the worm and comes against a spring which absorbs the strain. At the end of the worm the gear begins to rotate with the armature shaft and drives the flywheel.

As the engine begins to operate the flywheel drives the Bendix or pinion gear slightly faster than the motor and causes it to travel back upon the worm and out of mesh.

A second type of gear drive is found upon many of the present day cars and consists of a train of gears meshed with the starting motor drive gear. As the starting switch pedal is thrown in these gears are moved along their respective shafts and meshed with the flywheel.

It would never do to operate the starting motor first. then mesh these gears, for if this happened the teeth would be stripped. So the starting switch is arranged in such a way that the gears are meshed first, then the starting current switched on.

In a number of cases when the ignition switch is thrown on a slight amount of current passes through the motor and revolves the armature slowly so that the gears can be meshed easily.

The system so far described is termed a two-unit starting and lighting system. When the generator and starting-motor are combined it is termed a single-unit system. This system together with various wiring diagrams will be taken up in our next installment.

(To be continued.)

WAR PRICES

A Senator was talking about war prices.

"Like begets like," he said. "One war price creates another. That is why all prices, without exception, must be kept down.

"A farmer the other day took a ploughshare to the blacksmith's to be sharpened, and while the blacksmith worked the farmer chuckled and bragged about a sale of hogs he had just made.

" 'Them hogs was only eight months old,' he said, 'and none too fat, nuther, but I seen that the buyer was at his wits' end, and by skilful jugglin' I boosted up the price on him just 300 per cent. Yes, by gum, I got three times more for them hogs than I uster get before the war.'

"The ploughshare being done, the farmer handed the smith 50 cents.

" 'Hold on,' said the smith, 'I charge $1.50 for that job now.'

" 'You scandalous rascal!' yelled the farmer. 'What do you mean by treblin' your price on me? What have you done it for?'

" 'I've done it,' said the blacksmith, 'so's I'll be able to eat some of that high priced pork of yours this winter.' "—Washington Star.

Digitized by Google

Annealing, Forging, and Hardening High Speed Steel

There Are Many Points To Observe in Working With This Steel Or the Job Will Prove Unsatisfactory

BY J. F. SPRINGER

The blacksmith could probably forge the tool all right, whether the steel is annealed or not. But, as already pointed out, it is better to use annealed material. The annealed stock is stronger, that is to say, tougher; and tools made from it are therefore better able to resist stresses in the neck or shank than if made of the unannealed, and on that account are less liable to breakage at those points. It is understood that a good many breaks, which occurred when high speed steel wasn't as well understood as it is today, were due to the use of unannealed material.

Protect Against Drafts.

The forging may be done with the heat from an ordinary forge fire. It is very desirable, however, that the steel be protected against drafts and the like. If the fire is deep and if it is also clean, we may perhaps guard against drafts and other difficulties. Soft coal is scarcely to be recommended, because it is apt to burn away too rapidly. Coke is to be preferred. However, an ordinary fire is apt to give bad results, partly because of the difficulty of excluding all currents of air and partly because it is not so easy to heat the steel slowly enough to the right temperature.

An improvement over the ordinary fire may be secured by constructing a hood of fire brick over it. The bricks are simply laid in position—no mortar is required. Naturally, the hood may be readily taken down again. The object of the hood is two-fold: first, to hold the heat, and second, to avoid currents of air.

A good way to build a suitable furnace is to provide a grate over a box or chamber into which air at low pressure is admitted by means of a supply tube. This box or chamber, shown in Fig. 2, may be constructed of sheet steel and supported by suitable legs. A downward opening door provides for dumping the ashes. Naturally, the door should close tightly in order to save the air entering by the supply pipe. A wall of fire brick is arranged to envelop the grate and form the furnace chamber.

There should be suitable openings on the side and in front to provide access to the fire. The opening in front may be used to introduce and withdraw work. The side openings may be provided with hoppers into which the fresh supplies of coke or anthracite coal are dumped. A roof of fire brick should be provided to cover the furnace chamber to exclude air currents and retain heat. Of course, a valve to regulate the supply of air should be fitted.

Instead of a furnace using solid fuel, we may substitute one using gas or oil. Naturally, we will purchase a gas furnace and not attempt to construct it. But whether we purchase or construct, we must have a furnace protected from drafts of air.

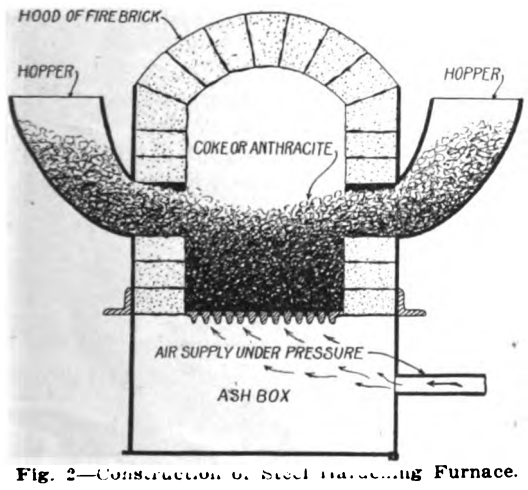


Fig. 2—Construction of Steel Hardening Furnace.

Steel Should Be Heated Slowly.

We heat up the steel gradually when getting ready to forge. This remark applies to the start as well as to other stages of the heating process. If the high speed steel has been well annealed, the slow start will not be as necessary as in the case of unannealed steel.

The temperature of forging high speed steel is higher than that used with carbon steel. The high speed steel resists the hammer more, and this requires us to use a higher heat. Now the very fact of heating up to high temperatures tends to promote big grains in the metal. This condition is not wanted. Consequently, if the high speed steel has been kept at a high heat for any length of time, we may find it desirable to forge very thoroughly. This thorough forging breaks up the big grains and forces the formation of smaller ones. However, it is difficult to make forging penetrate far into the mass of any kind of steel. The proper forging temperature is an orange or even a canary yellow.

Care must be exercised to avoid forging a piece of steel that is unevenly heated. We may easily have, if we are not on the lookout,

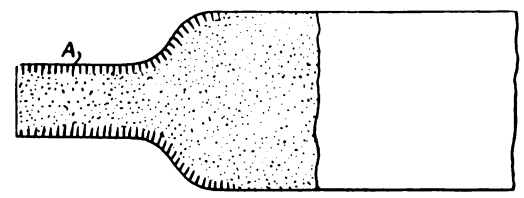


Fig. 3—Surface Cracks Formed by Excess Outside Heating.

a bar of steel that is hotter outside than in the interior. If the difference is considerable, then we may get a lot of fine surface cracks, as shown in Fig. 3 at A. Sometimes, the cracking may not be very noticeable at the time but become evident when the tool is ground or machined. Again, we may have the inside hotter than the outside. If the difference is a decided one, we may get interior cracks, as shown at B, Fig. 4. These arise during the cooling, the interior contracting at a different rate from the exterior.

The way to avoid uneven heating is to heat slowly, especially during the latter half of the heating. When the heat is advanced slowly, there is time for inside and outside to remain fairly close together in point of temperature. It is advised that the forging temperature be high enough to avoid the production of a metallic ring when the hammer is used. There should be only a dull sound. Inside and outside, the steel should be hotter than a bright red.

The smith should be careful not only when he begins to use the hammer, but also later on when the work is cooling off. He is apt to keep on hammering when the temperature has dropped down to the red colors.

The actual hammering is done in much the same way as with ordinary steel. However, since high speed steel resists more, it may be necessary to strike heavier blows. At the same time, the smith should be careful not to strike a small bar with such force as to spoil it.

One Heat for Forging.

It is desirable to do all the forging with one heat, if possible. This will often mean that the smith must hustle. In short, the blacksmith will frequently have to exercise more than ordinary skill because of the need to handle the work quickly. If two or three heats are required for the forging, then the blacksmith will be up against watching the extra heatings in order to avoid unevenness of temperature between inside and outside. A helper or a power hammer may so facilitate the work as to reduce the number of heats.

The smith will need to use extra skill in giving the proper shape. The reason for this is, when the tool or other work has been forged, it should be very close to its final size when completely finished. If it is not close to that size, then one will have a good deal of grinding or machining to do. At the same time, the smith may use up so much time in forging to size that it would be cheaper to do more grinding.

Where tools have to be formed for the lathe and also for other machines, the smith will often find it very desirable to have gauges which may easily be applied as he continues with his forging. Plenty of gauges suited to the work in hand will tend to reduce the number of heats and to finish forging at a higher temperature. After the forging is done, we may often use an emery wheel to get closer to the size before we go on to harden the work.

Hardening an Important Process.

The hardening is naturally a critical process. If it is done correctly, we get a fine tool able to bear up against the severe service to which high speed tools are put. If it is done wrongly, then we may have a ruined tool—or at least ruined for the time being.

The hardening temperature is very high. Sometimes it is carried to the point just short of the melting temperature. This excessive heating applies especially to the cutting edges of the tool to be hardened. Some tools are to be ground after hardening; some are not. Where the tool is to be ground subsequently to hardening, we may carry the temperature to a very high point indeed.

The limit is about 2,400 degrees Fahrenheit. The metal will be a brilliant white, but it will be short of the melting point. Watch the thin edges. Sometimes—especially when grinding after hardening is not permissible—the heating is not carried to a brilliant white, but is stopped at a light straw, a bright lemon or even at a very bright orange. It is considered better for most purposes to use very high heats if the conditions permit them.

If the ordinary forge provided with a fire brick hood is employed for the heating preparatory to hardening, let it be heated up well before any steel is put in. In order to heat up the work by stages, we may put the work first in the cooler parts of the fire near the borders or upon a fire plate, and later on, shift them to hotter regions. In this manner we heat up to a bright red in a gradual manner. Then we may go ahead more rapidly and bring the temperature up to the full hardening heat.

If the high speed steel is of the best quality, there need be no fear of overheating it in this kind of a fire. It is understood that there are several varieties or brands of high speed steel

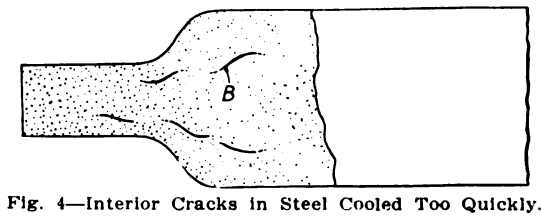


Fig. 4—Interior Cracks in Steel Cooled Too Quickly.

which will harden properly when heated to a somewhat lower temperature. What the particular manufacturer says as to this should be followed, as he has everything to gain and nothing to lose by giving directions exactly right for his particular steel. The latter part of the heating of an ordinary lathe tool need not take more than two or three minutes.

The heat is to be made to penetrate the working end through and through. On the other hand, the high hardening temperature is to be confined to the end and not allowed to penetrate back into the shank.

Do Not Quench in Cold Water.

The quenching of high speed steel is ordinarily not to be done with cold water. There is uncertainty whether good results will follow or not. The tool may or may not crack. The white hot metal may properly be cooled in a current of air or else in a bath of oil. When using air, the pressure should be low—about two or three pounds per square inch at the point where it issues from the nozzle—and the tool should be turned or moved about in such way as to get an even effect.

Digitized by Google

Use plenty of air but not at a high pressure. As to the kinds of oil that are suitable, mention may be made of the following: linseed, cotton-seed, rape, fish, whale, lard, tallow and paraffine. Kerosene oil has been used advantageously. It is said not to "flash," provided the whole of the highly heated part is plunged at once.

Quenching is to be done just as quickly as the tool can be gotten from the furnace to the oil bath. It should be thrust at once down into the liquid—not gradually or a part at a time, but the whole of the part that is highly heated should be promptly submerged.

NECESSITY OF FOOD RESERVE.

The effect in England of the greatly increased shipments of meat from this country during the past two months is indicated by a cable received from the British ministry of food.

During April, 359,058,000 pounds of beef and pork products were exported, as compared with 161,000,000 pounds in April, 1917, and 43,700,000 pounds in April, 1914, before the war began. The total exports of meat products last April were therefore about 220 per cent of exports in the same month last year and about 830 per cent of those in April, 1914.

The cable which follows emphasizes the necessity for building up a food reserve against any contingency and urges that there be no slackening of effort on this side of the Atlantic:

"Thanks to the splendid response from America, the shortage which was threatened in beef and bacon is now no longer as serious as it has been during recent weeks, and the meat ration, which was reduced, from the workingman's point of view, almost to the vanishing point, has now been restored to the normal amount under the compulsory rationing system. The willingness with which the population as a whole has accepted compulsory rationing and the success of the rationing arrangements have produced a marked decrease in consumption, and this also naturally eases the food situation.

"Supplies of butter and cheese, however, are still inadequate to meet the requirements, but it is hoped that imports from America will remove anxiety as regards our position in these commodities.

"The fact that it is now feasible to maintain the scale of compulsory rationing must not be taken to mean that there is any surplus of food in the country. Under conditions of war such as this it would obviously be an elementary precaution to build up as large a reserve of food as possible in an island which is menaced by submarine blockade. No such reserve is yet in sight and there should be no slackening in American efforts to provide foodstuffs for the allied nations."

Motor Trucks Are Being Recognized as Necessary Factors in Business.

These Units together with Trailer Cars Solve Many Problems for the Small Manufacturer as Well as the General Business Man

Newspapers throughout the country on the first anniversary of our entrance in the world's war gave much space to our achievements for the one year's period. True, one inclined towards criticism could pick flaws here and there but if the accomplishments be carefully studied the enormous task will be appreciated and it is astonishing the strides which we have taken in so little time. Look deeper into the matter and the fact looms up that such progress was only made possible by pressing into service the most efficient material obtainable.

Getting down to the point, there is a law of returns which makes it ultimately cheaper for the government to make use of the most efficient material which is also applicable to the individual in the equipment he may procure for his own needs. Many men recognized to be progressive in numerous respects fail to apply such ethics to their business. Some "hard shelled" merchants have been credited with remarks to the effect that the business had been run along certain lines for twenty or more years and no change would be considered as long as there continued to be nominal returns for the capital invested.

Must Anticipate Events.

Such men are more to be pitied than criticized. Time waits for no man, therefore man must keep pace with time. To illustrate this assertion, gas shells or gas helmets were practically unknown to our allies at the inception of the European conflict. Returned soldiers report that the casualties were heavy on the allies' side when the Boche first let loose this weapon, due to the fact that no preparation had been made to cope with the situation. Imagine what the result might have been had the heads of the war department adhered to the rule that previous warfare had been waged on a certain basis and there was no necessity for a change.

The terrible toll of lives on the allies' side was averted because of the rapidity in which it was realized that the equipment was inadequate for successful competition. It is not the writer's purpose to convey the thought that this or that merchant who has been doing business along certain defined lines is nearing the borderland of bankruptcy but to discuss the advantages of motorized delivery where the business is carried on a large enough scale to warrant the installation.

There is a certain merchant the writer has in mind who some ten or twelve years ago entered the grocery and meat business on a very conservative scale. Knowing full well that in order to compete successfully with several other grocers certain delivery service must not be overlooked, a boy with a bicycle was engaged to care for this end. A wire basket attached to front of bicycle frame served nobly for a time. Being an enterprising business man in due season he saw the necessity for a more efficient delivery system and consequently purchased a horse and wagon.

As the business grew more horses and wagons were added until at one time this particular merchant made use of 15 horses requiring a large barn and numerous sheds for the housing of the delivery equipment. Today this merchant who commenced with the boy and bicycle has a complete motorized delivery system and when questioned for his reasons for taking the step the following reply was received: "To save time, money, space and increase radius of trade."

Reasons for the Use of Trucks.

These words coming from the successful merchant are worthy of careful consideration. For the sake of argument let us eliminate the boy and his bicycle and compare motor truck vs. horse. A manufacturer in Michigan specializing two types of motor trucks, a heavy duty, two-ton type and three-quarter-ton model, recently mailed a questionnaire to the owners of the three-quarter-ton job, the first question being: "Why did you buy a motor truck?" Fortunately the writer has access to the replies and is able to submit the following partial list:

"Experience teaches economy. Trucks are more economical."
"Competition forced me."
"We disposed of two teams, and to give better service to our patrons."
"To get farther out on deliveries."
"Because we needed one and found it cheaper than horsepower."
"For hard service and long life."
"To reduce delivery cost and save time."
"To increase our business and give better service."
"To use in delivery of newspapers instead of using street cars."
"To replace horses and get home before dark."
"Because I thought it would save me money. I am right."
"It's a necessity."
"To save time which means money."
"To reduce expense of hauling."
"Excessively hot weather for horses."
"Because we believed it to be the most economical method of delivery."
"Less expense than horses and men. Much less grief."

In scrutinizing the records, this type of truck was found to be engaged in over 200 distinct lines of business and invariably had replaced from two to four teams of horses. Let us now analyze the situation on a small scale and see why the owners are for the most part strong boosters for motorized equipment. Space—the housing of the horse requires more space than one is apt to imagine on first thought. The "stall" requires only a minor portion of the room. Provision must be made for the storing of grain, hay, wagons, harness, etc. Anyone who has had any experience in the handling of horses will readily appreciate upon giving the matter a little thought the exact space required to meet the individual conditions.

Especially is this matter of vital importance if the room is consumed on expensive city ground and barns. Consider now that the average three-quarter-ton truck has a wheelbase of 128 inches and 66 inches in width while an average two-ton heavy duty truck has a wheelbase of 146 inches and a maximum width of 75 inches. From the above figures it is plain that a truck does not occupy a space greater than that required for the horse-drawn wagon, not taking into consideration the space taken up by the horse.

Trucks for Fruit Growers.

Now take into consideration that owners report that one efficiently routed truck will replace from two to four horse-drawn wagons and it will be possible to gain some conception of the space and money saving. In not all cases do the owners sing the praises of their trucks. One case brought to the writer's attention was that of a farmer located in Pennsylvania specializing in the growing of fruit.

The roads in that particular section of the country are extremely rough and some over-ambitious salesman had talked the farmer into buying a heavy duty truck fitted with solid rubber tires. There happened to be a good peach season the first year the truck came into his possession and a considerable quantity of this fruit was hauled to market, some 30 miles away. It was not long before the commission merchants reported to the farmer that much of his fruit was not saleable due to the damage in transit. This owner was naturally somewhat discouraged with his first investment in motorized equipment and it was only through several demonstrations made by a lighter and swifter truck mounted on pneumatic tires that the farmer was convinced that the trouble was in a misplaced sale rather than the impossibility of the motor truck to fit into his particular kind of business.

The lighter truck delivered the fruit in perfect condition and was operated much more economically, due to the speed, weight and fuel consumption. The farmer's business did not warrant the use of a heavy duty vehicle and providing the fruit could be de-

Digitized by Google

livered satisfactorily the expense of operation would have almost rendered the proposition prohibitive inasmuch as the return trip was made without load.

Still another case where the owners became at least temporarily dissatisfied with their truck investment is that of a Massachusetts wholesale provision house. Theoretically it was pointed out to the proprietors that the motor truck was the logical solution of their delivery problem. Accordingly all horse equipment was sold and a fleet of motor trucks purchased. In this particular instance the hauls for the most part were short. After giving the system a thorough trial it was shown by the figures on the books that motor trucks were no saving over horses. Before acknowledging defeat it was decided to call in an efficiency engineer for consultation.

Keep Trucks Moving.

After a careful survey of the situation the engineer was given permission to place if possible the trucks where they could be used to the best advantage. The engineer spent considerable time with the drivers and readily recognized that the trucks were standing idle for the most part of the day. Not that the drivers delayed on the road but through lack of system the time was being consumed in loading and unloading. Packing, trucking to dock, checking, tying and numerous other operations consumed time which involved several men and an idle truck. It did not require a whole lot of thought to appreciate that the reason the trucks were not solving the transportation problem was because they were not kept busy.

An order was promptly issued for a fleet of modern trailers which eventually proved to be the key to the situation. The short haul between the railway and storehouse showed on the books to be the largest factor inasmuch as the slow unloading of the freight cars had been the means of running up great demurrage bills. A string of trailers were drawn to the freight yard each morning and placed in charge of a crew of men who looked after the unloading of the freight cars. Bulky matter was quickly loaded on the truck body while the smaller boxes were properly loaded by the crew on the trailers. Where under the old regime it had been necessary to retain six trucks on the run between the freight yard and storehouse the new system released four of them for other duties.

How the Trailer Was Used.

A loaded trailer was quickly coupled to the truck at the freight yard and towed to the storehouse. This trailer was then dropped for unloading by the men at the house and an empty trailer promptly coupled to the truck and returned to the freight yard. The system is practically the same as that used by the railways. Can anyone imagine a locomotive drawing a string of freight cars to a certain point and then remaining idle waiting for the cars to be unloaded and reloaded. No such system prevails. The freight cars are placed in the yard and another string of loaded or unloaded cars are promptly coupled to the engine thereby keeping moving as much rolling stock as possible.

With the storehouse proposition solved the engineer turned his attention to the trade deliveries. Several heavy duty trucks not capable of a speed greater than 12 miles per hour were used for short runs about the city. Light trucks capable of speeds ranging from 20 to 25 miles supplanted the heavy jobs with desired results. The faster trucks accomplished more work than the big fellows for this branch of the work, insured better service to the trade through prompt deliveries, and proved more economical in upkeep and gasoline consumption. Finally to prove that the system installed was correct, a truck accounting system was made up which included practically every detail of time and work besides showing the operating cost which is of practical value to every owner. By comparing the operating cost and amount of work accomplished by one truck with others engaged in the same service it was possible to weed out the trucks which were not showing good results.

The engineer accompanied the drivers of these jobs on certain trips taking particular note of road conditions, the manner in which the trucks were handled, the number of stops and duration of same. As a result of his observations it was learned that for the most part the drivers could rightly be termed "lever pushers," giving little thought to economical operation.

After giving the situation careful thought it was decided to inaugurate classes for the drivers, the foreman from the truck dealer's service station acting as instructor. The drivers readily took to the educational campaign since it was pointed out to them that there was an opportunity of learning certain repair work as well as thoroughly grasping the principles of motor and truck operation. The accounting system kept strict record of oil and gasoline consumption and it was pointed out to the men how it was known at the office whether the trucks were being properly handled.

Mileage Estimated.

One by one a special gallon test tank filled with gasoline was placed on each truck and the vehicle driven on a straightaway course until all fuel in the auxiliary tank was consumed. By taking the speedometer readings at the beginning and end of test it was possible to arrive at the actual mileage each truck was capable of making to the gallon of gasoline.

In order not to hold the test under conditions which favor high mileage the trucks were driven in all directions thereby neutralizing any advantage which might be gained with the wind or down grades. The economy test made with each truck was recorded. Naturally it was not expected that a truck which showed 12 miles on the test must show 12 miles on the speedometer for each gallon of gasoline used but the tests were conducted for the one purpose of proving to the men that a certain truck was capable of a certain number of miles to the gallon of fuel and therefore it was possible for considerable gasoline to be consumed for which no mileage would be shown on the speedometer.

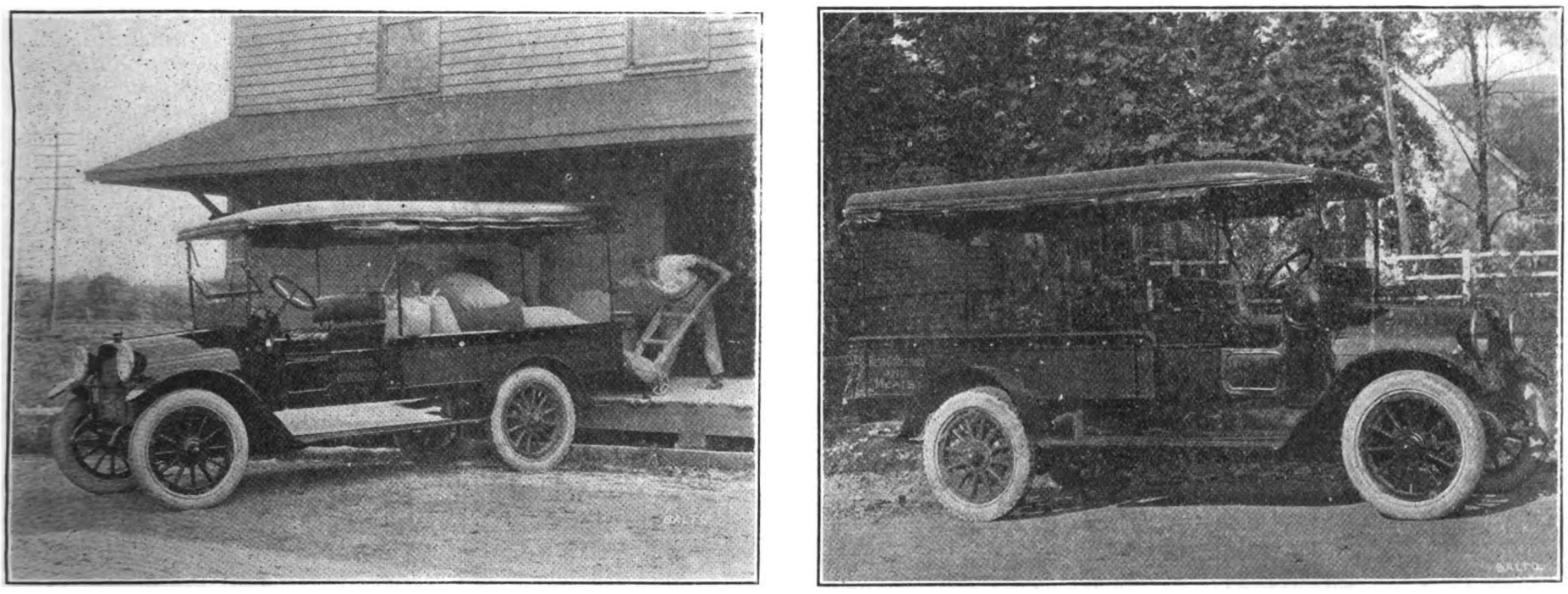
The weight of loads, nature of roads and congested districts must be taken into consideration but it was surprising to note the effect which the economy tests had on the drivers. A driver who had been accustomed to allowing the motor to run while unloading soon learned that there was a large saving by turning off the switch at such times. Working on the theory that competition has a tendency to stimulate efficiency, a wage bonus was offered each week to the operators of trucks making the best showing. At present the company is well satisfied with the investment in motorized delivery equipment.

Education Necessary.

Upon the recommendation of this company many trucks of a particular type and make were sold to other concerns. Recognizing the advantage of the educational campaign conducted by the above concern the dealer circularized the different truck owners advising the opening of a class in truck repair, operation, maintenance and construction and extending an invitation to the operators to join for which there would be no tuition fee. The class was held at night, two nights a week. Several of the owners took advantage of the liberal offer while the drivers turned out in numbers. Both owners and drivers were benefited, the former gaining on his investment and the latter in efficiency. Not least in importance the dealer through his willingness to extend co-operation enjoys a good truck business.

The men who are making big money on motorized equipment are those who have or create enough work to keep the wheels turning and in conjunction exercise common sense. A farmer cultivating about five acres of land would have little use for a tractor unless of course he hired same out to other farmers. The merchant farmer or whoever the owner of a truck might be must either have enough work of his own or find sufficient from other sources if he expects to reap profits. In the matter of efficiency one must not lose sight of the fact the motorized equipment is ready to meet any emergency. With the proper care it can be used 24 hours a day and unlike the horse maintains a steady speed at all times.

While the European allies are asking for food America's farms are speeding up and if one would take the time to finecomb the situation it would be discovered that the automobile, motor truck and motor tractor



Two Reo Trucks in Use, Showing How These Machines May Meet the Requirements of Grocers or Merchandise Men, Taking the Place of Horses and Increasing the Radius of Business.

Digitized by Google

are responsible for the revolutionized farming. Due to the scarcity of farm labor especially this year it is almost inconceivable what the situation might have been had old time equipment been relied upon to perform the different work.

The writer is fully aware that a certain "scientific manager" who at present is warlording in Europe has for a few score years been applying economics, efficiency, etc., to warfare and is in great danger of being squelched in his ambition. The British on the other hand "muddle along" but use common sense in conjunction, for example do not overlook the tanks, lorries, motor cars, aeroplanes, motorcycles and tractors—all motorized equipment.

This is the third story of our tractor and truck series and goes to show that business men throughout the country are beginning to realize the value of trucks and tractors. Tractors and trucks sell themselves and "it's up to" the blacksmith to increase his income by carrying an agency. We will do all we can to assist our blacksmith brothers in "getting into the game" for we feel that it is one road to success.—(Editor.)

WOMEN IN BUSINESS.

Women Are Becoming a Big Factor in the Industrial World and Do the Work of Men Satisfactorily When Properly Trained.

"Women engaged in industrial work, in the shop and factory, are adapting themselves to conditions, and grasping the fundamental principles of their work, with a readiness and efficiency that is truly surprising and gratifying."

The above statement from E. F. Primmer, manager of the employment department of The National Cash Register Company, Dayton, Ohio, is based upon close study and information obtained at first hand in one of the best known industrial concerns in this country. Mr. Primmer further said:

"While an untold number of reports have been made, the subject of women in industry is constantly enlarging. What seems strange and startling today is commonplace tomorrow. Government reports, magazines and newspapers daily are filled with statements about the everwidening horizon of women's work. Women are eligible for employment in so many unusual occupations that it would be difficult to briefly enumerate them. There seems to be, however, only one boundary to the field of women's activities, and that is imposed by physical limitations. No one will argue woman's physical equality.

"In England, where there was a national desire to help meet the terrible emergencies of the war, women unwisely overrated their strength and set themselves at tasks which later proved detrimental to their health. American industry, profiting by the experience of England, wants continued output, rather than sporadic bursts of effort. Every man and woman in industry today, or in the future, must realize that it is the steady pull that will count at this crucial period in the world's history.

"While the great influx of women into industry was hastened by war conditions, yet it has not been wholly due to that cause. Armies of women are earning their own living because of the stress incident to the increased cost of all things. Hundreds of women have gone into the industries because they desire to be independent, and they do not regard their jobs or positions merely as bridges over the gap until marriage.

"Their induction into industry will have a beneficent, permanent result. It will mean the introduction in many factories of systems that are important to the health, safety and welfare of all employees. Improper surroundings will be eliminated and labor in general will be better off and better satisfied because of more desirable working conditions.

"There are, however, some things the women must be taught besides being given specific training for specific work. They must learn to be regular in attendance, because they cannot expect to earn good wages unless they work steadily. They must adopt a business-like attitude toward their work, and regard their tasks as an opportunity for personal training, whether they expect to use their experience in the field of industry or elsewhere. They must regard health and hygiene as a business asset. Women are notably careless in matters pertaining to health, and frequently are unaware of the part poor health plays in reduced earnings or future happiness. They must be frank, straightforward and forego the privilege of having 'feelings.' If they remove the handicap of claiming privileges because of sex, they will find greater opportunities for advancement and sooner realize their ambition of equal work for equal pay.

Hardening Soft Center Plow Shares

An Article That Every Blacksmith Should Read with Great Care for It Contains Much Valuable Information

BY JAMES STEELMAN

In order to deal properly with a plow share in the matter of hardening, it is necessary to know something of the mode of its manufacture. For example, it is very needful to know whether the steel is a "soft center" metal or whether it is uniform all the way through. By "soft center steel" is meant steel that is hard on the outside surfaces and soft in between. Such steel is almost the same as if one had taken three plates of steel, two of them hard and one of them soft, and had welded all three together with the soft one in between the other two.

If we had proceeded in this way, a proper thing to do would have been to select steel with but little carbon in it for the inside layer and steel with a good deal of carbon in it for the outside layers. This would perhaps be a very excellent way to manufacture a plow share, but there is a more economical way of getting pretty much the same result.

It is well known that the more carbon steel has in it, the harder it is, even when it has not been through a heating and quenching. The carbon gives it hardness. In fact, the hardness increases so regularly with the amount of carbon, in the case of ordinary steel, that we could probably tell pretty closely how much carbon a given piece of steel contains simply by using an instrument known as the scleroscope which is used for determining the degree of hardness of metals. If we put the steel through a proper heating process and then suddenly chill it by dropping it into water, the amount of carbon will affect the result in the following way.

If there is enough carbon to make the steel a tool steel, then the heating and sudden chilling will result in a very hard metal indeed. But steel that has only a small amount of carbon in it, will be affected only moderately by heating and sudden chilling. The workers at the anvil know this very well; for they will tell you that the one steel will harden and that the other will not. The principal difference between the steel in the cutting part of an axe and the steel in a trace chain is that the one has a great deal more carbon in it than the other.

Not Much Carbon

But, after all, the steel that has the most carbon in it has really only a small amount, if we compare its weight with that of the iron. The blade of a penknife or a razor blade is made of steel that contains, perhaps 1¼ or 1½ pounds of carbon to 100 pounds of metal. In order that a steel be a tool steel, it is only necessary that 100 pounds of it contain 13 or 14 ounces of carbon. It requires at least this amount to get a real hardening when it is heated and suddenly chilled. However, high carbon steel, that has been treated thus is apt to be rather brittle. A sudden shock, such as might be had when a plow share made of it should strike a firmly imbedded rock, may easily result in a crack or even in the accident of a piece broken off. Steel with only a moderate amount of carbon is tougher and consequently better able to stand rough usage.

The great advantage of "soft center steel" used in a plow consists in the fact that the outside may be made very hard without hardening the inside. When a piece of "soft center steel" is heated and suddenly chilled, it is only the high carbon part that becomes very hard. The inside remains pretty much as it was. The result then is a very hard outside, where the plow wears against the soil, and a comparatively soft and tough inside. Sudden shocks are resisted because the soft inside is there with its toughness.

As I have already said, a plow might be made of three thicknesses of steel welded together, a low carbon metal being put in between two high carbon plates. But this might be rather expensive. At any rate another method of getting pretty much the same result is employed. The procedure is undoubtedly substantially as follows.

A piece of steel which is later on to consist of high carbon surfaces and low carbon inside is originally all of the low carbon variety. The outside is then impregnated with additional carbon until there is in fact an outside layer on each side that is really tool steel. This procedure or its equivalent has been in use for many years in other manufacturing lines, and is known as case hardening. An approved method of impregnating the outside layer with additional carbon consists in packing the work in an iron or steel box in a packing material consisting of bone dust or the like. The box is sealed up with fire clay and the whole put into a furnace where it is heated up to about 1,900 degrees, Fahrenheit. The effect of the heating is to make the bone dust give off carbon. This carbon enters the "pores" of the work and becomes a part of the metal. After a period, which may be quite a long one if a deep layer of high carbon steel is wanted, the external layers will be in effect tool steel. The interior will be what it was before.

Tool Steel Surface

The result, then, of the strong impregnation of the exterior layers of mild plow steel is to produce an article that is really formed of tool steel on its outside layers. Since the two kinds of steel contain very different amounts of carbon, the effects produced will be different when the whole is heated for the purpose of forging.

Naturally, the blacksmith may want to heat the work pretty hot, for the reason that the hotter the steel the easier it is on the arm. The cooler the steel being forged, the more muscle required. Now the effect of high temperatures on steel is, as we learned in other articles in this magazine, one that manifests itself in big grains and weakened steel.* The higher the heat, the more aggravated are these results. There are methods of partial or complete restoration. There is correction by hammering and also by re-heating.

The trouble is, there is another procedure to be carried out—the hardening—at a lower temperature. The smith may perhaps begin his forging with almost any heat up to a yellow. The hardening is properly done at quite a low heat—a cherry red or a dull cherry. For instance: the smith heats the work to a yellow, and completes his hammering when the steel is still a dull orange. He

*See Blacksmith & Wheelwright for May and June, 1918 ("Scientific Heat Treatment and Hardening of Steel").

Digitized by Google

may now want to dip the work into water and do the hardening without waiting for the steel to drop to medium dull cherry; or he may decide to wait. In either case, he gets a bad result. Steel at a dull orange means steel with enlarged grains, since these begin to grow at a medium cherry and continue to grow as the heat rises.

In the interval between medium cherry and dull orange, there is a good deal of opportunity for the grains to get big. If the smith stops hammering at dull orange and lets the work alone until it cools down to the proper hardening temperature, there seems no reason why he should expect any smaller size of grain than that which corresponds to the dull orange. Assuming then that this is really the size of grain, the result will be that he hardens steel that has big grains. That is, he hardens steel that is in a weakened condition. He will get the hardness all right, but it is simply hard steel in a damaged condition.

But suppose that he doesn't let the steel alone when he stops hammering at a dull orange and that he dips it into water at once. What now? says the smith. Well, everything depends on what the size of grain was when he stopped hammering. The reader will remember that the forging began with the steel at yellow. The grains must have been big fellows at such a heat. However, the hammering tended to better this condition. The question is, How much did it better it? We can hardly suppose that the hammering did anything more than produce the smaller and smaller grain sizes corresponding to the various temperatures as the steel cooled under the hammer.

Hammering Contracts the Grains

Indeed, it would seem as if the forging did a good deal, if it did that much. Remember that the cooling does nothing at all. It is the hammering. At the same time, it is an accepted fact that when we heat the metal, we get various grain sizes at the various temperatures. But we don't get these sizes again when we cool down. What I have supposed is that the hammering of the smith brought about the proper sizes as the temperature fell. We can hardly suppose more than that. That is, we can hardly suppose that the hammering will be so effective that it will make smaller grains than those corresponding to the colors. Well, then, if the smith stops hammering at dull orange, the most to expect is that the grains have been reduced in size until they are of the particular size corresponding to this color. Dipping the steel into water will harden the steel, but will have no effect on the grain size. Consequently, we get hard steel with rather big grains.

There will be poor results, in view of the foregoing, whether the smith stops hammering and dips the steel when at a dull orange or whether he sets it aside to cool down to the dull or medium cherry and then dips. What then is the smith to do? He has at least two courses left open to him. I will explain both.

First, he may heat up to a lower heat than yellow. A good plan is to estimate the length of the hammering operation, and then heat to a point that will enable him to finish forging at just the right time to harden. He will then be able to work the steel without stopping—until the moment it is quenched. The advantage is that he is continually breaking up the grains and forcing them to assume smaller sizes. The disadvantage is that he has to work hard because of the fact that the steel, being cooler, is also stiffer and harder to work. Let us suppose a case.

We will assume that the forging will be of such an amount that the smith can get through in time to harden if he begins at a dull orange. Well, then, he hammers and shapes his steel, never letting up, until he gets down to the hardening heat, and then quickly plunges the work in the quenching bath. By "never letting up," he keeps the grains from getting a full chance to grow. This they might do in the cases where, in his hammering, the grains are made rather small. Of course, the hammering only affects the parts where the blows strike. It would probably be best, then, to keep working all over the section being forged, in order to keep small grains from uniting.

Second Heating Often Necessary

Second, the smith may do the forging at a high heat and have the benefit of the softer metal and easier work. He will probably get through more quickly unless he wastes time while the steel is heating. In this procedure, however, it is necessary to finish by a second heating. That is to say, the smith must not quench the work in the bath until he has the heat going upwards again. He lets the work cool until he is absolutely sure that it is down below the point at which grains begin to grow—that is, below 1,274 degrees, Fahrenheit. As this temperature is near the point at which the hardening should be done, it is well to cool the steel, say, to a black heat (or even lower), and then start the second heating.

It is all right, in fact, if the work cools off after forging until it is quite cold. Thus, the work may be kept on the floor of the shop all night between the first and the second heats. But if the smith is in a hurry or wants to save fuel, he may cool simply to black and then begin the re-heating. This re-heating process is for the purpose of giving the grains a chance to become small under the influence of heat. This they may be expected to do if the heat is on the upward swing and not on the downward one. If there is time, the steel may be expected to develop somewhere about the sizes corresponding to the various heats as they are reached.

Consequently, under these circumstances, we may expect to get at the hardening temperature the size corresponding to that heat. But, really the hardening temperature is but a little above the heat at which we have the smallest grain size. In fact, in this re-heating we pay no attention to the temperature for any other purpose than to get the right hardening heat. Without attention from us, we have then the temperature of small grains. But we may do well to allow time for the grains to assume their proper size.

An Actual Case Considered

Let us now take an actual case. We go ahead and heat the work to yellow, say, and start in with the forging. When this is completed, and the work has in the meantime cooled off a bit to, say, dull orange, we put the work aside and let it cool off naturally. It will now have the right shape but the metal will be in poor condition because of the over-heating. When the cooling has gone on until the work is black, we start to heat it up again and continue until the hardening temperature is reached.

It may be well to hold the heat awhile before plunging the work into the quenching bath. Our purpose in holding the heat will be to give time for the grains to assume the small size. A little experimentation with a piece of an old soft center plow share may assist the smith a good deal in respect to the length of time to wait after he has the proper hardening heat.

The foregoing account of two ways of dealing with the question of how to forge and harden a soft center steel is also applicable to the case of other steels—particularly, to crucible and similar steels that are uniform all the way through.

There is still another method by which a soft center could perhaps be gotten with a plow share. Theoretically, at least, the method is all right; but what I am afraid of is, that it will be found very difficult to carry out in the case of work as thin as a plow share.

When steel is heated, we come pretty suddenly to a point where it can be hardened by plunging it into water or some other cooling substance. A very few degrees below this point means that the hardening will not take place. Sometimes, we can take advantage of this in the following way.

Suppose the work is a rather heavy round bar and that we heat it all round at the same time. The result will be that there will be an outside shell hotter than the inside. The reason at the bottom of this is that the heat requires time to penetrate to the interior. Consequently, the center will lag behind in respect to temperature. If we heat very, very slowly, then the lag will be only a small one. But, if we hurry the heating, we may expect to have the outside shell quite a little ahead of the center. Suppose, now, we heat the heavy round bar in such a way as to rush the heat, especially as we get up towards the hardening heat. It is not difficult to see, then, that if we plunge the bar quickly the moment it gets fairly to the hardening heat, we will harden the outside but not the inside. The inside is still not hot enough for hardening.

Now, whether a smith can do this trick with a plow share is perhaps another matter. The difficulty consists in getting enough difference between the inside and outside. The total thickness is small. However, there is no harm in the smith experimenting. He can take a flat bar of about the same thickness as the work and see what he can do. After he has heated up and hardened, he can break the bar and find out whether he has a soft interior or not. On the whole, it seems to me better that the plow share should be a regular "soft center" type.

Follow Maker's Directions

It is to the interest of the manufacturer to give proper directions for doing the blacksmith work on his soft center plow share. The smith may feel pretty safe, then, in following the directions of any high class manufacturer.

One of the big plow concerns states that there are three noteworthy points that should be kept in view in dealing with soft center plow shares—(1) heating, (2) hammering, (3) hardening.

First, with respect to heating, it is advised that only that portion of the plow share which is to be hammered should be heated. "This can be done by laying the share down flat with the edge over the center of the fire and filling up the underside with green coals. This keeps the greater part of the share cool, thus preserving its shape. The common mistake is to put the share in the fire in a vertical position with the edge down." The objection to placing the share thus is that the result is a heating of too much of the share. In consequence, we are apt to have warping and distortion.

Second, hammering is to be done from the upper side, the bottom of the share having been laid flat on the anvil. "This keeps the cutting edge down and works the hard steel of the upper surface over the soft steel in the center, thus preserving for the share a hard cutting edge. Shares receive the most wear on the underside. Pounding tne share at this point exposes the soft center steel and it has a tendency to work the cutting edge out of shape." As soon as the point of the share has been hammered to the proper shape, we may weld on a piece of steel to the top of the point. But in carrying out this, we should be on our guard lest we spoil the scouring qualities by denting the share in our hammering.

Third, this particular concern gives dull cherry red as the proper hardening heat. This is doubtless all right—especially for their particular product—but we may need to make sure that we understand each other in the matter of the color. "Dull cherry red" will mean one thing to one man and another thing to another man. Here, again, a little experimentation may be a good thing. Try what you think is a dull cherry red and note the result. If the work is soft on the outside, then the heat was not hot enough. "One of the most successful methods of tempering [hardening] is to draw the share through the fire slowly with the cutting edge down until the edge has been heated to the proper color. Then draw the share from the fire, put the point into the ground far enough to hold up the share, and let it stay there till it cools."

Digitized by Google

BLACKSMITH & WHEELWRIGHT

The Pioneer Journal of Its Class in the World.

Member of the Audit Bureau of Circulations.

PUBLISHED MONTHLY BY

M. T. RICHARDSON COMPANY,

71-73 MURRAY STREET, NEW YORK.

POST OFFICE BOX, 654. TELEPHONE—7377-7378 Barclay.

CHICAGO OFFICE, 608 SOUTH DEARBORN STREET.

Entered as second-class matter at the Post Office in New York City.

M. T. RICHARDSON, President and Treasurer
F. R. WHITTEN, Secretary
M. T. RICHARDSON, Editor
FRANK L. AVERY, Managing Editor

F. R. WHITTEN, Advertising Manager
H. F. LUDINGTON, Western Representative
GEO. A. SMITH, Eastern Representative
FRANKLIN MYERS, Art and Copy Dept.

FOREIGN AGENTS:

NEW ZEALAND
MR. R. HILL, Matlock House, Davenport, Auckland, New Zealand.

GREAT BRITAIN
ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance.....$1.00
One Copy, six months, in advance.....60 cents
Single Number.....10 cents
Canadian subscriptions.....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English Money.

Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

ADVERTISING RATES SUPPLIED ON APPLICATION.

SPECIAL NOTICE

Subscribers failing to receive their magazine regularly will favor us by giving us notification to that effect.

CHANGE OF ADDRESS

Subscribers who desire the address of their paper changed should send us the old as well as the new address.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

Regarding One of Our Editorials Which Was Criticized

ONE of our readers took exception to an editorial, which appeared in the recent "Blacksmith and Wheelwright." He claimed that he was a German, who had come to this country and was now a loyal American citizen and that he didn't care anything about Germany. He stated that he did not think it was right to hit the loyal German-Americans now in this country, because many of them like America better than they had the old country.

We are very glad that our reader brought up this question, for we do not want any loyal Americans to feel that we are hitting a them in any way. When a foreigner comes to America, accepts American protection and supports his family upon money made in America, he is American, he puts off everything relating to his former country, and he owes his allegiance to this country alone; in other words, he is either an American or a foreigner, and we trust that all of our readers are TRUE AMERICANS. It is against those foreigners that we directed our editorial in question.

Not long ago, a reader of a certain magazine wrote to the publishers, saying that unless the scathing editorials against the Germans ceased he would not forward his renewal subscription money. That magazine published the subscriber's letter and added as an editorial note; "keep your money, we don't want it," and this is just the way we feel, but we also feel sure that we will lose none of our readers because they agree with us when we say that "America must and will win the war and that German kultur must be stamped out."

If you were born in Germany and are now a loyal American citizen, we respect you just as much as if you were born here.

An Interesting Series of Articles Begins in the September Number.

WE want to call the attention of our readers to a series of articles which will begin in the September number of the Blacksmith and Wheelwright. These articles will be written by one of our well-known contributors, Mr. J. F. Springer, and are intended for the blacksmith who is obliged to forge, sharpen, and harden the bits and other tools used in drilling rock. The articles will be valuable to every blacksmith because they will be applicable to practically any steel working operation. Tell your friends about these articles and suggest that they subscribe to the Blacksmith and Wheelwright in order that they may not miss any of the stories.

Muscles Must Be Exercised and Money Circulated, to Grow

WE wonder how many of our readers have ever suffered with a broken arm or leg! Do you remember when the plaster cast was first taken off and even for some weeks afterwards, that the muscles were stiff and almost unmanageable? Muscles must be used in order to be kept in condition. The more they are used the stronger they get and the more flexible.

When you come to think of it, money follows the same rules. If money is not circulated, stagnation results. There is a difference between economy and penuriousness;—on the other hand, there is a difference between extravagance and thrift. The miser buries his gold in the ground and saves it until he dies, then it goes to some one else and in the meantime it has done him no good nor has it benefited the public in general.

Gold in this condition is just like a broken arm; suppose, however, one spends a dollar, this dollar goes to someone else and that second person has the use of the money and passes the dollar along, and so it goes, the dollar may benefit many people.

Each time a dollar changes hands it earns something and it is upon this earning capacity that the government collects its revenue. If everyone in the U. S. were to hoard their money the country would soon go bankrupt. Suppose the manufacturer did not spend his money in mills and machinery but hoarded it in his own house, there would be no utilization of raw products and consequently no finished goods, he would add nothing to the resources of the country and his money would be worthless.

On a smaller scale it is the same with the individual. Don't feel, because we are at war, that you must put your money in a stocking beneath your pillow, on the other hand, don't lavishly waste your money. Put your money in Government Bonds or W. S. S. Spend money for what you need, but don't buy anything you don't need. Always bear in mind that money, like muscles, must be carefully used if it is to grow, but it must not be abused.

Our Subscription List is a List of Our Friends.

ABOUT the best sort of a letter which we receive from our subscribers is the kind which criticizes our magazine in the following words: "The one fault that I find with The Blacksmith and Wheelwright is that it does not come often enough," and we receive many such letters. They make us feel that our work is appreciated and they help us because, after every such letter we put in just a little more time on the new issue. We hope that all of our readers feel the same way.

We have a feeling that if we were to give a big "party" and were to invite our friends, we could do no better than to use the names from our subscription list. We want every one of our readers to feel that we are his friend and that our part of the bargain when we receive his subscription money is the service which we offer in our different departments.

If you have any problem, big or small, which troubles you, don't hesitate to call upon us and we will try our best to solve it for you. If you want to start in the automobile business and repair machines, remember that our engineering force will be able to help you out should you encounter any difficulties in the way of mechanical problems.

Be Sure to Read the Articles About Hardening Steel

THERE are two ways of doing blacksmith work and two ways of handling metals. The blacksmith who does not know anything about the metals he is handling is never successful. He may harden steel by "guess" or he may harden it by a certain rule which has been tried out and confirmed by men who have made the study of steel their life work.

Hardening steel is an art and every blacksmith knows that unless steel is properly forged and hardened the steel is worse than useless. It will not stand up under hard usage, nor will it hold its edge if it is a cutting tool, improperly hardened. We advise every subscriber to read over the articles which are running in this magazine, written by J. F. Springer as well as the article appearing in this issue, written by Mr. Steelman. Both Messrs. Springer and Steelman are experts upon the working of metals and the hardening of steel and the articles which these men have written and are at present compiling for this magazine are so written that they may be understood by everyone of our readers.

There Is Money in Trucks and Tractors—Get Into the Game!

IN THIS issue our readers will find an article dealing with the using of motor trucks and trailer cars, and we want our subscribers to read this article carefully. Business men all over the country are waking up to the fact that trucks, trailer cars and tractors are practical investments. We predict that next year will see a 100% increase in the number of trucks and tractors sold.

Even the small farmer to-day is contemplating the purchase of a truck; the larger farmer perhaps is contemplating the purchase of both a truck and a tractor, while we don't doubt but what many of our blacksmith readers are contemplating the purchase of one or both of these valuable machines.

Every mechanic should familiarize himself with gasoline engines and should obtain the necessary knowledge to enable him to repair such machines, and the blacksmith in particular should try for his share in the business. There always will be horses, but these animals gradually will be replaced by tractors.

In the community of five or six farms will be found one tractor. If a farmer is unable to buy a tractor or truck for himself, the community will buy these machines and share the expenses; undoubtedly these machines will save money. A farmer may be "land poor" and own five or six large horses, which eat up all the profits, or, on the other hand, he may be rich and looking for more land, if he owns one tractor.

We tell you again, brother blacksmith, to "get into the truck and tractor field."—Learn to repair these machines and, if possible, take an agency for them—someone will sell trucks and tractors to the farmer and you may just as well be the one to collect the commission. Don't hesitate to call upon us for any information that you may desire. Letters from our subscribers are always welcome.

Digitized by Google

Three Exceptionally Fine Photos for the Contest

In our September issue we expect to publish a list of prize photographs, entered in the contest. Shortly after we will announce the prizes. Nearly fifty pictures have been entered and we feel that the contest has attracted considerable attention and been very interesting.

Early this spring, while the snow was still on the ground we received a picture from California which showed the trees in bloom and the blacksmiths working in their shirt sleeves. We rather hoped that we would receive a picture from one of our far northern readers this summer, which would show the snow on the ground, but such is not the case, and we are forced to swelter in the heat with nothing to cheer us.

Within a few months we expect to start another contest, so, if you did not send your picture in time to enter for our first contest, send it in now, so that we can publish it later on.

Prize Photo No. 36.

From E. H. Atherton, Idaho.—I am sending you a number of photographs of my shop and you can use those which you think best, entering them in the prize photo contest, if you care to. If you do enter them in the contest, I expect to win the prize for the best blacksmith shop.

I have been wanting to send in a photo ever since the contest started, but could not get a good one until now. The shop is 60x70 feet with a concrete floor and an arched roof. There are no posts in the center of the floor to be in the way. We have plenty of room for rigs inside the shop, when working on them. We have plank floor on top of the cement floor where the shoeing is done, and like the plank floor best for shoeing on. You will see that we have electric lights on the wall in front of the shoeing floor. By the way, will say that this is one of the many tips I got from The Blacksmith and Wheelwright. The shoeing floor is 70 feet long.

You will also notice that we have plenty of light all over the shop. A little whitewash goes a long ways towards lighting a shop, especially at night when the electric lights are turned on.

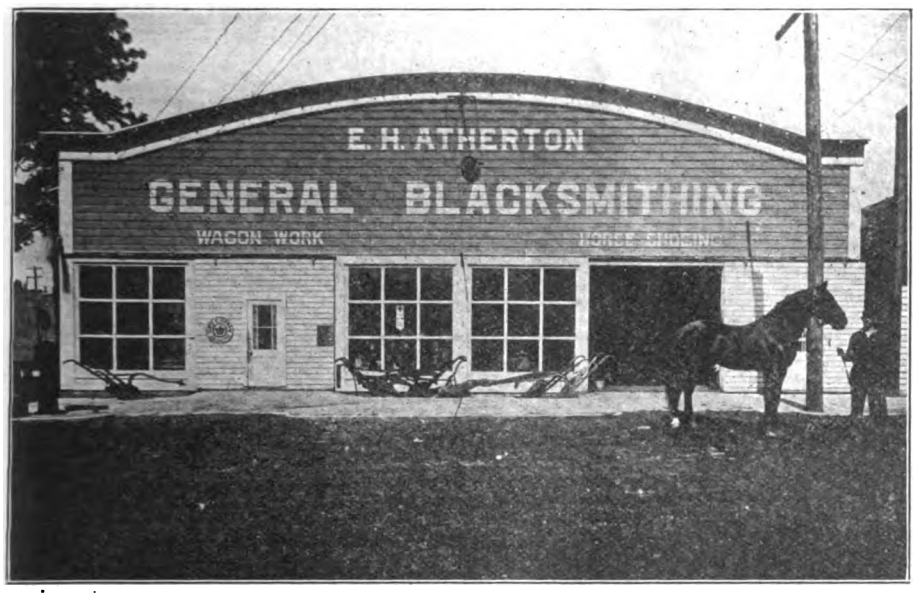
I want to say a word about the concrete floor. It is the finest floor ever put in a shop (except for shoeing) that I ever saw. There are no cracks to lose nuts and bolts in and let the cold wind up through. Notice the glass front which helps light up the shop. We do not work with the doors open in winter, but keep them closed, and heat the shop by three stoves.

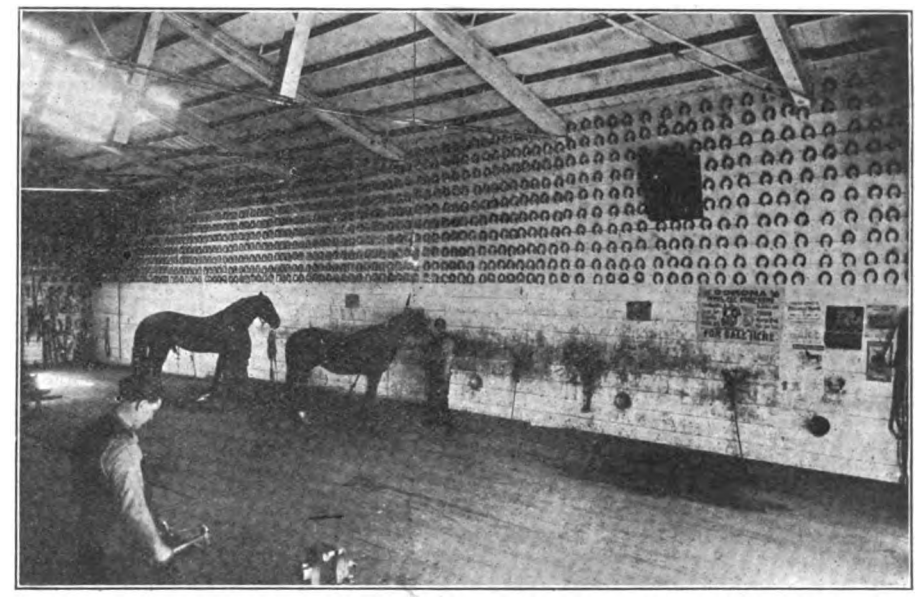
I do not have advertisements on the wall, only for things I have to sell. The shoes on the wall are all toed and heeled ready for use. We have over 4,000 filled up in the photo showing the front of the shop. You will see my registered saddle horse which my son is holding.

I will try to mention some of the equipment. Everything runs by electric power. We have one 5 h. p. electric motor, one screw cutting engine lathe, one universal wood worker, one Brooks cold tire setter, one hot tire setter, one bolt threading machine, cold iron shears, one 4-fire electric blower, one hub boring machine, drill press, emery wheel, triple punch, three forges, and small tools for each fire. We also have one tire furnace in the rear of the shop and a warehouse 20x36 feet for hardwood lumber. We have no windows in this warehouse to let the sun shine in and crack the lumber.

I think the best time-saving device in the shop is a Chicago pencil sharpener, and think the best article ever published in The Blacksmith and Wheelwright was a very short one, "Clean Up Your Shop." I have a good new broom for every man in the shop, and they all seem to like to use them once in a while.

I would like you to send me the cuts of these photos if you use them, as I want to put them in our town paper, and use them to get some pictures printed to give to my customers, instead of calendars.





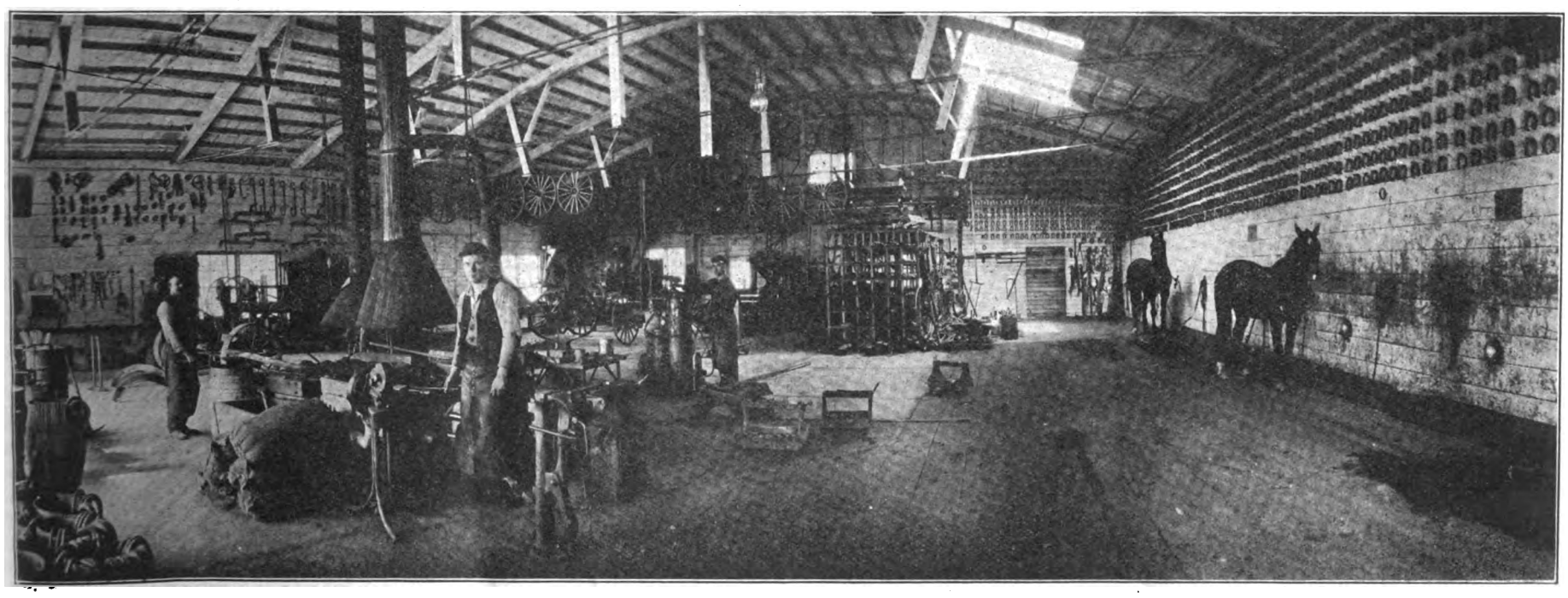
The Outside of Mr. Atherton's Shop and How It Looks on the Inside. The Reader's Attention Is Called to the General Neatness and Cleanliness of the Shop.

THE HORNED HORSE IS ONE OF THE FREAKS OF NATURE.

One of the strangest freaks of nature is the horse with horns. Such horses are foaled occasionally, and have provided a rich field of speculation for scientists. Certainly the presence of the horns would seem to indicate that in some far-away period this animal was so provided by nature.

In most cases where horses have been foaled with horns, the horns were upon the forehead, and usually three or four inches long. But a colt near Rogersville, Tenn., the existence of which is on record, had a curved horn just below the aperture of the right eye. This is approximately the same position from which sprout the horns of many animals whose horns have a full growth.

Despite this evidence of a return to some earlier state of development, no trace of their presence can be found on any of the skulls of horses which belonged to other ages. Thousands of these skulls have been uncovered in many lands. The oldest goes back just 3,000,000 years, and is of a size to indicate that the horse of that time was no larger than a good-sized dog.



This Picture Was So Good That We "Just Had to" Publish It. It gives a Larger View of Mr. Atherton's Shop.

Digitized by Google



An Interesting Letter.

From Charles Nelson, Illinois.—I have a shop down in Egypt, which is a very good farming country.

I have been at the good old trade for about fourteen years and can say that I like it O. K. I have a fairly good equipment. My shop is 22 ft. by 50 ft., with good, firm walls, a solid brick foundation, and plenty of windows. My equipment consists of a five-horsepower gas engine, trip hammer, emery stand, cold tire setter, hot shrinker, large sized Edward Shear Drill press, planer, hub shoeing machine, band-saw, boring machine, large grindstone and plenty of hand tools.

I have a competitor in this little town and we get along finely together, as we have a little union of our own and work things our own way pretty much. We keep one another posted if anything new comes in the way, and have fair prices for our work.

I have a few kinks for the boys of the craft. How many have ever tried resharpening an old rasp? This is easily done and will give as good service as a new one when done right. Put the rasp on the fire and draw the temper. When cool take a five-inch three square slim taper file and just run square across till the teeth are sharp. Then put back in the fire and heat slowly to a red, and dip edgewise in the slag tub, plunge under the surface till cool. If this is done right, you will have a good job.

For the shop that does not have a tire bolting machine for 3/16 inch bolts, will say that I have one that I made, which works fine. To make it, take a piece of ⅜ soft steel about 48 inches long and upset the end for the nut. Drive a pinch in the end and work out until large enough to make a socket for the nut on the other end. Then bend it to have the shape of a bit brace. The end for the head can be made in the following way: Weld a 7/16 inch nut about ¾ of an inch from the end and thread for a nut. Then get a piece of ⅛ inch round iron 2½ inches in diameter. Bore ⅜ inch hole in the center and about three holes to attach to the wood cap. Place the plate on, screw the nut on and rivet. Then fasten plate to the wood head and this will be a good socket wrench for the purpose.

I will close by saying to the craft that I never cut prices.

A PORTABLE FORGE.

From Sneve Bros., Idaho.—We are enclosing a sketch of a forge which we made

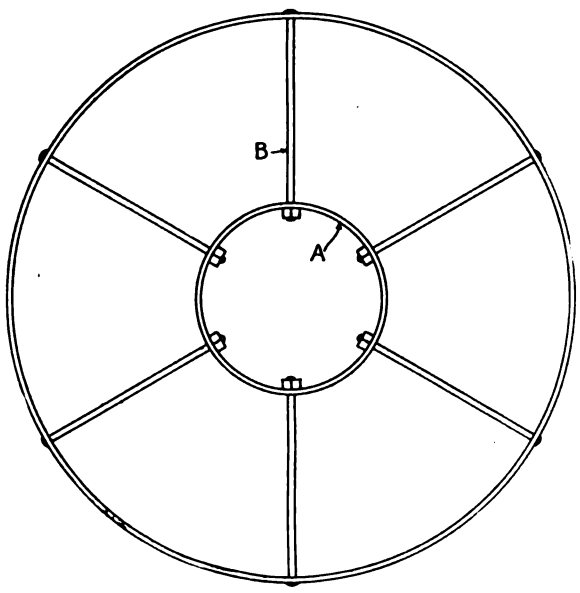


Fig. 1—The Old Binder Wheel.

from a full wheel out of an old binder. Fig. 1 shows the bottom; A is a circle big enough for the bottom of the tuyere to go through. B is one of the rods which go through the rim and each has a nut on the inside of the small circle A.

Fig. 2 shows the forge complete. The legs are made out of old pipes from an old binder frame. The legs are slightly bent out at C, where the support is bolted on at D upon eye bolts fastened to the rim. E is a rod which is hooked in to the eye bolts, which allows it to swing up and down. F is another rod with a loop on one end which is

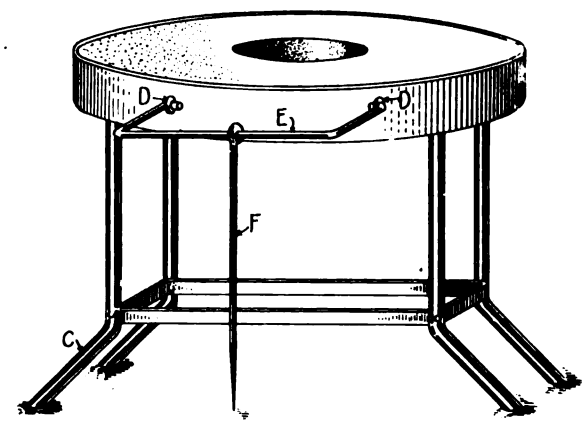


Fig. 2—The Complete Forge.

slipped on to E and sharpened on the other end so it will catch on the floor and hold E in proper place when needed.

Now take a piece of old sheet iron and cut out for a bottom and place it on top of the rods, which are put in the lower holds on the rim, put in your tuyere and fill in with clay, and you will have a stout and neat forge.

Soldering Aluminum.

From Will Brown, Illinois.—If Puzzled, North Dakota, is still interested in soldering aluminum perhaps the clipping I am sending you to publish will explain what Puzzled wants to know. I found this clipping in an old magazine and trust it may help my brother smith out:

One of the difficulties of soldering aluminum is due to the formation of a film of oxide which persistently occurs on the metal during the soldering process, hence it is advisable to employ a solder containing an ingredient which will absorb oxygen from the film and the surrounding air, or else a suitable flux. The solder should be capable of alloying itself with the metal as quickly as possible, and at the same time it should possess sufficient strength to make a fairly reliable joint. An absolutely reliable joint under all conditions is very difficult to make, and probably nothing short of autogenous welding, or soldering by means of the oxy-acetylene blowpipe flame will secure it. However, since zinc alloys itself more or less readily with aluminum, and since phosphorus (or phosphor tin) absorbs oxygen, a solder containing zinc and phosphorus (or phosphor tin) is desirable for soldering aluminum to aluminum. A suitable solder, and one conforming to these conditions, consists of 70 parts of tin, 25 parts of zinc, 3 parts of aluminum, and 2 parts of phosphor tin. But it should be understood that this solder cannot be made to flow readily by means of a soldering bit. A higher temperature is required, consequently a blowlamp can be usefully employed in this connection. The aluminum should be scraped, filed or otherwise cleaned, then it should be "tinned" as quickly as possible where the joint is to be made. No flux is necessary when using a solder similar to that just given, owing to the phosphor tin content. During the application of the blowpipe flame, hold the joint well together by exerting pressure on the upper lap, then by directing the flame also on the lap, the solder will run between and a good joint will result; but care should be taken to hold the lap down until the solder sets. Not so much difficulty is experienced in soldering aluminum to brass or to german silver, and many prefer to use tinsmith's fine solder, consisting of 2 parts of tin to 1 part of lead. A soldering bit may be employed with this solder, and a flux, of course, is necessary. Stearin is a good flux; but whatever the flux selected may be, the chief thing is to get rid of as much oxide as possible by preliminary clearing, and then "tin" the metal as rapidly as possible. A good plan when tinning the metal is to use the bit with a scraping action. This facilitates the process by removing the oxide on the metal under the solder, thus making it comparatively easy for the solder to alloy itself with the surface of the metal before it comes in contact with the air.

Prices of Work in Montana.

From J. G. Bierman, Montana.—I have taken The Blacksmith and Wheelwright for over thirty years and it is just like an old friend. I can't get along without. I am giving you a price list of work here in Montana and if you think it will help any of my brother blacksmiths you might print it.

8 Never Slip shoes, sizes from 1 to 4 (New)	$6.00
8 Never Slip shoes, sizes from 5 to 7 (New)	7.00
8 Common Shoes, sizes from 1 to 4 (New)	5.00
8 Common Shoes, sizes from 5 to 7 (New)	6.00
For resetting, per shoe	.35
New Never Slip calks in old shoes, per pair	.07
New spokes in wagon or buggy wheels, per pair	.40
Rimming buggy wheels	3.00
Setting tires, per set of four tires	5.00
Pointing plow shares, per pair	1.50
New Wagon Tongue	$5.00 to 6.00
Sharpening plow shares, per pair	.50
Sleigh shoes	$8.00 to 10.00

History of the Tapered Axle.

From A. Stevens, Minnesota.—I find many letters in The Blacksmith and Wheelwright about setting axles, and every reader seems to have his own idea about this sort of work.

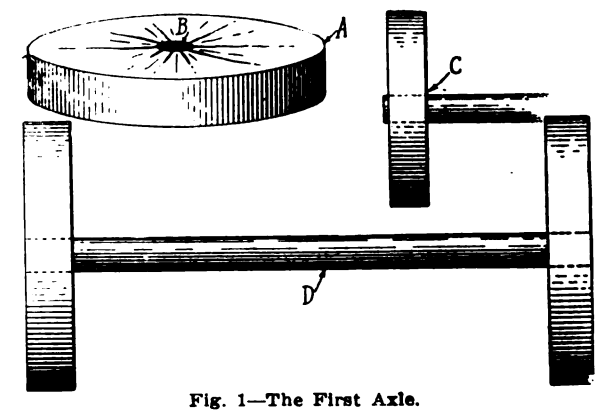


Fig. 1—The First Axle.

One man believes in the plumb spoke, another one doesn't.

I presume that our ancestors, when they first conceived the idea of having vehicles, took a slice from a tree trunk like A, Fig. 1. They made a hole in the center of it, B, and put a piece of a branch in it, giving them a wheel such as shown at C. The next step was to put a wheel on the other end of the branch and then they had a carriage axle like D. These were probably the first kinds of axles used, solid wheels, and as they did not know anything about axle setting they made the wheels straight as well as the axles. Brother Wentworth must agree that they were on a plumb spoke, as no blacksmith had had a chance to dish them, either forward or back, and I think it was a long time before they put tires on them. These wheels were not quite satisfactory and the next step was to cut out spaces all around the solid wheel, in order to make it lighter, as shown in Fig. 2 at E. Then some "smart

Digitized by Google

John" thought of making a hub, putting in the spokes and making a rim on the outside. Still everything was on the plumb spoke. They had as yet not started to put on tires

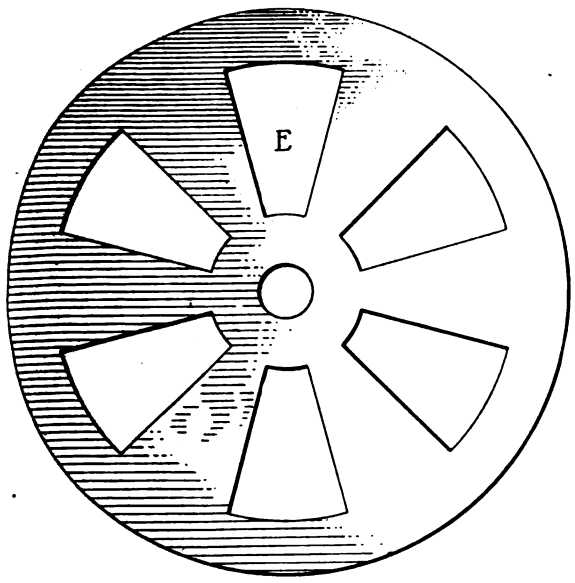


Fig. 2—How the First Open Wheel Looked.

and so to prevent wear, they nailed pieces of iron around the outside of the wheel as shown in Fig. 3, at A.

After the wheels had been run for a while the same "smart John" noticed that the spokes worked loose and would move back and forth, so he conceived the idea that, if he beveled the spokes on one side he would

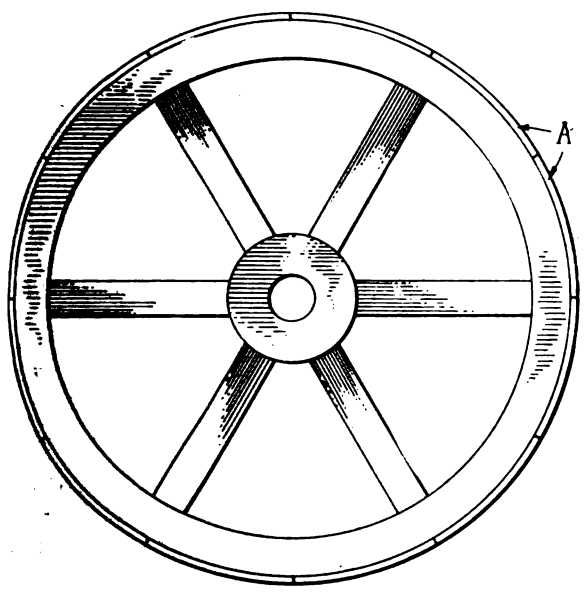


Fig. 3—The First Iron Rimmed Wheel.

make the wheel lean over on one side, as at A, Fig. 4. After he had looked over his work he found that he could make a solid tire, shown at B, put it on the wheel and so keep the wheel from slipping over to the other side. He put this tire on tightly, dishing the wheel a little more as shown at C in the same figure. People found this type of wheel so much stronger than the straight type that they adopted it universally.

When the wagon makers tried this wheel on the straight axle they found that the axle wore on the top, at the point A, on the inside, and at the bottom, B, on the outside, Fig. 5. So to prevent this they bent the axle down somewhat in the manner shown at C. This gave pretty good results, but they soon found that the oil and grease ran out and the axle got dry on the inside very quickly. It was then that the idea came to me, why would it not be possible to make the axle smaller on the outside, so as to taper it, then the taper would give the same result as if the axle were bent down. To get this result the axle should be tapered and bent so that the bottom of the taper is level with the rest of the axle as shown at D.

If you will look at the illustration, Fig. 5, you will see that the taper on the axle and the amount that the heel is tipped over, taken all together, brings the spokes plumb again at the bottom, thus proving that the plumb spoke is necessary and is the best way to mount wheels, but the wheels must be dished in and the taper on the axle correct, in order to set the axles right.

If the wheels are of a different dish, as Mr. Wentworth states, it is a case of repairing the wheels and not the axles. Now Mr. Wentworth sets his axles all right, and sets them for a plumb spoke, providing his wheels have the ordinary dish of 5/8 inch or 3/4 inch and he will find out that the taper on the ordinary steel axle is figured for a 5/8-inch dish. This axle setting is on the principle of the square; the more dish in the wheels the more the axle must be dropped and the more it must be tapered. When one buys axles one gets a certain taper which one cannot change; but one can dish the wheels and set the axle to comply with the taper now in actual use. I make a practice of giving steel axles a trifle more than 1/8 inch because there is a certain spring to the axle and when the wagon is loaded this setting makes the axle run on a plumb spoke.

I set hundreds of axles a year and could not be bothered with measuring every set of wheels. Our wheels are set by machinery and are designed to have from 5/8 inch to 3/4 inch dish. The front wheels show up the

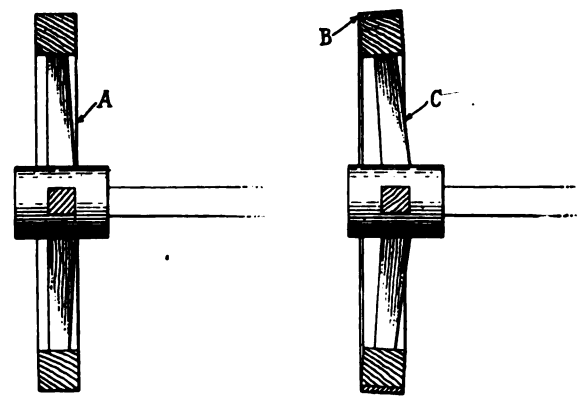


Fig. 4—The First Dished Wheel.

same as the rear, but they are figured for four-foot wheels. We have a gauge for setting the axles which indicates within 1/16, and I set them all down on the center line 3/4 inch, bringing them a trifle under, but I think that is better than having them out the other way.

In repairing old buggies, especially in putting new stubs on the end of springs, I give them as much as 1/2 inch under, which allows for the spring of the axle. The gather is determined by the fit of the box. If it is worn you will have to give it more gather than if it were a good fit. The gather is taken at the height of the axle, back and front of the wheels, and is calculated to over-

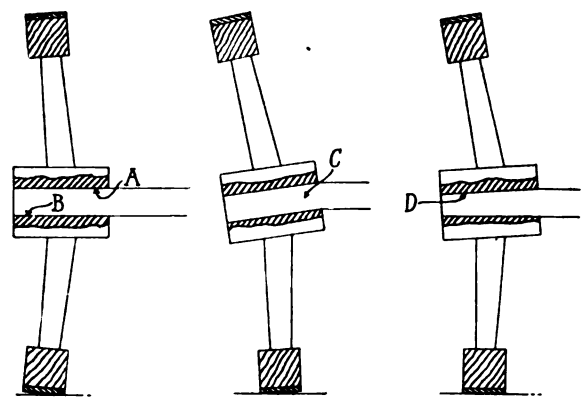


Fig. 5—The Evolution of the Taper Axle.

come the friction which throws the wheels out in front.

I hope that you will pardon the length of this letter and publish it in the best trade paper in the best country in the world.

Prices in Kansas.

From George W. Hogeland, Kansas.—I thought I would write a few lines to the craft, as I have been a silent reader for many years and read the magazine when I was under a boss.

First I will speak of prices. The cost of material has gone up so much that we are hardly able to keep pace in raising our prices, although we always get just what we ask for. Our people here are farmers, and they like to increase prices on what they sell.

Some seven years ago we raised prices on shoeing from $1.50 to $2.00 per pair, and toeing and calking from 50c. to 75c. a pair, so that we can't complain. We now get $4.00 for a new wagon tongue, 50c. for one spoke or felloe, three of either for $1.00; and 50c. for setting tires. We use a scientific hydraulic cold tire machine and have not set tires hot for over seven years. We have set as many as 55 tires a day.

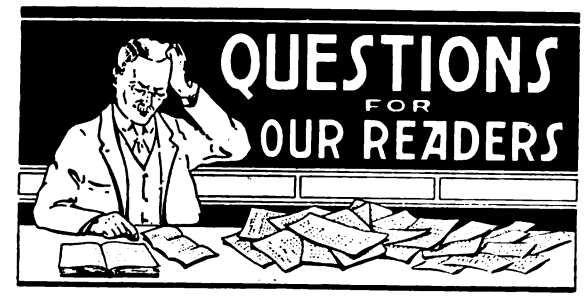
In one period of seven months we booked 500 tires set, and the following year we booked 2,000. That was a dry season at thrashing, and the farmers came from as far as twenty-five miles with wheat to market here, so we had tires to set from a good distance around.

Now our hobby for all shops is the acetylene welding, and any shop that hasn't such an outfit had better "get in and get his feet wet while the water is fine," for he is losing some good money, and so are his customers, for, with the high cost of machinery, repairs are hard to make sometimes, and only a few minutes of the acetylene torch will mend a broken casting that would probably take a week to get if it had to come from the factory.

The acetylene welder can repair most anything that contains melting properties, and for brazing many a thing is repaired very easily. I have been using this machine for over four years, and it would be like taking one of our anvils out of the shop to take the welding outfit.

I do not say that a man never has trouble, for I believe every fellow has his obstacles, and the fellow that doesn't have any trouble with his welding outfit, or the work he tries to do never does anything, for I have seen a good deal of other fellow's work—some that was just fine, and some that was all wrong.

Give our boys in the Army and Navy every fighting chance. Pledge yourself to save to the utmost of your ability and to buy War Savings Stamps.



Now that the thermometer is hovering around the 90 degree mark most of our readers do not feel like writing many letters and still less do they feel like asking questions. Doubtless many of our blacksmith brothers however are still being puzzled by various problems and we hope that some day, when the thermometer makes a mistake and drops below his usual height, our readers will pen a letter to us, asking us for help in solving their problems.

The answers to questions cost nothing except a three cent stamp in forwarding us the letters, yet these answers come from all parts of the country. It is just like putting your question before a large meeting of delegates; don't you think that this is worth a three cent stamp?

How Can He Remove Bends and Dents?

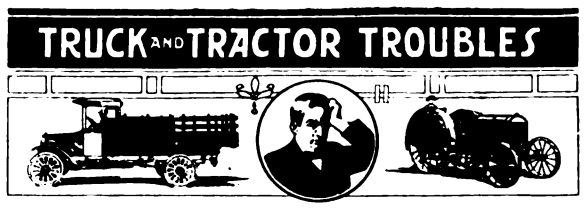
From a Brother in Illinois.—Not long ago I made a visit to Chicago, and there I saw a number of shops that made a specialty of mudguard repair work. In these shops there seemed to be lots of work, principally in removing dents and bends in mudguards, the backs of machines, and fenders. I think that I could pick up some spare cash in this town if I could learn the business; can any of my brothers give me some pointers on this work?

WHEN THERE'S A WILL.

Country Constable—"We haven't had any motorists violating the speed limit for 'most a week."

Justice of the Peace—"We'll have to arrange to lower the speed limit."—Milestones.

Digitized by Google



By this time the blacksmiths must realize that sooner or later the art of blacksmithing will not bring in enough money to keep a man busy all the year round. Undoubtedly many blacksmiths realize this fact, and are wondering what they will do when they cannot get enough blacksmithing work.

The blacksmith should make himself familiar with trucks and tractors as well as gasoline engines. The horse of next year will be made of iron, and he will be able to do the work of many flesh and blood horses.

His name will be "the tractor." Instead of giving him a new pair of shoes the blacksmith will be obliged to give him a new set of bolts or nuts and, if the blacksmith is wise, it will be just as easy for him to fix the tractor as it is for him to shoe a horse. We want to help our blacksmith brothers in every way possible and for that reason we have started "The Truck and Tractor Trouble Department" in this column. Any questions that you may have relative to trucks and tractors or automobiles should be sent to us, and we will answer them by letter as soon as possible. Only by asking questions can one hope to learn, and we invite all of our readers to send in as many questions as they have.

How Does Ford Magneto Operate?

From W. A. Roedding, Illinois.—Will you kindly tell me how a Ford magneto works? I understand that this magneto generates alternating current, but how is it that the vibrating coils can be used in connection with it?

How Can He Locate Knocks?

From A. R., Pennsylvania.—I wish that some of my blacksmith brothers who have done automobile repairing would tell me how to locate knocks and find the reasons for them in an automobile engine. Some repairmen say that a knock is dull and heavy while others say it has sort of a metallic sound, when a main bearing is loose.

I don't think there is any way to describe a particular knock and would like to know of some instrument that I could make or buy with which to locate the knocks more exactly.

A Trailer for C. P. J.

From I. C. Miller, Pennsylvania.—I noticed that C. P. J. of Canada wants a trailer car idea. I built one for my own use as I live 4½ miles from the railroad, and use the car to haul iron, lumber and most everything else; have even hauled pigs in it.

As I am not good at making drawings, I will give a description of the trailer car, as best I can.

The body is built the same as any spring wagon, six feet long, three and one-half feet wide with three cross bars, well braced. I have an end gate at each end, so that I can use it for long pieces. The rear gate is arranged so that it can be tilted half open, and not hang down behind. I use a leather covered chain for holding it, for an uncovered chain "rattles like blazes."

The tongue is 4½ by 2¼ inches and reaches to the middle crossbar. It is fastened securely to the bottom of the box and extends two feet six inches ahead of the front end gate.

I obtained the wheels and spring together with the axle from a second-hand Sear's-Roebuck Gem Buggy, as we call them. The axle is 1¼ inches square. The wheels have 16 spokes and a 2 inch rim with solid rubber tires.

One should not use anything but rubber tired wheels and roller bearings if he cares to have the car last. The tongue should be bound with strap iron at the top and bottom or it will snap off, as my first one did, at the first deep ditch I struck.

I use this trailer back of a 1917 Ford car, it only weighs 450 pounds and is so light that one can hardly tell when it is being taken along.

This is what I did with it, one day this spring, as I have 23 acres of land together with my shop; 2½ tons of lime arrived in 50 pound bags at a station 3½ miles from the shop. I hauled this lime because my farmer was busy at the time. I carried 850 pounds of lime on one load and took 45 minutes for the round trip.

I used only three gallons of gasoline on the trip and the road is not at all level. On one hill it requires four good draft horses to pull a two-ton load.

I almost forgot to say that the sides of the trailer are eight inches in height with side boards 12 inches in height. Be sure to have the sides plenty high enough or the load may bounce out, for in running at a speed of 20 miles per hour (I can make that easily enough), the trailer bounces about.

If Mr. C. P. J. wishes a coupling, send to Cray Bros. of Cleveland, Ohio, they sell two kinds, and it is where I obtained mine. Ask for their catalogue and you will see a picture of a trailer car, also a better description than I can give.

SHOEING A PONY IN CHINA.

This Operation is About as Pleasing to the Pony as is Pulling Teeth to the Human.

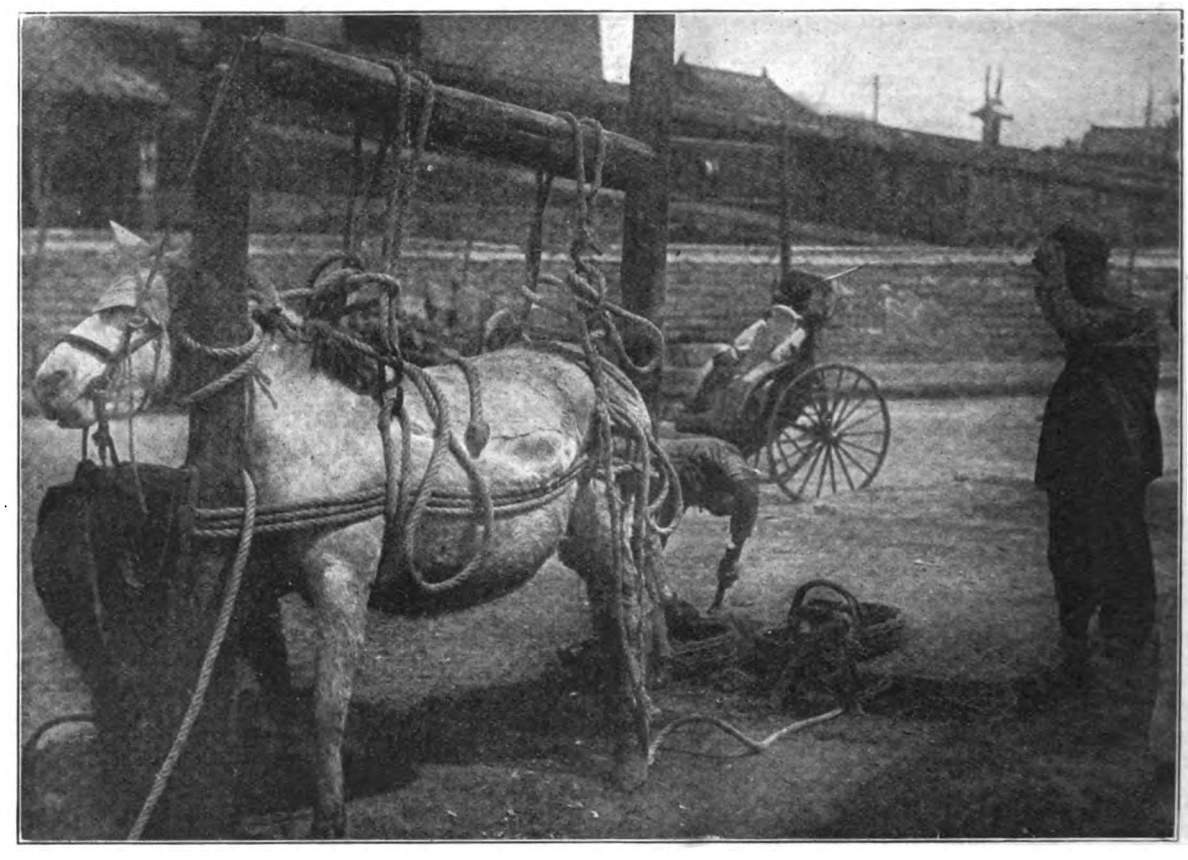
Most people have the mistaken idea that China is a country of mystery, that the people are about a thousand years behind the times, and for this reason we reproduce herewith a photograph showing just how the blacksmith in that ancient country goes about the important process of putting shoes on a pony.

If we were to judge by appearances, we would not be lead to feel that, as far as the pony is concerned, the operation is pleasing; and we would be correct in our belief; it is not.

The pony is lead beneath a heavy cross beam, which is supported by two heavy uprights. He is then tightly fastened to the front and rear uprights by three or four strands of stout rope, he cannot move forward nor backward. Two lengths of rope are then passed beneath him and he is lifted just clear of the ground, if he is a fierce animal. If, however, he is considered gentle, he is allowed to stand upon his four feet, or more correctly, upon his four toes, for the lengths of rope are tight enough to take his weight from the ground.

Now China has always considered herself just a little brighter than any other country, as far as craft and trades work is concerned, and the craftsmen are careful to preserve their secrets. With this end in view, perhaps, the pony is blindfolded, he is unable to see how the work is being done, and incidentally he is unable to place his kicks effectually.

Efficiency is always kept in view—two blacksmiths work at the same time, one in front the other in back. So, like pulling a tooth, it may be rather unpleasant at the time but it is soon over.



Evidently the Chinaman Believes in "Safety First," the Pony Is Not Given Much Chance to Kick.

CAN YOU GO?

Secretary Josephus Daniels, Secretary of the Navy, says:

"No other agency in the world is comparable to the Y. M. C. A. Its service is known all over the world for its aggressive helpfulness wherever there is opportunity to serve. Never was a greater opportunity presented and never has any organization met the challenge that opportunity offers, more nobly than in the response this organization has made since April 6th, 1917."

He also said: "We now have a selective draft for the men over the military age. There is no place anywhere in America for any man of any age except in service to win the war."

The Overseas Motor Department of the Y. M. C. A. appeals to the motor mechanics of America to volunteer for service in France. There has never been a time in the history of this country when the opportunity for volunteer service was so great as it is at the present time for men over military age, who can go in this service. The whole Y. M. C. A. service in France depends upon our motor trucks being kept in proper repair and running shape. America has gone over the top in every other call that has been made. We must not fail in this.

Garage owners! Automobile dealers! Blacksmiths! It is your duty to prepare yourself to not only give up but seek the opportunity to offer the services of your mechanical experts. It is even your duty to urge them to go into this service. This may hurt your business temporarily but business men are getting used to such things now days.

For full particulars, see your nearest Y. M. C. A. secretary.

New Record for Hauling Eggs.

A commercial truck load of eggs left Vineland, N. J., at 11 a. m. and arrived in the wholesale district of New York City at 2 o'clock the next morning, traveling the entire distance of 140 miles without breaking a single egg. Delivery from the shipper to the wholesaler was made in 15 hours, which is faster time than that made by express shipments, and establishes a record for motor haul of eggs. The five-ton truck carried 150 crates of eggs, weighing nearly four tons, the rest of the load being made up of crated glass. The Bureau of Markets of the United States Department of Agriculture arranged for the demonstration.

Digitized by Google

Automobile Agents Wanted.

The Bush Motor Co., Bush Temple, Chicago, Ill., is advertising in this magazine in order to obtain good agents for their well known line of automobiles. One of the most popular Bush cars is a five passenger touring car, which has most attractive specifications. Blacksmiths are wanted to become agents for this car and such agents are given an opportunity to pay for the car out of their commissions. Many Bush agents are making good money. Cars are shipped promptly as ordered and the Bush cars are all guaranteed to give satisfaction. The 1918 models are now ready. Readers who are interested are requested to address J. H. Bush, Pres. Bush Motor Co., Dept. G 7, Bush Temple, Chicago, Ill.

Phoenix Horse Shoe and Bull Dog Calks.

The Phoenix Horse Shoes are so well known to most of our readers that recommendation is hardly needed. The Phoenix Horse Shoe Company has large rolling mills and factories at Joliet, Ill., and Poughkeepsie, N. Y. A full line of horse and mule shoes is made by this company, also the well known bull dog toe calks. Any of our readers who have not tried these products should write for samples direct to the main office of the company at Chicago.

Bailey Ball Thrust Bearing.

One of the greatest troubles with a Ford or Chevrolet rear axle is caused by the thrust of the Bevel gear against the Master gear, resulting in end-play of the differential and consequent racking of the axle, as well as the engine and transmission. With the ordinary washers, if there is any wear in the differential housing, the pinion and master gears will not mesh properly.

With the Bailey Ball Thrust Bearing, however, all this trouble is eliminated and instead of ordinary thrust washers, a ball bearing is furnished the differential. The Bailey Ball Thrust Bearing takes up all of the pinion gear thrust and puts the Ford rear axle in a class with the higher priced cars. The blacksmith should find little trouble in marketing this device, because the price is so low and of course Ford owners demand it. Our readers should write Geo. D. Bailey Co., 4506 N. Ravenswood Ave., Chicago, Ill., for full particulars.



Free 512 PAGES OF BARGAINS

POST PAID

WE WANT TO SEND YOU THIS 512 PAGE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

Tells how you can work up a profitable auto supply and repair business.

Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories

1117 W. 11th Street, Cleveland, Ohio, U. S. A.

Index to Advertisers

Aetna Nut Co., horseshoe calks....Front cover
Akron-Selle Co., gears....Front cover
American Calk Co., calks....Front cover
Anti-Borax Compound Co., welding compounds....203
Armstrong Mfg. Co., bolt dies....204
Armstrong-Blum Mfg. Co., punches and shears....Front cover
Bailey, Geo. D., Co., ball thrust bearings, 2d cover
Barcus Mfg. Co., horse stocks....199
Barnett, G. & H., Co., files and rasps, Front cover
Bertschy-Bermo Co., welding plants....202
Bicknell Mfg. & Supply Co., dies....219
Bradley, C. C., & Son, shaft coupler....202
Buchanan, C. G., Chemical Co., industrial chemicals....204
Buffalo Forge Co., blacksmiths' tools....203
Burden Iron Works, horseshoes....3d cover
Bush Motor Co., automobiles....Front cover
Butterfield & Co., taps, dies and screw plates....204
Campbell Iron Co., supplies....219
Canedy-Otto Mfg. Co., blacksmiths' tools....198
Capewell Horse Nail Co., horse nails, Front cover
Champion Blower & Forge Co., blowers....199
Champion Tool Co., blacksmiths' tools....198
Childs, S. D., & Co., steel stamps..Front cover
Columbus Forge & Iron Co., anvils....199
Columbian Hardware Co., vises....4th cover
Cortland Welding Compound Co., welding compounds....200
Cray Bros., blacksmiths' tools....217
Crescent Machine Co., woodworking machinery....Front cover
Diamond Calk Horseshoe Co., horseshoes..219
Edwards, C. D., Mfg. Co., shears....219
Electric Blower Co., blowers....220
Electric Wheel Co., wheels....202
Empire Mfg. Co., wheels....Front cover
Felton, Sibley & Co., paints....197
Firestone Tire & Rubber Co., tires....200
Fisher & Norris, anvils and vises....204
Franklin Steel Works, toe calks....3d cover
General Welding Co., welding outfits....202
Gogel Mfg. Co., tire heaters....202
Greenfield Tap & Die Corporation, screw plates and blacksmiths' machinery....200
Gwilliam Co., ball bearings....4th cover
Hart Mfg. Co., stocks and dies....4th cover
Harvey Spring & Forging Co., auto springs....3d cover
Hay-Budden Mfg. Co., anvils....4th cover
Heller Bros., horse rasps, tools, etc....204
House Cold Tire Setter Co., tire setters, hollow and spoke augers....4th cover
Jenner, H. W. T., patents....218
Kerrihard Co., hammers....202
Kimball Tire Case Co., tire protectors....219
Linde Air Products Co., oxygen....204
L. S. P. Calking Machine Co., calking machines....3d cover
Macgowan & Finigan Cordage Co., hammers....219
Mayer Bros. Co., hammers....197
Ness, Geo. M., Jr., steel stamps....Front cover
Nicholson File Co., files and rasps....220
Oneida National Chuck Co., chucks....202
Ottawa Mfg. Co., kerosene engines, Front cover
Parker, C. L., attorney....202
Parks Ball Bearing Machine Co., woodworking machinery....204
Peck, Stow & Wilcox, pincers....220
Phoenix Horseshoe Co., horseshoes and toe calks....201
Porter, H. K., bolt clipper....4th cover
Prentiss Vise Co., vises....4th cover
Rosewater Electric Co., blowers....4th cover
Sampson & Murdock, directories....4th cover
Shaler, C. A., Co., vulcanizers....4th cover
Sheldon Axle & Spring Co., axles....201
Standard Horse Nail Co., horseshoe nails, 4th cover
Standard Horseshoe Co., horseshoes....
Star Mfg. Co., agricultural implements....219
Stokes Bros. Mfg. Co., rasps....Front cover
Superior Oxy-Acetylene Machine Co., welding outfits....219
Thompson Tuyere Iron Co., tuyere iron, 4th cover
Union Horse Nail Co., horse nails....197
Western Newspaper Association, books....197
West Tire Setter Co., tire setters, hammers....219
Wheel, B Top & Hardware Co., supplies..218
Whisler Mfg. Co., nut splitters, jointer heads....Front cover
Witte Engine Works, engines....219
Young, W. F., veterinary remedies..4th cover

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co....219

Anvils
Columbus Forge & Iron Co....199
Fisher & Norris....204
Hay-Budden Mfg. Co....4th cover

Attorneys
Parker, C. L....202

Automobiles
Bush Motor Co....Front cover

Automobile Springs
Harvey Spring & Forging Co....3d cover

Axles
Sheldon Axle & Spring Co....201

Blacksmiths' Tools
Buffalo Forge Co....203
Butterfield & Co....204
Canedy-Otto Mfg. Co....198
Champion Blower & Forge Co....199
Champion Tool Co....198
Cray Bros....217
Heller Bros. Co....204
Nicholson File Co....220
Peck, Stow & Wilcox Co....220

Ball Bearings
Gwilliam Co....4th cover

Ball Thrust Bearings
Bailey, Geo. D., Co....2d cover

Blacksmiths' Machinery
Greenfield Tap & Die Corporation....200

Blowers
Buffalo Forge Co....203
Champion Blower & Forge Co....199
Champion Tool Co....198
Electric Blower Co....220
Rosewater Electric Co....4th cover

Bolt Dies
Armstrong Mfg. Co....204

Bolt and Rivet Clippers
Porter, H. K....4th cover

Books
Western Newspaper Association....197

Calking Machines
L. S. P. Calking Machine Co....3d cover

Calks, Horseshoe
Aetna Nut Co....Front cover
American Calk Co....Front cover
Diamond Calk Horseshoe Co....219

Calks, Toe
Franklin Steel Works....3d cover

Chemicals (Industrial)
Buchanan, C. G., Chemical Co....204

Chisels
Champion Tool Co....198
Peck, Stow & Wilcox Co....220

Chucks
Buffalo Forge Co....203
Oneida National Chuck Co....202

Dies
Bicknell Mfg. & Supply Co....219

Directories
Sampson & Murdock Co....4th cover

Disc Sharpeners
Mayer Bros. Co....197

Drills
Buffalo Forge Co....203
Champion Blower & Forge Co....199

Engines
Ottawa Mfg. Co....Front cover
Witte Engine Works....219

Farriers' Tools
Barnett, G. & H., Co....Front cover
Champion Tool Co....198
Heller Bros. Co....204
Peck, Stow & Wilcox Co....220

Files and Rasps
Barnett, G. & H., Co....Front cover
Nicholson File Co....220
Stokes Bros. Mfg. Co....Front cover

Forges
Buffalo Forge Co....203
Champion Blower & Forge Co....199

Gasoline Engines
Witte Engine Works....219

Gears
Akron-Selle Co....Front cover

Hammers
Champion Tool Co....198
Kerrihard Co....202
MacGowan & Finigan Cordage Co....219
Mayer Bros. Co....197
Peck, Stow & Wilcox Co....220
West Tire Setter Co....219

Hollow Augers
House Cold Tire Setter Co....4th cover

Hoof Parers
Champion Tool Co....198

Hoof Nippers
Champion Tool Co....198

Hoof Shears
Champion Tool Co....198

Horseshoes
Burden Iron Works....3d cover
Diamond Calk Horseshoe Co....219
Phoenix Horseshoe Co....201

Horseshoe Calks
Diamond Calk Horseshoe Co....219

Horseshoe Nails
Capewell Horse Nail Co....Front cover
Standard Horse Nail Co....4th cover
Union Horse Nail Co....197

Horse Stocks
Barcus Mfg. Co....199

Kerosene Engines
Ottawa Mfg. Co....Front cover
Witte Engine Works....219

Nut Splitters
Whisler Mfg. Co....219

Oxygen
Linde Air Products Co....204

Paints and Varnishes
Felton, Sibley & Co....197

Patents
Jenner, H. W. T....218
Parker, C. L....202

Pincers
Peck, Stow & Wilcox Co....220

Punches
Champion Blower & Forge Co....199

Punches and Shears
Peck, Stow & Wilcox Co....220

Screw Plates
Butterfield & Co....204
Champion Blower & Forge Co....199
Greenfield Tap & Die Corporation....200

Shaft Coupling
Bradley, C. C., & Son....202

Shears
Edwards, C. D., Mfg. Co....Front cover

Spoke Augers
House Cold Tire Setter Co....4th cover

Steel Stamps
Childs, S. D., & Co....Front cover
Ness, George M., Jr....Front cover

Stocks and Dies
Butterfield & Co....204
Champion Blower & Forge Co....199
Hart Mfg. Co....4th cover

Supplies
Campbell Iron Co....219
Wheel, B Top & Hardware Co....218

Swages
Champion Blower & Forge Co....199

Tires
Firestone Tire & Rubber Co....200

Tire Bending Machines
Buffalo Forge Co....203
Champion Blower & Forge Co....199

Tire Heaters
Gogel Mfg. Co....202

Tire Protectors
Kimball Tire Case Co....219

Tire Setters
Buffalo Forge Co....203
House Cold Tire Setter Co....4th cover
West Tire Setter Co....219

Tire Shrinkers
Buffalo Forge Co....203
Champion Blower & Forge Co....199

Tire Upsetters
Buffalo Forge Co....203
Champion Blower & Forge Co....199

Tongs
Champion Tool Co....198

Tool Grinders
Phoenix Horseshoe Co....201

Trucks
Akron-Selle Co....Front cover

Tuyere Irons
Buffalo Forge Co....203
Champion Blower & Forge Co....199
Thompson Tuyere Iron Co....4th cover

Veterinary Remedies
Young, W. F....4th cover

Vises
Butterfield & Co....204
Columbian Hardware Co....4th cover
Fisher & Norris....204
Prentiss Vise Co....4th cover

Vulcanizers
Shaler, C. A., Co....4th cover

Wagons
Akron-Selle Co....Front cover

Welding Compounds
Anti-Borax Compound Co....203
Cortland Welding Compound Co....200

Welding Outfit
General Welding Co....202
Superior Oxy-Acetylene Machine Co....219

Welding Plant
Bertschy-Bermo Co....202

Welding Supplies
Linde Air Products Co....204

Wheel Dishers
House Cold Tire Setter Co....4th cover

Wheels
Electric Wheel Co....202
Empire Mfg. Co....Front cover

Woodworking Machinery
Buffalo Forge Co....203
Crescent Machine Co....Front cover
Parks Ball Bearing Machine Co....204

Wrenches
Champion Tool Co....198

Wrenches (Knife Handle and Pipe)
Peck, Stow & Wilcox Co....220

Roto Electric Blower.

Many of our readers have discovered the great economy and convenience of an electric blower. The Rosewater Electric Co., 5516 Kinsman Road, Cleveland, Ohio, manufactures the well known Roto Electric Blower. This blower is put out on an unsually liberal guarantee. The retail price of the outfit complete is only $27.50 and the manufacturers offer to instal this blower in any shape, with the understanding that the blower may be returned at the end of 30 days if it does not give entire satisfaction, and the purchase money under these circumstances will be refunded to the purchaser.

This is an offer which is well worthy of consideration and no doubt many of our readers will be glad to accept this offer by writing direct to this company.

The Bradley Ball Bearing Thrust Coupler.

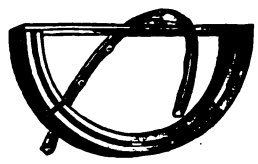
A very important element of safety and convenience in connection with any horse drawn vehicle is a shaft coupler. The Bradley Ball-Bearing carriage coupler made by C. C. Bradley & Son of Syracuse, N. Y., has been on the market for many years and it is of standard quality. This coupler is furnished with a one-piece moulded leather packing, that it is claimed will outwear any other packing on the market. It is held in place by a strong steel retaining ring. This coupler may be put on and taken off in a jiffy and it stays where it is put.

The device is made in five sizes: Pony, buggy, surrey, delivery and express, to fit axles ¾ inch diameter to 2¼ inch. This coupler is sold by all good jobbers throughout the country, or for further information you can write direct to C. C. Bradley & Son, Syracuse, N. Y.

Digitized by Google

We Can Ship Promptly

RIMS



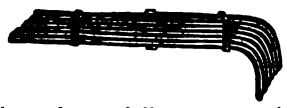
$1.60 and up.
We Carry All Sizes.

SPOKES



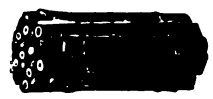
1 1-16 Sar. Pat., per 100.... ....$4.80
Other sizes in proportion.

BUGGY SHAFTS



Repair grade, per bdl..... $9.00

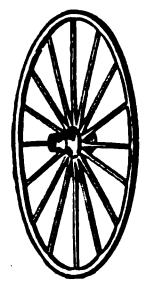
WOOD HUB SPOKES



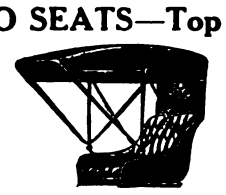
Market prices.

LIGHT WHEELS

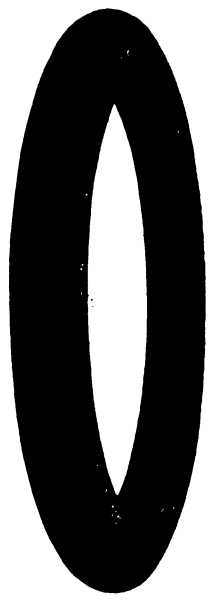
With Steel Tire on, $7.80 and up.
With Rubber Tire on, $16.80 and up.
We make all sizes.
We make Wheels up to 4-inch tread.



AUTO SEATS—Top Seats



Seat.....$3.56 and up
Cushion and back ..... 7.63 and up
Top ..... .12.84 and up



A 5,000 Mile Tire

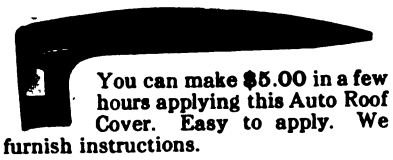
30x3½
NON-SKID

$14.25

Parcels Post Paid up to 3rd Zone

Other Sizes in Proportion

AUTO TOP RE-COVERING



You can make $5.00 in a few hours applying this Auto Roof Cover. Easy to apply. We furnish instructions.

Roadster, $7.20 Touring, $9.00
Others up to $25.00

Parcels Post Paid

B. Wheel, Top & Hardware Co.
128 East 8th St., Cincinnati, O

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

will be inserted under this head at 3 cents a word, including the address, for each insertion, payable in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York.
PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT.

Patents

PATENTS FOR INVENTIONS.
H. W. T. JENNER, patent attorney and mechanical expert, 622 F Street, Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trade-marks registered.

PATENTS.
C. L. PARKER, attorney-at-law, and solicitor of patents. American and foreign patents secured promptly. Handbook for inventors sent free upon request. McGILL BUILDING, Washington, D. C.

For Sale

FOR SALE.
Shop and garage, well equipped for all kinds of work. Work for two men. Good big territory to draw from. Will sell a new Barcus shoeing stock and shoeing vise separately. CHAS. O. MORRIS, Sand Springs, Montana.

FOR SALE.
No. 4 scientific cold tire setter, hydraulic, hand or power, cheap. Sets tires up to 4 inches. Owner retiring from business on account of age. Write J. H. TUTTLE, Lake Charles, La.

FOR SALE.
Immediate delivery, new machines: 13 in. Jointers, $75; 9 in. Jointers, $50; 5 in. Jointers, $30; 20 in. Band Saw, $45; 14 in. Pattern Lathe, $100; Emery grinder, $25; 50 Circular saws, Band saws, and 12 in. Jig saws; send for list. 2 in. Bignall & Keeler Pipe Machine, $35, second hand; also a number of Saw Arbors, Grindstone Fixtures, Cutter heads for wood table jointers, and combination outfits. Send for circular and prices. W. L. SHERWOOD, Kirksville, Mo.

FOR SALE.
In a good locality, blacksmith ship, stock, tools, and all. Garage in connection. Can rent building if desired. For information write OLE SLOTTO, Fillmore, N. D.

FOR SALE.
Reasonable, general blacksmith shop, 40 x 90, lot 100 x 50, corner, half block from depot. Building 8 years old. Have a great trade on wagons and sleighs, good shoeing stand and good shoeing trade, two fires; one Barcus stock, one 6 H. P. International engine, band saw, Emery wheel, drill press, and a good outfit for a good man. We are getting 40c to 75c for spring forming in mining town. Reason for selling: I have lost my right arm a few months ago, so have to go into some other business. I want to hear from some good, reliable man wishing to take hold of a good proposition. Address, E. J. PERRON, P. O. Box 150, Ontonagon, Mich.

FOR SALE.
Blacksmith woodworking tools and stock in best city in California. Brick building, 40 x 60 feet. Splendid location for blacksmith and auto repairing. Fine climate. For particulars address G. E. STEWART, Blackstone and McKinly Ave., Fresno, Calif.

FOR SALE.
Carriage and Wagon Shop. Main building 80x26, with hand elevator. (Three floors). Wing, 24x12. (Two floors). With stock and tools: One 36" Band Saw with Tilting Table. One Buzz Saw. One 10 h.-p. Electric Motor. One 24" Wood Planer. One Drill Press. Two Fires with tools for same and furnace for heating heavy tires inside of shop. Or will sell stock and tools and rent shop to responsible party. Reasons for selling, poor health and advancing age.
Also have one-family brick house; 11 rooms and bath, with hot water heat. Address C. W. BENDER, 1019 Seymour Avenue, Utica, N. Y.

For Sale

FOR SALE.
Good two-forge blacksmith shop Good trade. Run by 5 horse dynamo. Work for two men year round. Good prices. If you want a good shop, now is the time to get it in the best country in the United States. Best climate in the world. No cold winters. Address for full particulars, SIMS & WILLIAMS, Bishop, Texas.

FOR SALE.
Blacksmith shop, 2 story stone building 50x50, 2 fires, all electrically equipped. Building is worth $3500.00. Stock and tools are worth $1600.00. Must sell as I have other business. $3,000.00 buys everything. Don't answer unless you mean business. Above is located in best farming community in Southwestern Kansas. Am doing a big business but must sacrifice. Address C. J. COONEY, St. Paul, Kans.

FOR SALE.
Blacksmith shop and home in Western Colorado. Good business. Only shop in town. Schools, mountain water, great bargain if taken promptly. W. A. NIX, Austin, Colo.

FOR SALE.
Blacksmith shop, 24x50, two story, stock and tools, best stand in city. House and large lot for garden. Wish to retire. Address G. W. KENYON, Corning, N. Y.

FOR SALE.
Carriage implement and blacksmith business in a lively town of 6,000. Railroad center; located on Colorado River. Fine farming country; healthy. Doing a good business. Will sell half interest or the entire business. Good reasons for selling. Address all letters to P. O. BOX 608, Smithville, Tex.

Miscellaneous

AUTO TIRE VULCANIZING PLANTS.
We buy, sell or exchange. Catalog is free—you save 30%. Instruction book on Vulcanizing, 75c. EQUIPMENT CO., 360 Eighth St., Cincinnati, O.

PRINTING FOR BLACKSMITHS.
Write for prices on printed letter heads, envelopes, statements, etc. NEWS PRINTING CO., Stockton, Ill.

Wanted

WANTED.
Second hand House Cold Tire Setter, with punch and shear, or with shear. Must be cheap. J. L. SCOTT, 4048 Laclede avenue, St. Louis, Mo.

WANTED.
Good all-around blacksmith. Young married man preferred. Top wages for right man. Address M. W. ABTS, Morrill, Nebr.

WANTED
Blacksmiths - Painters
Woodworkers - Helpers
Rapid Advancement to right men.
H. H. BABCOCK CO.
WATERTOWN, - NEW YORK

WANTED.
To buy a good blacksmith stand with from ten to forty acres of land, with some fruit. Address with particulars to L. L., box 33, Prairie View, Ill.

Tires

DOUBLE TREAD TIRES
GUARANTEED
SPECIAL OFFER TO AGENTS. Write for Catalogue
Get our special price on new tires
M. LIBEN & CO.
205-AK West 48th St. New York City

Double Tread Tires
Notice Our Prices Before Going Elsewhere
PRICE LIST

Size	Plain	Size	Plain
30x3	$5.00	35x4	$9.00
30x3½	5.50	36x4	9.50
32x3½	6.50	36x4½	10.00
32x4	7.00	36x5	10.00
33x4	7.50	37x4½	10.00
34x4	8.00	37x5	10.50
34x4½	8.50		

For Non-Skid, 50 cents more on all sizes.
We Carry a Full Line of New and Used Tires & Tubes
GINSBERG & BERKOWITZ, Inc.
236 WEST 48th STREET, NEW YORK

GEARS & SHAFTS
Transmission gears and shafts, differential gears and axle shafts in stock for over 125 makes (500 models) of pleasure cars and trucks. Obsolete, Orphan and Current models.
Dealers and repairmen, send for our 125-page price list and make a good profit on your repair work.
AUTO GEAR CO., Inc.
844 Eighth Avenue, New York, N. Y. 1461 S. Michigan Ave., Chicago
275 Marietta St., Atlanta, Ga.
NO SECOND-HAND PARTS OR JUNK

Tires

BUY EARLY AND SAVE MONEY
Double Tread Tires and Tubes
GUARANTEED

Come to the Tire Clearing House—here are prices—clear cut and plain as daylight. We buy wholesale the best "try out" Tires—and you get the benefit—you want truthful tires, and truth is never crushed to earth if given a square deal—real truth is puncture proof—

SO ARE OUR TIRES.

Size	Plain	Non-Skid	Tubes
28x3	$4.40	$4.95	$2.00
30x3	5.50	6.05	2.00
30x3½	6.60	7.15	2.50
32x3½	7.15	7.70	2.75
34x3½	8.25	8.80	3.00
30x4	7.70	8.25	2.75
32x4	8.80	9.35	3.00
33x4	8.80	9.90	3.50
34x4	8.80	9.90	3.50
35x4	9.90	11.00	3.60

Get your order in quick for goods listed here—by all means get in touch with us for further information about our special process—it means money in your pocket. Get in right—write today—yes—today.
Look up rating in Dunn's or Bradstreet's.

Size	Plain	Non-Skid	Tubes
36x4	$9.90	$11.00	$3.60
32x4½	9.90	11.00	3.75
34x4½	11.00	12.10	4.00
35x4½	11.00	12.10	4.10
36x4½	11.00	12.10	4.25
37x4½	12.10	13.20	4.35
34x5	11.00	12.10	4.50
35x5	13.20	14.30	5.00
36x5	13.20	14.30	5.00
37x5	13.75	14.85	5.00

For (non-skid) sizes up to 32x4, 50c extra; all other sizes $1.00 extra.
For rebuilding your old tires we charge you 60% of the above prices.
B. LIBEN & COMPANY
261-A West 54th Street NEW YORK CITY 112-A East 110th Street
THE HOME OF DOUBLE TREAD TIRES

Personal

PERSONAL.
BROTHER—Tobacco is foolish, expensive habit, injurious to heart, nerves, eyesight and sexual system. Quit easily with nature's pleasant antidote. Glady send necessary particulars. G. S. STOKES, Mohawk, Florida.

Blacksmith Tools.

A very large and complete line of blacksmith tools are manufactured by the Buffalo Forge Co., of Buffalo, N. Y. This line includes various electric blowers, drills, shears and almost every type of heavy tools and machinery used in a first class blacksmith shop. Readers who are interested should write direct to the Buffalo Forge Company to Dept. 6 for free catalog.

Burden Horse Shoes.

The Burden Iron Co., of Troy, N. Y., were the pioneers in this country in the manufacture of horse shoes which were formerly made by the blacksmiths at their own forge. Thousands of our readers are using the Burden product, but those who are not familiar with it, should write for samples and prices direct to the Burden Iron Co., who will gladly furnish full information to our readers.

Standard Horse and Mule Shoes.

The Standard line of horse and mule shoes is known all over the country and this line is sold by leading dealers from Maine to California. The main office of this company is at 131 State Street, Boston, Mass., with rolling mills and factory at South Wareham, Mass. Readers who have not already obtained literature in regard to this line of horse shoes should send at once to the main office of the Standard Horse Shoe Co., at Boston, for their new catalogue No. 7, which will be sent free to any horseshoer who will mention the Blacksmith and Wheelwright.

The Kerrihard Power Hammer.

This is a machine which if installed in a conservative old style shop will make the shop a live proposition. The Kerrihard Power Hammer will pay for itself in a very short time in any shop, and the manufacturers state that it does the work of four men. Readers who are interested should write for full information direct to the Kerrihard Company, Kerrihard Station, Red Oak, Iowa.

Digitized by Google

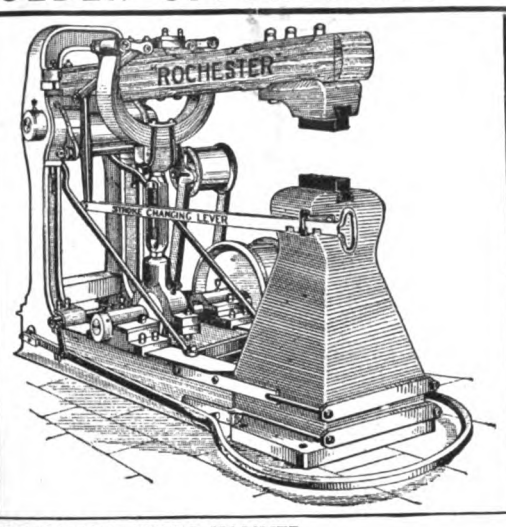
IT'S A GOLDEN OPPORTUNITY

THE ROCHESTER WEST TIRE SETTER

THE ROCHESTER HELVE HAMMER

is adjustable for length of stroke while running. The long stroke provides for handling larger work than other hammers of the same head sizes. The Hickory Helves give springy forging blows, combining the advantages of forging and drop hammer.

6 SIZES
2 Styles of Frames



WEST HYDRAULIC SHELL BANDING MACHINES

THE ROCHESTER HELVE HAMMER

SEND A CARD TO THIS ADDRESS FOR OUR CATALOGUE AND PRICES

WEST TIRE SETTER CO.
ROCHESTER, NEW YORK



I WILL SELL YOU AN ENGINE

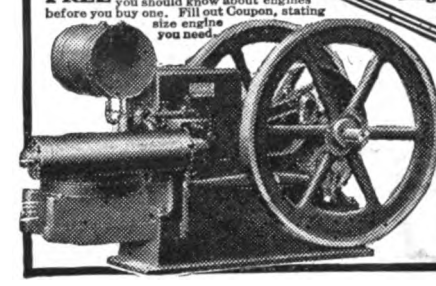
On Practically Your Own Terms

ED. H. WITTE

ALL CASH, PART CASH, or NO CASH DOWN

Any worthy, creditable person, anywhere in the U. S. can buy on these terms. Anyone can order without risk. I guarantee safe delivery to your station. All WITTE Engines sold on 5-year guarantee, 2 to 30 h-p. My factory is the largest exclusive engine factory in the world, selling direct to the user, any style—Stationary, Portable or Saw Rig. **I Ship Your Engine Quick.** You choose engine and plan of payment. WITTE Engines are best-looking, best balanced, easy to operate. **Money Back If Not Satisfied on My New 90 Day Engine Offer—FREE.**
—ED. H. WITTE, Pres.

"How to Judge Engines" FREE My new book explains what you should know about engines before you buy one. Fill out Coupon, stating size engine you need.

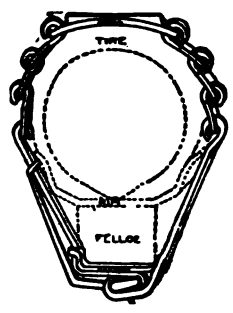


SIGN HERE FOR FREE BOOK

WITTE ENGINE WORKS
2446 Oakland Avenue
Kansas City, Mo.
2444 Empire Bldg.,
Pittsburgh, Pa.

Name .....
Town .....
State .....
Mail to Witte Engine Works

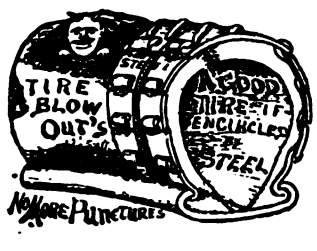
Advertising Rates in The Blacksmith and Wheelwright made known on application.



MUD CHAIN

Can be put on in a jiffy with one hand while standing on the run board. If you get in a mud hole, you will laugh out loud. Hook the ends together and pull the little lever and they are on tight. One or two will take you out of a hole but it is better to use about 6 for continuous running. Good for blow-outs.

STEEL TIRE PROTECTORS



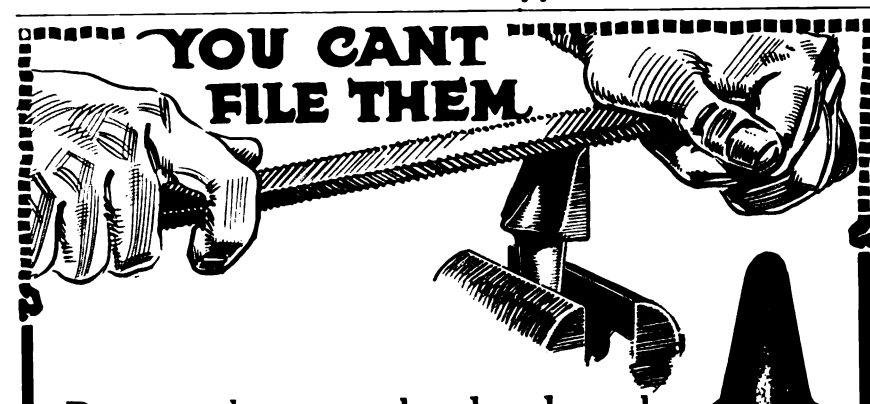
Tires can't wear out if covered with **Steel.** Try a few sections over any old blow-out. Tires are as flexible as ever. **Can't Skid.**

Special Inducements to Those in New Territory

KIMBALL TIRE CASE CO.
175 Broadway Council Bluffs, Iowa

Each Section 2 inches Wide, ⅛ inch Thick
Write for Prices and Full Particulars



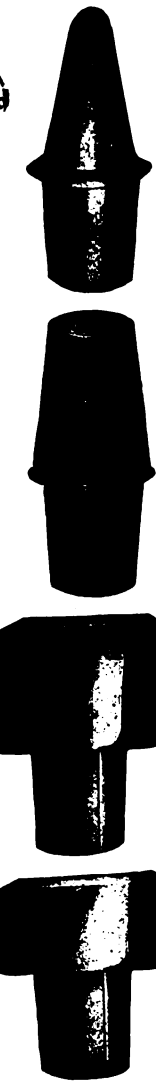


Because they are so hard and tough.

That's why

DIAMOND Calks





wear so long and don't break off.

They don't twist in the shoe or fall out either, because the calk shanks fit the calk holes absolutely tight, in fact they don't vary 1/10,000 of an inch in diameter.

Ask for Illustrated Catalogue

Diamond Calk Horseshoe Co.
Duluth, Minn.

BICKNELL'S DRILL PRESS VISE

Holds Rounds, Squares and Flats



Drill Vise

Saves its cost every year in drills alone.
Base, bed and jaws fully machined.
Swivels to any position on Drill Table, or can be used as a Bench Vise.

For sale by the jobbing trade.
Write for circular.

BICKNELL MFG. & SUPPLY CO., JANESVILLE, WIS.

Edwards Shears

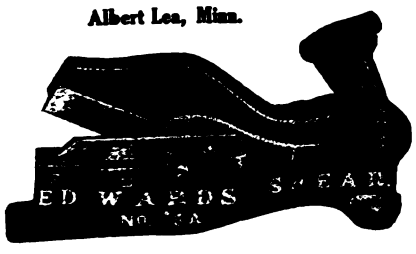
For twenty-four years the **Two Leading Low Priced Shears** in the U. S., representing the **Greatest Value** for the **Least Money.**

No. 5, weighs 200 lbs., cuts 4x½ inch soft steel.
No. 10, weighs 430 lbs., cuts 4x¾ inch soft steel.

At their price you should have had one long ago. **Order one** from the first iron man that calls on you. **They All Sell Them.**

Write for descriptive circular and prices.

C. D. EDWARDS MFG. CO.
Albert Lea, Minn.



SUPERIOR { Welding and Cutting Outfits, designed for the Blacksmith's use

Increase your profits by being able to take care of your repair work by the Oxy-Acetylene process. Saves time and money.

Write for complete catalog and monthly price sheet.

AGENTS WANTED
SUPERIOR OXY-ACETYLENE MACHINE CO.
HAMILTON, OHIO

The **Campbell** Iron Company

Wholesale Automobile, Garage, Machinists, Blacksmith and Implement Supplies, Hardware Specialties. Duplicate Parts for Fords carried in stock.
Write for New General Catalogue.
817 Cass Avenue St. Louis, Mo.

The Perfect Power Hammer



Note the difference in construction over other makes:

Extra Long Guides, insuring a direct movement of the ram without any side motion, which causes guides and springs to break on other Hammers.

The only Hammer made with a disk attachment with special anvil for sharpening harrow and plow disks.

A recently invented **Friction Clutch** fitted with **Ball Bearings,** absolutely controls the operation of the Hammer by foot pressure from the lightest tap to the heaviest blow. This ease of operation makes the Hammer particularly well adapted for plow work, as you can get as light a stroke as you desire.

Will ship to any responsible party on approval. If not as represented, no sale.

Made in two sizes:

3 inch square, 40 lb. ram—shipping weight, 1,150 lbs.
4 " " 80 " " " " 1,800 "

Write any jobber for prices, or

Macgowan & Finigan Cordage Co.,
204 North Third St., ST. LOUIS, MO.

Leading Blacksmiths USE **STAR STEEL SHAPES**

Solid Cast, Crucible, Soft Center Steels

Write your Jobber to-day

Made by
STAR MFG. CO. Carpentersville, Ill.

Do you want anything? Is your shop for sale, or do you want to buy a shop or hire a man? If so, a "Want" advertisement in THE BLACKSMITH AND WHEELWRIGHT will bring you good results. See terms at the head of the "Want" Department on another page.

Subscribe to THE BLACKSMITH AND WHEELWRIGHT $1.00 per year.

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google



The files which do the best, "longest," are the ones for you to use on your work.

You will always find that

NICHOLSON FILES
Give Best Service

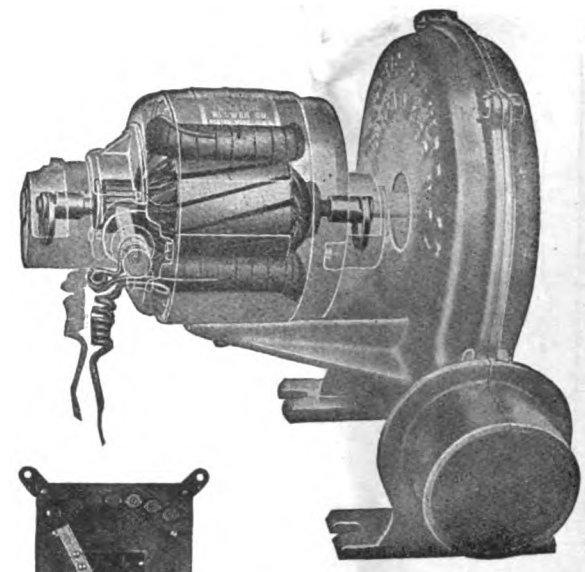
NICHOLSON
U.S.A.
(TRADE MARK)

BY INVITATION
MEMBER OF
NEW YORK, U.S.A.

"NICHOLSON" stamped on a file, absolutely guarantees selected steel—forged, annealed, ground and cut by expert workmen who have made your needs a lifetime study.

SPECIFY "NICHOLSON"—AT ALL LEADING DEALERS.

Nicholson File Co., Providence, R. I.



"ONE FIRE"
"MARVEL" $35.00
A. C. or D. C.
or
UNIVERSAL MOTORS
Extra Large Ring Oil Bearings
Case Hardened Armature Shaft

The cut above shows the inside design and mechanical construction of our OIL RING BEARING MOTORS used on our "ONE FIRE" MARVEL.

With the enlarged oil wells and CASE HARDENED SHAFT, you get long wearing qualities and ruggedness found only in a MARVEL BLOWER. As long as there is ANY oil in the oil-well, the RING revolving on the CASE-HARDENED SHAFT keeps a STREAM OF OIL on the bearings.

This prevents OLD AGE.

Show this cut to the best mechanical engineer you can find, and ask him his opinion regarding our claims.

You naturally want the BEST and the MOST that your money will buy, and in a Forge Blower you will find those qualities in a MARVEL.

Any of the LEADING HARDWARE FIRMS will ship you any one of our MARVEL BLOWERS on 30 days' trial.

NOW is the time to improve your shop equipment.

Ask YOUR Dealer to have us send you one on 30 days' free trial. Unless you get a RING OIL BEARING "MARVEL" Blower, you are not getting the MOST your money will buy.

15 Different Sizes. *Descriptive Circular Mailed on Request.*

ASK YOUR DEALER.

ELECTRIC BLOWER CO.,
352 Atlantic Avenue, BOSTON, MASS.

THE
SCREW-CUTTING LATHE
How to select, set up, adjust and operate

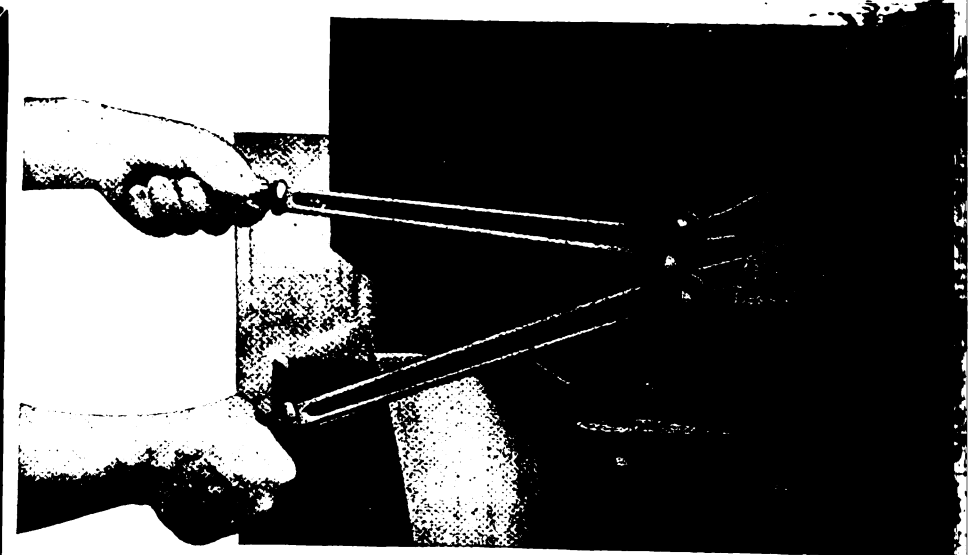
By JAMES F. HOBART, M. E.

THIS book is a concise and exhaustive treatise on everything pertaining to the SCREW-CUTTING LATHE, including costs, erection, operation and adaptability. It is written by one who thoroughly understands his subject in all its details, and is so copiously illustrated that everything in it will be readily understood.

It will be found invaluable to those desiring to know just how a Screw-Cutting Lathe should be run.

There are ***92 illustrations,*** and the book is substantially bound in cloth. ***Price, $2.00.*** A copy will be sent postage prepaid to any address on receipt of price.

M. T. RICHARDSON CO.
PUBLISHERS
71-73 Murray St., New York



Pexto in Quality Moderate in Price

Read the heading again!
Here's a strongly constructed cutter that will clip bolts or wire up to ¼ inch – a moderate priced cutter with all the speed and easy cutting qualities of a high priced tool.

Designed especially to take care of the large variety of work for which you do not feel justified in buying a more expensive tool.

Sizes range from 9 inches to 15 inches, capacity to ¼ inch, medium in weight.

There's a large line of other Pexto Tools, including pincers, nippers, pattern butterises, farriers' hammers, etc.

If your dealer cannot supply you, write us.

The Peck, Stow & Wilcox Co.

PEXTO MFRS. Mechanics' Hand Tools, Tinsmiths' and Sheet Metal Workers' Tools and Machines, Builders' and General Hardware.

Southington, Conn. Cleveland, Ohio

Address correspondence to 209 W. Center St. Southington, Conn.

PEXTO
BLACKSMITHS' TOOLS

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

THE NEW YORK PUBLIC LIBRARY

ESTABLISHED 1880

The Pioneer Journal of its Class

THE BLACKSMITH & WHEELWRIGHT

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U. S. Patent Office.

Vol. LXXVIII. No. 3 NEW YORK, SEPTEMBER, 1918 TERMS: One Dollar a Year. Foreign, $1.50. (6s. 3d.)

EMPIRE STEEL WHEELS



Plain or Grooved Tire To Fit Any Wagon.

FARM TRUCKS
All Standard Types

Write today for Proposition to Blacksmiths

EMPIRE MFG. CO.
P. O. B. 208
QUINCY, ILL.

STEEL STAMPS
BURNING BRANDS
RUBBER STAMPS
STENCILS
GEO. M. NESS, JR.
61 FULTON ST. NEW YORK
Send for price list.

ATTENTION, BLACKSMITHS!

BE SURE IT'S A SUPERIOR Welding and Cutting Outfit you purchase. ACETYLENE GENERATORS. Welding Supplies. Price Popular. Service Immediate. Quality Superior. Write for catalog and price list. Agents wanted.

SUPERIOR OXY-ACETYLENE MACHINE CO.
Manufacturers of Everything for the Welder
HAMILTON, OHIO



SUREGRIP CALKS
American Calk Co.
DETROIT, - - MICH.

The Capewell Nail

Drives Easiest

Hold Best

will give you satisfaction to the last one in the box. It will save the time of the man who does the shoeing and the money of the man who does the buying.

Let the order read "Capewell" Nails and you will have no regrets. A money saver and a money earner for horseshoers.

The world's best nail—sold at a fair price. Everything considered by all odds the cheapest.

The Capewell Horse Nail Co.
Hartford, Conn.

Leading Horse Nail Manufacturers of the World



Saw Those Heavy Bars ON A MARVEL Power Hack Saw

Machine stops when work is cut off. Requires very little power.
Price is Low. Write Us.
Ask for reply by return mail.
ARMSTRONG-BLUM MFG. CO.
340 N. Francisco Ave., Chicago, Ill., U. S. A.

STEEL STAMPS
LETTERS and FIGURES
For Marking Your Tools and Your Product
NAME PLATES OF ALL KINDS
S. D. CHILDS & CO.
DEPT. 2
136 S. CLARK ST. CHICAGO

PATENTS
C. L. PARKER
Ex-Member Examining Corps, U. S. Patent Office
Attorney-at-Law and Solicitor of Patents
American and foreign Patents secured. Trade marks registered. Searches made to determine patentability, validity and infringement. Patent suits conducted. Pamphlet of instructions sent upon request.
McGill Building WASHINGTON, D. C.

IS ANY SUCCESS—

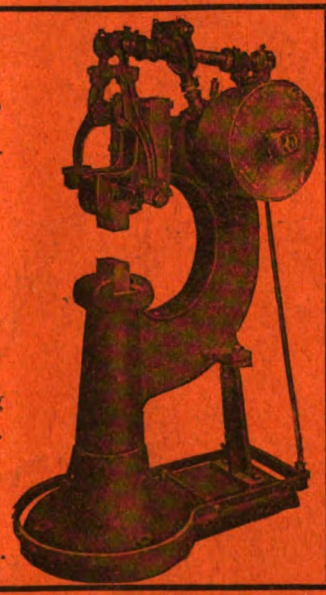
any big success—ever really luck? Not much! Nobody wins haphazard.

BE SOMEBODY!
Get a
KERRIHARD POWER HAMMER
and make your shop 100% efficient.

Lack of self-confidence is the only thing that can keep a man with ability down.

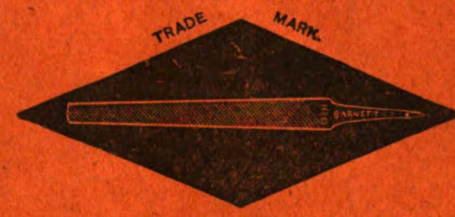
Better Write Us a letter Today.

THE KERRIHARD COMPANY
Kerrihard Station, Red Oak, Iowa, U. S. A.



THE TEETH IN
BLACK DIAMOND RASPS
ARE MINGLED
So as to Cut Clean and Free and Leave no Furrows In the Work

Twelve Medals of Award by Jurors



At International Expositions

C. & H. BARNETT COMPANY
Black Diamond File Works, PHILADELPHIA, PA.
Owned and Operated by NICHOLSON FILE CO.
Copy of Catalog sent Free to any interested file users upon application.

Stokes Bros.' Improved Horse Rasps
Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A.

AETNA STEEL TOE CALKS
Made by THE AETNA NUT CO., Southington, Conn.
BLACK HORSE BRAND

BEST SHAPE
BEST SPUR
TO DRIVE
BEST STEEL



TOE AND HEEL CALKS

SOLD BY ALL DEALERS

WELDING PLANTS, $25.00 to $300.00
Designed for all purposes. Small cash payment; balance, three to six months.
Every mechanic and shop should have one.
BERTSCHY-BERMO CO. OMAHA, U. S. A.

BUYERS' GUIDE AND INDEX TO ADVERTISEMENTS, PAGE 242

Digitized by Google

C. C. BRADLEY & SON, Inc., Syracuse, N.Y.

MANUFACTURERS OF

THE BRADLEY BALL BEARING SHAFT COUPLING



OPEN

ALL STEEL
ALL RIGHT
ALL THE TIME



CLOSED

Quick as a wink. Silent as the grave. Change from Shafts to Pole in 10 Seconds. One hand the only tool required.

The Bradley has been on the market 20 years. There are more than a million pairs in use and giving perfect satisfaction. They are made of STEEL drop forgings and will outwear any vehicle to which they are attached. Our Spherical Leather Bushing or Packing is self-lubricating and wears indefinitely. The SPRING automatically takes up all wear until packing is worn out. A new packing can be put in by anyone, its cost is a few cents, all the wear comes on the packing. The Bradley Shaft Coupling is the best that can be had regardless of price.

Save Time and Money



The experienced blacksmith who is extra hard to please in rasps will stop short of nothing but the best. He will always

Use NICHOLSON RASPS

TRADE NICHOLSON U.S.A. MARK

See that this brand is on every Rasp you buy

Over 50 years' experience, as well as special study of blacksmiths' needs, enter into the making of every one of these rasps.

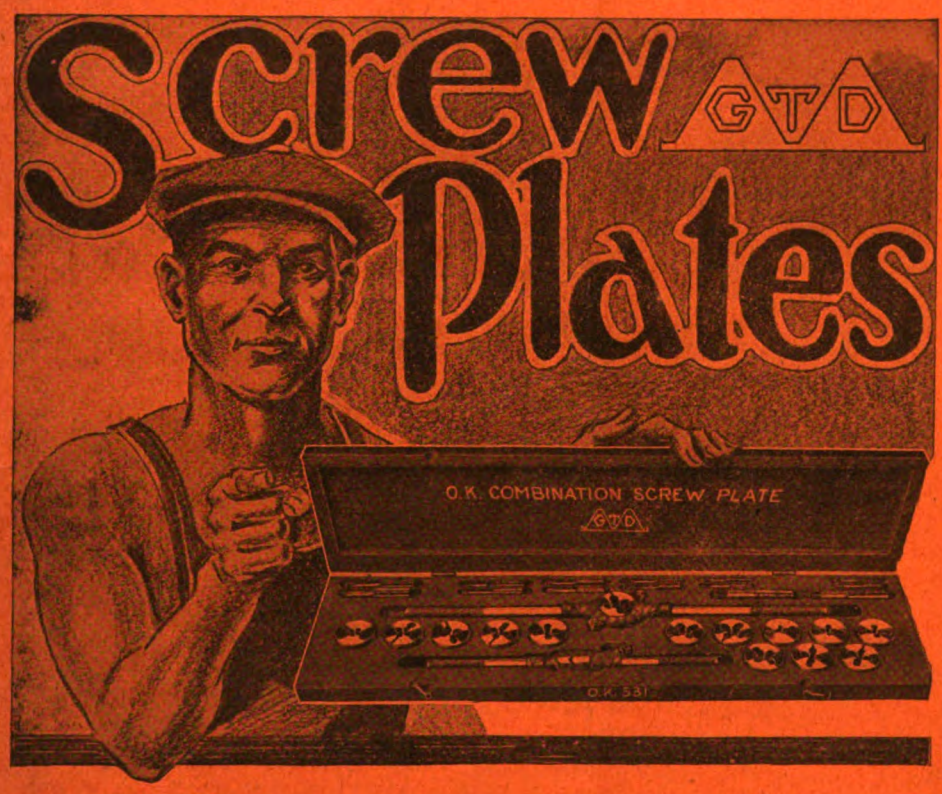
Every NICHOLSON rasp is rigidly inspected for temper and cutting qualities before it is wrapped in our *rust-proof* paper, boxed and sealed.

SOLD BY LEADING DEALERS

Catalogue Sent Free on Request

NICHOLSON FILE CO., Providence, R. I.

Screw Plates GTD



AUTO REPAIR WORK PAYS

and the blacksmith who has a set of taps and dies is not only prepared to do the thousand and one jobs found in the day's work but he is prepared to take on auto and tractor repair work as well.

COMBINATION SCREW PLATES

contain taps and dies for cutting both U. S. S. and S. A. E. (Automobile) standard threads.

Every Tool Guaranteed. ***Send for Catalog.***

GREENFIELD TAP AND DIE CORPORATION

GREENFIELD, MASSACHUSETTS, U. S. A.

NEW YORK, 28 WARREN ST. -:- CHICAGO, 13 SOUTH CLINTON ST.
DETROIT OFFICE, 74 CONGRESS ST., W.
Canadian Plant, WELLS BROS. CO. of CANADA, LTD., GALT, ONTARIO

JOB WANTED



An able bodied workman seeks a position in some good blacksmith or machine shop.

He is an old acquaintance and friend of the Editor of the Blacksmith and Wheelwright, to whom he is permitted to refer.

He is not particular as to what locality he works in, provided he has plenty of good hard work to do, and his employer honest and careful.

With such a boss, he agrees to never touch intoxicants or indulge in other dissipation. He agrees to be on hand ready for work at seven o'clock in the morning, or any earlier hour the shop opens. He will work overtime without grumbling, even to twenty-four hours daily for as long a period as may be necessary.

He will agree never to strike, ask for higher wages, or even want to go fishing or take a holiday.

He will board himself and remain in perfect health indefinitely. He has no family cares to worry about. He and his brothers, older and younger, are of the well known L. G. P. HAMMER clan, world renowned for skill, integrity and ability.

He is willing to work for twenty cents a day and agrees to do more work than any six skilled men at $3.00 per day. After his wages have been paid for twenty months, he agrees to work for nothing during the remainder of his natural life, which he estimates at fifty years.

He agrees to come on trial, and after thirty days' work, if his boss is not satisfied he will return home without any charge for his services.

He guarantees that he will relieve his employer from all drudgery, so he can spend more time with his family, and not be so eternally tired that he can get no enjoyment out of life.

He will treat all customers so pleasantly and do their work so skillfully that they will always bring their work to his shop, and advise their friends to do likewise.

He is not subject to enlistment or draft, and is ready to leave at once and begin work immediately on arrival.

ADDRESS:

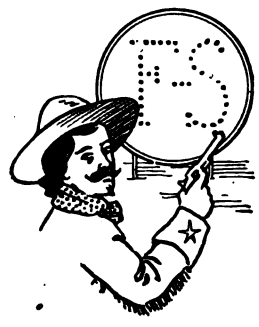
LITTLE GIANT

103 Rock Street

MANKATO, MINN., U. S. A.

Digitized by Google

"F-S" PAINTS



The Surety of "F-S" Products Has Been Proven in the Last 50 Years

There will be no question of the successful finish of your fine job when you use "F-S" Quality Coach, Carriage and Automobile Varnishes and Japans. Their reputation for "Surety" satisfaction has been gained thru half-a-century of use.

FELTON, SIBLEY & CO., Inc.

Manufacturers of Colors, Paints, Varnishes since 1863

136-140 North Fourth Street, Philadelphia

(153)

Don't Send a Penny

These Len-Mort work and outdoor shoes are such wonderful value that we gladly send them, **no money down.** You will find them so well-made and so stylish and such a big money saving bargain that you will surely keep them. So don't hesitate. Just fill out and mail the coupon. We will send a pair of your size. No need for you to pay higher prices when you can buy direct from us—and know what you are getting before you pay even a penny. Why pay out $5.00 and $6.00 for shoes not near so good? Act now. Mail the coupon today while this special offer holds good.

Great Shoe Offer

We can't tell you enough about these shoes here. This shoe is built to meet the demand of an outdoor city workers' shoe as well as for the modern farmer. Send and see for yourself what they are. Built on stylish lace Blucher last. The special tanning process makes the leather proof against the acid in milk, manure, soil, gasoline, etc. They outwear 3 ordinary pairs of shoes. Your choice of wide, medium or narrow. Very flexible, soft and easy on the feet. Made by a special process which leaves all the "life" in the leather and gives it wonderful wear-resisting quality. Double leather soles and heels. Dirt and waterproof tongue. Heavy chrome leather tops. Just slip them on and see if they are not the most comfortable, easiest, most wonderful shoes you ever wore

Pay only $3.85 on arrival. If after careful examination you don't find them all you expect, send them back and we will return your money. No obligation on you at all. This is at our risk, not yours.



Leonard-Morton & Co.
Dept. 1208 Chicago

Send the Len-Mort Shoes prepaid. I will pay $3.85 on arrival, and examine them carefully. If I am not satisfied, will send them back and you will refund my money.

Size.....Width.....

Name.....

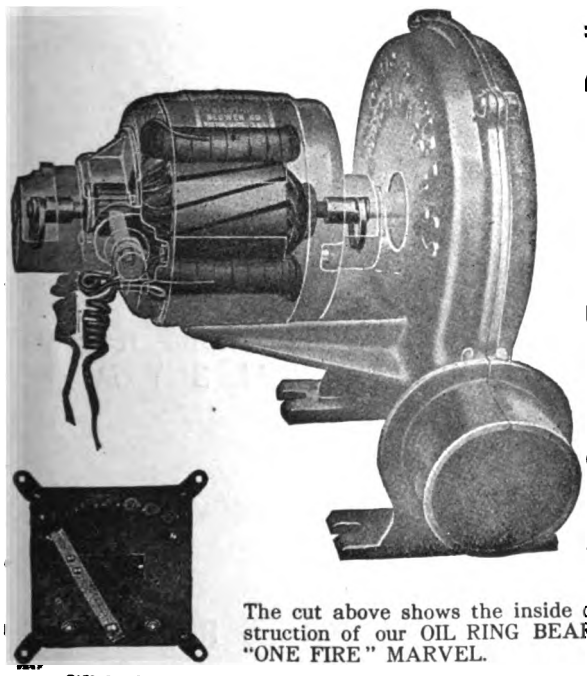
Age.....Married or single.....

Address.....

Send →

Only the coupon—no money. That brings these splendid shoes **prepaid.** You are to be the judge of quality, style and value. Keep them only if satisfactory in every way. Be sure to give size and width. Mail the coupon now.

Leonard-Morton & Co.
Dept. 1208 Chicago



"ONE FIRE"

"MARVEL" $35.00

A. C. or D. C.
or
UNIVERSAL MOTORS

Extra Large Ring Oil Bearings

Case Hardened Armature Shaft

The cut above shows the inside design and mechanical construction of our OIL RING BEARING MOTORS used on our "ONE FIRE" MARVEL.

With the enlarged oil wells and CASE HARDENED SHAFT, you get long wearing qualities and ruggedness found only in a MARVEL BLOWER. As long as there is ANY oil in the oil-well, the RING revolving on the CASE-HARDENED SHAFT keeps a STREAM OF OIL on the bearings.

This prevents OLD AGE.

Show this cut to the best mechanical engineer you can find, and ask him his opinion regarding our claims.

You naturally want the BEST and the MOST that your money will buy, and in a Forge Blower you will find those qualities in a MARVEL.

Any of the LEADING HARDWARE FIRMS will ship you any one of our MARVEL BLOWERS on 30 days' trial.

NOW is the time to improve your shop equipment.

Ask YOUR Dealer to have us send you one on 30 days' free trial. Unless you get a RING OIL BEARING "MARVEL" Blower, you are not getting the MOST your money will buy.

15 Different Sizes. Descriptive Circular Mailed on Request.

ASK YOUR DEALER.

ELECTRIC BLOWER CO.,

352 Atlantic Avenue, BOSTON, MASS.



ADVANCE OF THE GRAND ARMY

NAPOLEON'S name fills more pages in the world's solemn history than that of any other mortal. The advance of the Grand Army into Russia is the turning point of his career and marks the beginning of his downfall. Mighty armies are once again marching over the same battlefields where Napoleon fought a hundred years ago. All the causes of this mighty struggle may be learned from the pages of history. The one complete, accurate, authoritative and reliable history, containing the rise and fall of every empire, kingdom, principality and power, is the world famed publication,

Ridpath's History of the World

Dr. Ridpath is universally recognized as America's greatest historian. Other men have written histories of one nation or period; Gibbon of Rome, Macaulay of England, Guizot of France, but it remained for Dr. Ridpath to write a history of the **entire World** from the earliest civilization down to the present. We offer the latest edition, 4000 pages, 2000 illustrations, brand new, down to date, beautifully bound in half morocco.

At a Great Sacrifice in Price

We will **name** our **special low price** and **easy terms** of payment only to Blacksmith and Wheelwright readers and in direct letters to all who mail the coupon printed on the lower corner of this advertisement. **Tear off the coupon,** write your name and address plainly and **mail now.** Our **plan of sale** enables you to buy by saving only about ten cents a day for the ensuing year. Mail the coupon now before you forget it. The sample pages are free.

32 Page Booklet Free

We will mail you 32 free sample pages without obligation on your part to buy. These will give you some idea of the splendid illustrations and the wonderfully beautiful style in which the history is written. You can purchase this great history at the **lowest price ever offered** and pay for it in **small sums monthly** if you prefer.

Six Thousand Years of History

Ridpath takes you back to the dawn of history long before the Pyramids of Egypt were built; down through the romantic troubled times of Chaldea's grandeur and Assyria's magnificence; of Babylonia's wealth and luxury; of Greek and Roman splendor; of Mohammedan culture and refinement; to the dawn of yesterday. He covers **every race, every nation, every time** and holds you spellbound by his wonderful eloquence. **Mail the coupon.**

Western Newspaper Association
CHICAGO



9
18

FREE COUPON

FOLD HERE, TEAR OUT, SIGN AND MAIL

Western Newspaper Association
H. E. Sever, Pres.
140 So. Dearborn St., Chicago, Ill.

Please mail 32 free sample pages of Ridpath's History of the World, containing photogravures of Napoleon, Cæsar and other great characters in history, and write me all particulars of your special offer to The Blacksmith and Wheelwright readers.

Name .....

Address.....

Mail this Coupon

Digitized by Google

Firestone



Driving Quality Home

YOU will get real work from every Firestone Tire you apply; it will wear evenly down to the channel without cutting or chipping; it will have more than usual resiliency, lightness and endurance. It will bring your customers back when after long service it is finally worn out.

That's the reason for Firestone success. Careful design and building, plus quality, come home in

"Most Miles per Dollar"

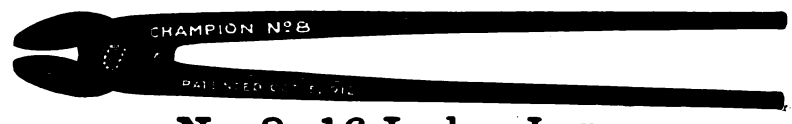
FIRESTONE TIRE AND RUBBER CO.
Firestone Park Akron, Ohio
Branches and Dealers Everywhere

CARRIAGE TIRES

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge

Nothing to get out of order.



Will hold securely any size of shoe.

No. 8 16 Inches Long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

Weights, 1¼ to 3 lbs.

This Hammer is the most popular Sharpening Hammer on the market.

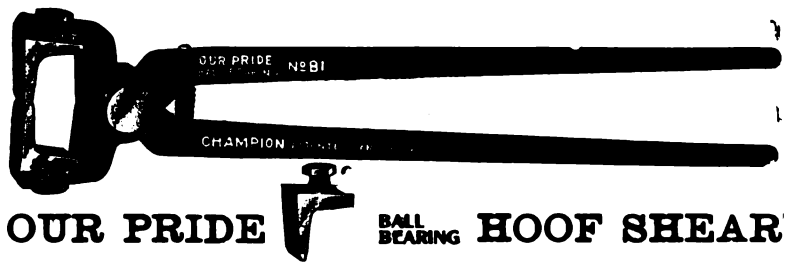


Corrugated Pein.

IT GIVES RESULTS.

No. 12 ELECTRIC SHARPENING HAMMER

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.



OUR PRIDE BALL BEARING HOOF SHEAR

Blades easily replaced when worn out.

All parts interchangeable.

Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY, - Meadville, Pa., U. S. A.

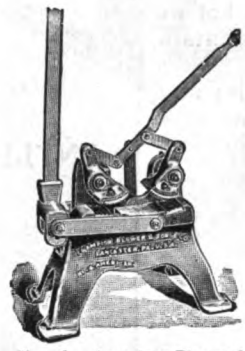
THE LIVINGSTON CO., 131 E. 23rd Street, NEW YORK, Eastern Representatives

Digitized by Google

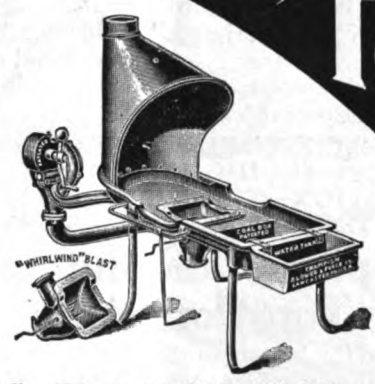
THE FAMOUS CHAMPION BLACKSMITH TOOLS



No. 408. Steel Blacksmith's Forge.



No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.

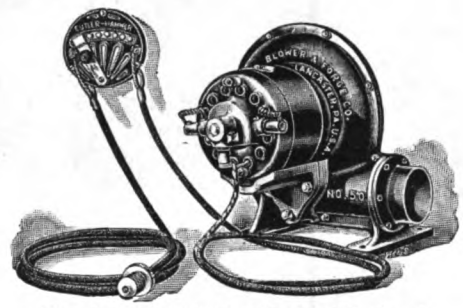


No. 433. Cast Iron Blacksmith's Forge.



No. 400. Crank turns either way.

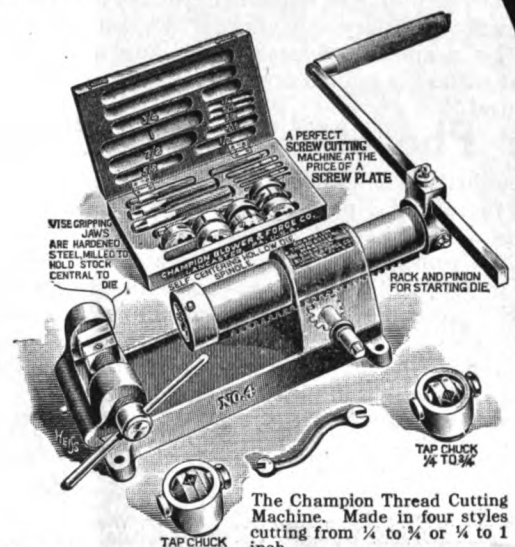
FAMOUS 400



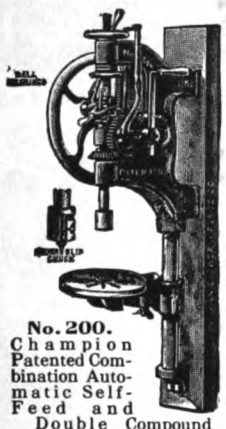
No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower.

Don't Fail to Get 1918 Catalog

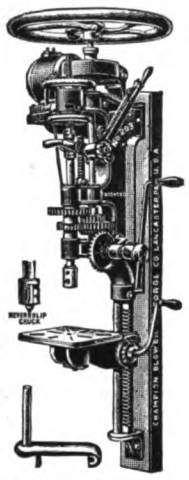
Before purchasing a Hand Blower, Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



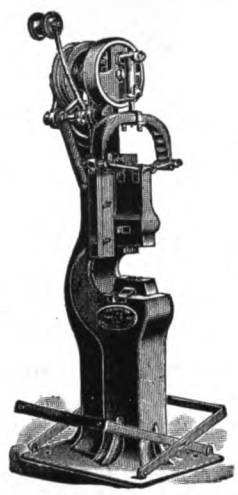
The Champion Thread Cutting Machine. Made in four styles cutting from ¼ to ¾ or ¼ to 1 inch.



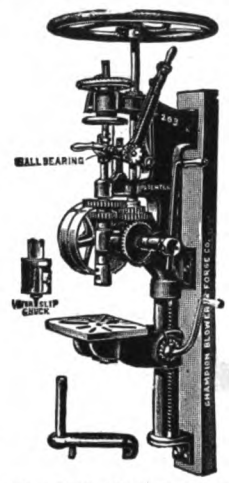
No. 200. Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



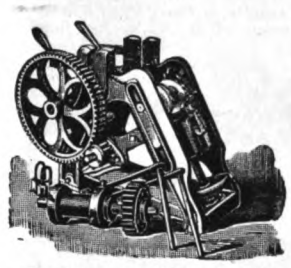
No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.



Hercules Patented Power Hammer. Weight of ram, 65 pounds.



No. 203. Self-Feed and Double Compound Lever Feed Drill.



The Champion "Columbian" Tire Bender. Made in 3 sizes.



LET THE WORLD REST EASY

THERE WILL BE PLENTY OF WORK TO DO

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

Digitized by Google

WAGON BUILDING

"Build me a wagon that will last forever."

"Sorry, Sir, but 'axle troubles' (due to wear—wear on the spindle, or on the box, or both) make it impossible."

You've often received a specification like that and been obliged to give that answer—haven't you?

The Sheldon "TON-DON"—an axle that will not wear, run hot or break—allows your meeting the requirements of the man who wants a wagon to last forever, **and we have told him so.**

The Sheldon "TON-DON" was originally made for buggies and carriages. Its success was so instantaneous and pronounced that we were deluged with requests for an axle embodying the same principle for use on Delivery, on Business and on Express Wagons.

Hence, the "TON-DON" CONCORD EXPRESS.
In EFFICIENCY—The HIGHEST.
In CONSTRUCTION—The SIMPLEST.
In SERVICE—The MOST SATISFACTORY.

The Spindle of the Sheldon Ton-Don Axle

Ordinary axles wear flat on the bottom of the spindle because the bottom side is the point of contact and where the wear of the spindle is concentrated. It takes a spindle of unusual hardness to resist this wear—greater hardness than any ordinary axle affords. The spindle of the "TON-DON" is hardened by a special process, producing a wearing surface of such hardness that a fine file makes no impression on it—yet the center remains soft or "natural."

The Phosphor-Bronze Lined Box

The peculiarity of this box lining is that while somewhat softer than the spindle, there is no perceptible wear after thousands of miles of running, but becomes harder and more wear-resisting with use.

Phosphor-Bronze (of a mixture which increases its toughness, smoothness under friction, and wear-resisting qualities) is a metal used for making the propellers of ocean steamships, bearings for locomotives, crank-shaft bearings for automobiles and other fine machinery. Imagine what a metal must be to meet such conditions, and you will grasp the advantages of applying such metal to axle purposes.

THESE AXLES CARRIED IN STOCK BY THE FOLLOWING JOBBERS AND CAN BE OBTAINED AT MANUFACTURERS' PRICES.

Baltimore, Md.....E. Scott Payne Co.	Providence, R. I....Congdon & Carpenter Co.
Boston, Mass.....E. P. Sanderson Co.	Rochester, N. Y.....Burke Iron & Steel Co.
Buffalo, N. Y.....H. D. Taylor Co.	San Francisco, Cal....Waterhouse & Lester Co.
Chicago, Ill.....E. D. Kimball Co.	Scranton, Pa.....Bittenbender & Co.
Cincinnati, O.....G. B. Schulte Sons Co.	Seattle, Wash.....Gray Bros. Co.
Indianapolis, Ind.....W. J. Holliday & Co.	Springfield, Mass.....Chas. C. Lewis & Co.
Los Angeles, Cal.....Percival Iron Co.	St. Louis, Mo.....Sligo Iron Store Co.
Milwaukee, Wis....Shadbolt & Boyd Iron Co.	Washington, D. C.....Louis Hartig
Pittsburgh, Pa.....McLean & McGinness	Wilmington, Del. ....Delaware Hardware Co.
Portland, Oregon.....J. E. Haseltine & Co.	Bridgeport, Conn.....Chapman & Bangs Co.
Ft. Wayne, Ind.....Mossman, Yarnelle & Co.	San Antonio, Texas ..Heusinger Hardware Co.
New Orleans, La. .....Jos. Schwartz & Co.	

SHELDON

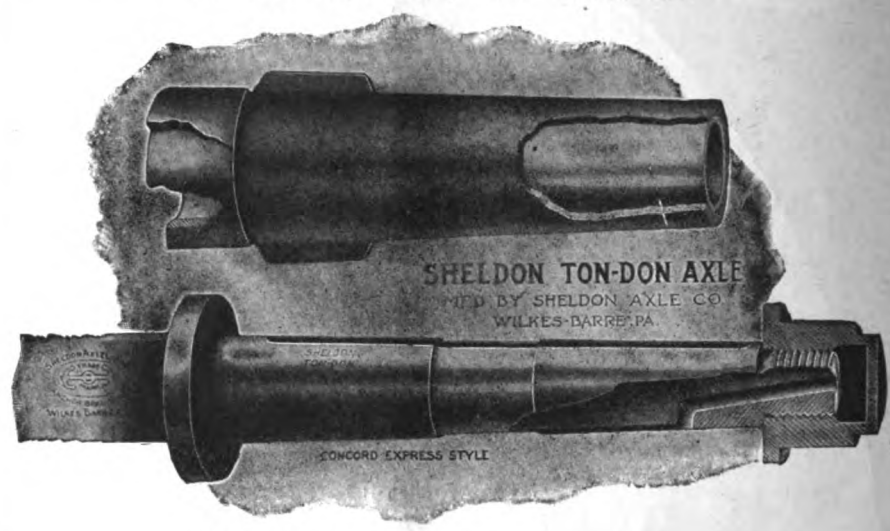
"TON-DON"

CONCORD EXPRESS STYLE

NOT A BALL OR ROLLER BEARING—BUT

ANTI-FRICTION—EVERLASTING—INTERCHANGEABLE

IT WILL NOT CUT, HEAT OR STICK



NOTICE THE PATENTED OILING DEVICE
HAS ALL THE ADVANTAGES OF FRICTION AND ANTI-FRICTION AXLES
WITHOUT THEIR DISADVANTAGES
"TON-DON" MEANS KNOWN QUALITY WITHOUT FANCY PRICE
MADE ALSO FOR BUGGIES AND SURRIES

SHELDON AXLE & SPRING CO.,
WILKES-BARRE, PA.

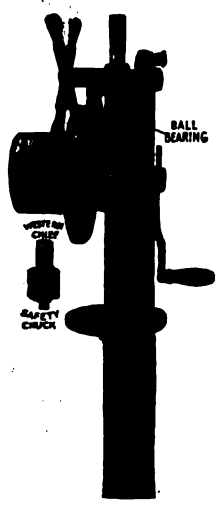
LARGEST AXLE FACTORY IN THE WORLD.

The Better Your Equipment The Bigger Your Profits

Buy CANEDY-OTTO

AND INCREASE YOUR INCOME

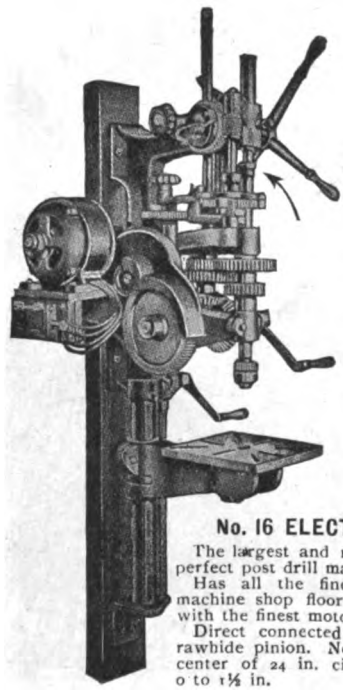
Once Tried, Always Used : There's a Reason—Quality



No. 19 DRILL

A low-priced combined hand and power self-feed drill.

Drills to center of 16½ in. circle.



No. 16 ELECTRIC DRILL

The largest and most mechanically perfect post drill manufactured.

Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.

Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1½ in.

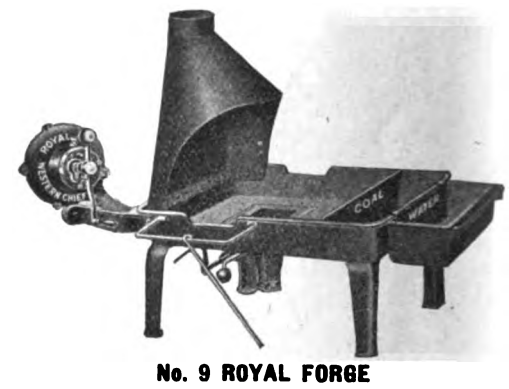
OVER 200 DIFFERENT STYLES

SEND FOR CATALOGUE No. 12



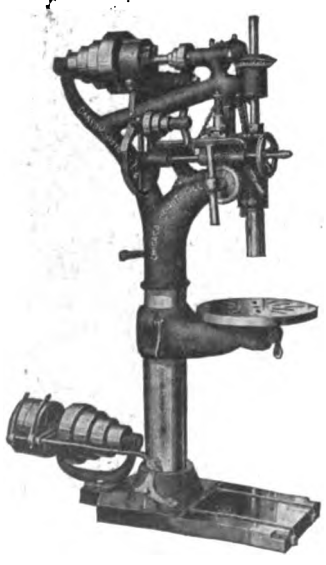
No. 100 ROYAL FORGE

The most popular forge ever made.
Fan, 12 in. Hearth, 31½x45½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x50 in. Blower, 14 in.



No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.

All machines are tested before leaving the factory, and guaranteed in every respect.

Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.



ROYAL BLOWER

(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.

Fire pot is 8x6 in. inside.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS



No. 1 1/2 SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



No. 8 ELECTRIC BLOWER

The best outfit money can buy.

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google



Digitized by Google

SUPPLIES

for AUTOMOBILES, TRUCKS and TRACTORS

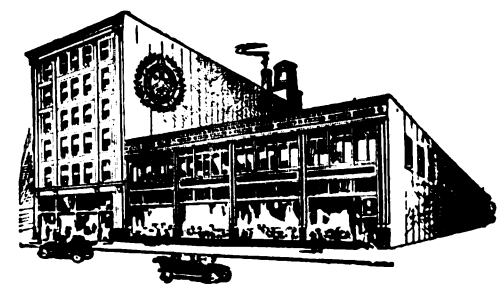
TOOLS and EQUIPMENT

for GARAGES and REPAIR SHOPS

THE BECKLEY-RALSTON CO.

(WHOLESALE ONLY)

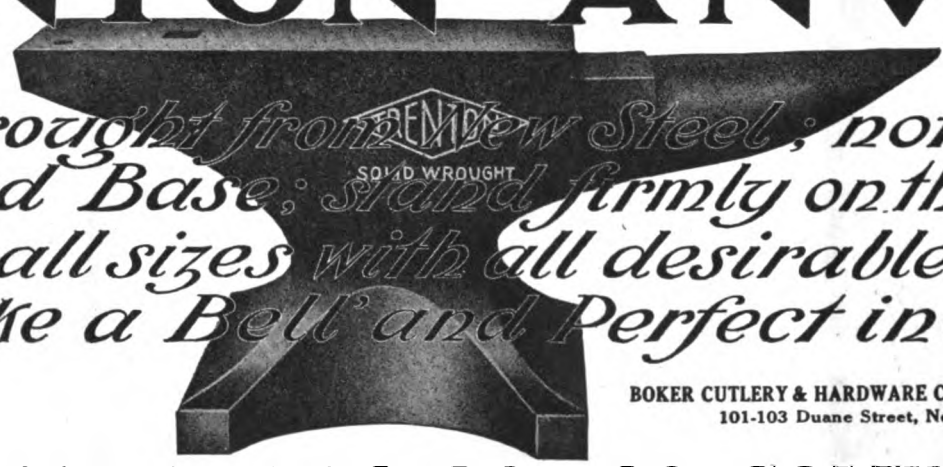
1801-1815 MICHIGAN AVENUE **CHICAGO**



OUR NEW CATALOG

contains 500 pages. If you have an established place of business and are entitled to buy at trade prices we will gladly send you a copy of this book. When writing please use your business letterhead and ask for catalog No. 82.

TRENTON ANVILS



Solid Wrought from New Steel; not cast.
Recessed Base; stand firmly on the block
Made in all sizes with all desirable Clips.
Ring like a Bell and Perfect in Shape.

BOKER CUTLERY & HARDWARE CO., Inc., Sole Sales Agents,
101-103 Duane Street, New York City

THE COLUMBUS FORGE & IRON CO. COLUMBUS, O.



CRESCENT Wood Working Machines

will always satisfy those particular users who want the highest quality at reasonable price.

Send today for catalog of band saws, saw tables, shapers, jointers, variety wood workers, planers, planers and matchers, swing saws, cut off table, disk grinder, borers, hollow chisel mortiser, Universal wood workers.

THE CRESCENT MACHINE CO.
203 Main Street
LEETONIA, OHIO, U.S.A.

All-Steel Weldless Anvils.



Made from Solid Crucible Steel of Special Analysis.

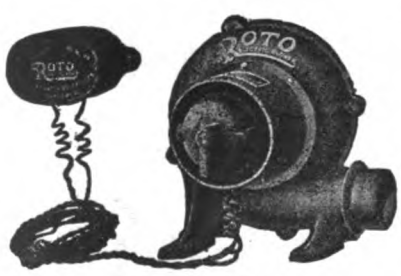
The Columbian Hardware Co.
Manufacturers **Cleveland, Ohio**

The ROTO ELECTRIC BLOWER ONLY $30.00

SAVE TIME! SAVE MONEY!

It is your patriotic duty to save. Labor is in great demand. Machinery must take its place. Are you still blowing your forge by hand? Do you know that this time is WASTED? Install a ROTO ELECTRIC BLOWER and SAVE this time. It lets your hands free for other work. You will then say, like hundreds of our customers,

I wouldn't sell my ROTO for $100.00 if I couldn't get another.



Buy direct from the makers and save from $10 to $15, the middleman's profit. The Aeronautic Department of the United States Navy uses the ROTO. You can rely on it. Mail the coupon today and try out this time and money saver.

N. B.—The above price is subject to change without notice.

SEND THE COUPON. DO IT NOW.

THE ROSEWATER ELECTRIC CO.
5516 KINSMAN ROAD, CLEVELAND, OHIO

Send me by.....An AIR COOLED ROTO BLOWER with one year's guarantee, complete with cord, plug and Speed Regulator. I will return it to you at the end of 30 days, if it does not give me entire satisfaction, and if I keep it, I will pay you $30.00 at the end of 30 days.

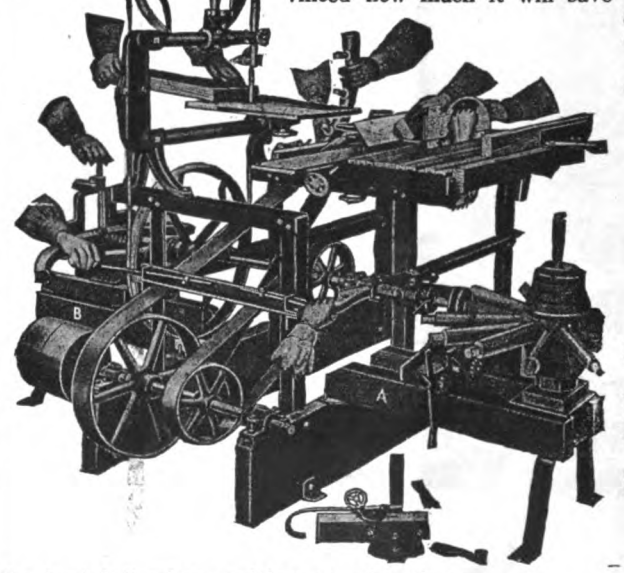
Name.....Address.....

Current.....Voltage.....Cycles.....

Your Electric Light or Power Company Will Give You This Information.

PARKS WAGON SHOP SPECIAL

You may think you don't need this practical woodworker in your shop. Take advantage of our trial offer, and be convinced how much it will save you. **Machines sent on trial anywhere in United States and Canada.**



Machine is a combination of Circular, Rip and Cross Cut Saws,
22" Band Saw,
12" Jointer,
Rim Rounder,
Felloe Borer,
Spoke Tenoner,

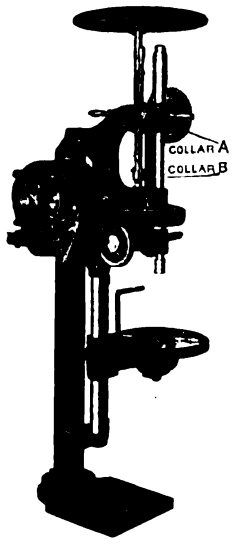
All ready for instant use. No Changing.

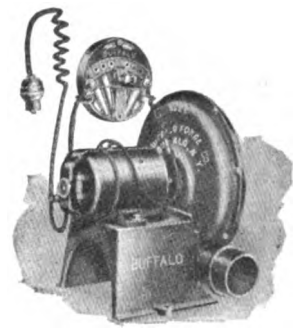
Light size takes 2 to 3 H. P., heavy size 3 to 4 H. P.

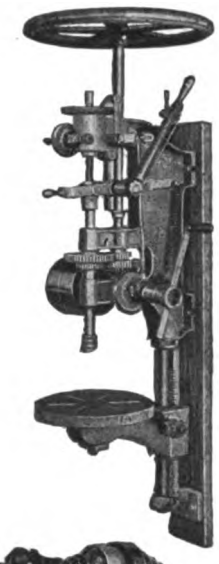
Write for catalog and full information about how a woodworker should be arranged to be convenient to operate.

Parks Ball Bearing Machine Co.
North Side Station
Cincinnati, O.

Digitized by Google







Modern Shop Efficiency

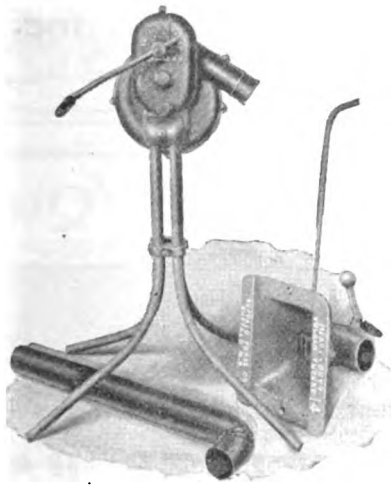
BLACKSMITHS AND GARAGEMEN are determined to have the best that may be had in Blacksmith Shop Equipment.

The work of the modern shop demands modern efficient tools—tools that will stand up under severe service.

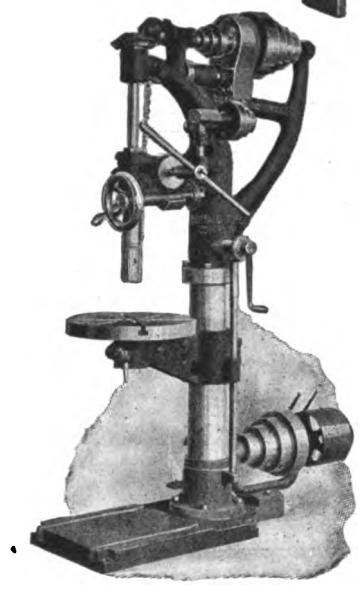
Forges; electric blowers; drills—floor and post type; shears—for cutting angles, bars and sheets—and of every size from the little bench type hand power shear to the heaviest power shear made—these are the tools you should know about.

Write Dept. 6 for Catalog

Buffalo Forge Company, Buffalo, N. Y.

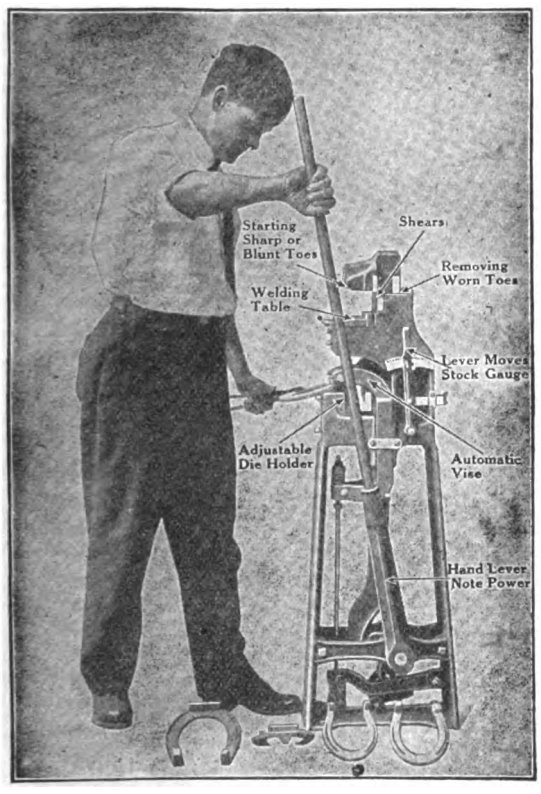


"Buffalo"



1918 MODEL
THE L. S. P. CALKING MACHINE

The Greatest Time and Labor Saving Machine On Earth



1918 MODEL—Fully covered with Patents

OUR 1918 Model is the same as our 1917 Model with the exception that we have eliminated the steel plugger attachment and strengthened some of the parts.

Do not mistake this for a machine which makes toe calks or a foot vise. This machine is for turning heel calks, both Blunt and Sharp, sticking and welding toe calks, clipping and trimming ends of shoes. IT CALKS SHOES, doing the work just the same as you do by hand with the hammer, only it is done much better and easier, and in a fraction of the time.

In turning heels, you can turn up just as much stock as you wish, upset or stoveup to make as heavy as you like and square up the calks without use of hammer. There is no losing of toes when you weld on the L. S. P.

It is a strong, handsome, well made machine and will last, as you might say, a life time, fully warranted for one year. It is in use in the best shops in the United States, users claiming more for it than we do.

Write at once for full information and prices.

L. S. P. CALKING MACHINE CO.

P. O. Box 225 WYALUSING, PA., U. S. A.

NATIONAL MACHINE CO., Brighton, Ontario, Canada

Would You Sell Your Life For $65?

You wouldn't part with even an arm or a leg for that figure, would you?

Yet every vicious horse you shoe is likely to do more damage in the twinkling of an eye than can be repaired at several times the cost of **Barcus Stocks.**

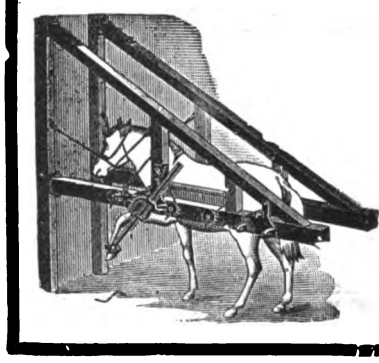
When you place a horse in a Barcus Stock, he is harmless—he cannot hurt either you or himself. Costing only $65 it is cheap insurance, indeed.

BARCUS STOCKS not only furnish the logical way to observe "Safety First," but they are also a positive aid to good shoeing. The BARCUS is a modern Stock—automatic working parts instead of the bothersome ropes, straps and blocks that made the old style stock almost more of a nuisance than a help.

If you don't know about **Barcus Stocks** you owe it to yourself and your family to write **at once** for the complete details.

The Barcus Mfg. Co.,

Wabash, Ind.



Please send me full particulars regarding your Horse Stocks without any obligation on my part.

Name.....

Town.....*State*.....

Digitized by Google

LINDE OXYGEN

From Coast to Coast 65 Producing Plants and Distributing Stations provide an unlimited supply of Linde Oxygen for users everywhere.

LINDE SERVICE means no investment except for oxygen actually received—no expensive overhead or upkeep charges.

Linde Oxygen may be obtained from any of the following Linde Plants and Distributing Stations where a large suppply of charged 100 to 200 cu. ft. cylinders is kept on hand constantly to insure immediate shipments.

Mail or telephone your order to THE LINDE AIR PRODUCTS CO., at the nearest point. **Shipments will be made on day order is received.**

PRODUCING PLANTS AND WAREHOUSES

Alabama
*Birmingham
10th Ave. & 28th St.
California
*Emeryville, Oakland
*Los Angeles
1405 Mission Road
Colorado
*Denver
S. B'way & Exposition Ave.
Connecticut
Hartford
1096 Main Street
District of Columbia
Washington
9th & Maryland Ave., S. W.
Georgia
*Alanta
Plyant St. & Southern R. R.
Savannah
OgeecheeCanal,So.of BaySt.
Illinois
*Chicago
3633 Wall Street
East St. Louis
6th & Walnut Ave.
Peoria
721-731 So. Washington St.
Indiana
*East Chicago
S.E.Cor. Kennedy& 145th St.
Fort Wayne
414 E. Columbia Street
*Indianapolis
2819 Roosevelt Ave.
Iowa
Davenport
118 Harrison Street
Des Moines
117 W. 5th Street
Kansas
Wichita
Rock Island Ave. & 2nd St.
Kentucky
Louisville
126 East Main St.
Louisiana
New Orleans
801 Fulton Street
Maryland
*Baltimore
25th & Montebello Ave.
Massachusetts
Cambridge
25 Waverly Street
Springfield
Napier Street
*Worcester
961 Southbridge St.
Michigan
*Detroit
St. Aubin Ave. & Newton St.
Grand Rapids
Pearl Street by the Bridge
Minnesota
Duluth
Seventh Ave., West
*Minneapolis
1809 Hennepin Ave.
Missouri
*North Kansas City
14th & Charlotte St.
*St. Louis
4218 Forest Park Blvd.
Nebraska
Omaha
1007 Jones Street
New Jersey
*Elizabeth
Linden Ave.
Newark
354 Plane Street
New York
Albany
Montgomery & Colonie Sts.
*Brooklyn
475 Driggs Ave.
*Buffalo
155-183 Chandler St.
*Utica
Walnut & Schuyler Sts.
Ohio
*Cleveland
802 East 72nd Street
*Cincinnati
Stanton & Mellish Aves.
Columbus
310 Dublin Ave.
Dayton
521 E. First Street
Lima
338 East High Street
Ohio
Toledo
441 South Erie Street
*Youngstown
601-621 Jones Street
Oklahoma
Oklahoma City
27 E. Grand Ave.
Tulsa
1 North Boulder St
Oregon
Portland
15th & Hoyt Streets
Pennsylvania
Erie
1502 Sassafras Street
*Norristown
*No. Philadelphia
18th & Cambria Streets
Pittsburgh
16th &Pike Streets
*Trafford
Tennessee
Chattanooga
212-238 King Street
Memphis
203 Washington St.
Texas
*Dallas
Harwood and Coombs St.
Houston
Cedar & Baker Sts.
San Antonio
512 Dolorosa St.
Utah
Salt Lake City
112 West Second St., South
Virginia
Richmond
1709 E. Carey Street
Washington
*Seattle
Henrietta St. & 8th Ave., So.
Spokane
121-123 S. Madison St.
Wisconsin
Manitowoc
810 Quay Street
*Milwaukee
36th St. & National Ave.

(Star) * Designates Plants.

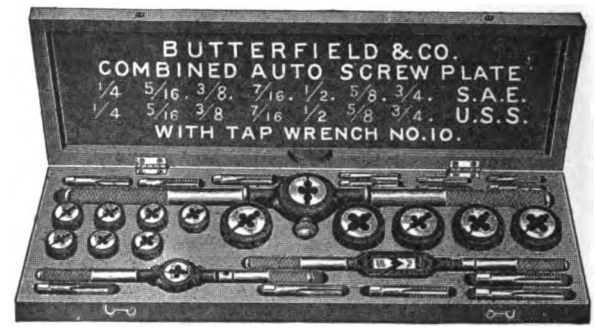
Other Plants and Distributing Stations are planned for other industrial centers throughout the country and will be established as fast as and wherever the local demand for oxygen warrants.

THE LINDE AIR PRODUCTS COMPANY

Largest Producers of Pure Oxygen in America

Forty-Second St. Building **NEW YORK**

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

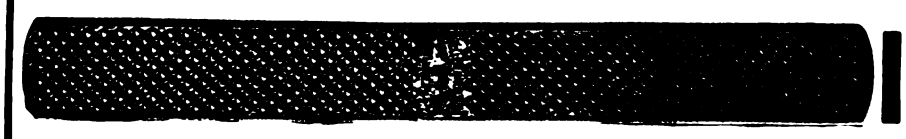
No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.
New York Store: 126 Chambers Street

The Horse Rasp of Quality



Ask your Dealer for the

IMPROVED HELLER RASP

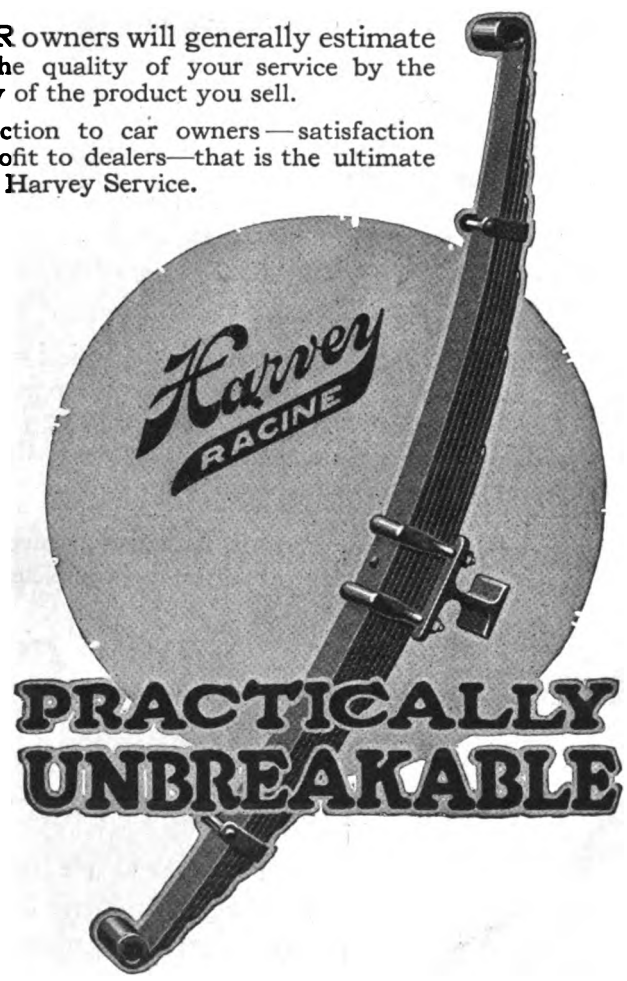
with keen cutting hard teeth. Made in all patterns and cuts, **"Slim," "Light," "Slim Light"** and **"Fine Cut."** Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial. New catalogue mailed free on application.

HELLER BROTHERS CO. *Established in 1836* **Newark, N. J.**

Service

CAR owners will generally estimate the quality of your service by the quality of the product you sell.

Satisfaction to car owners—satisfaction and profit to dealers—that is the ultimate aim of Harvey Service.



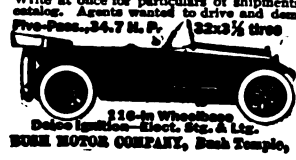
PRACTICALLY UNBREAKABLE

THERE'S A HARVEY JOBBER NEAR YOU
Our new catalogue giving complete measurements of over 900 styles of Springs is yours on request

HARVEY SPRING & FORGING CO.
919 - 17th Street, RACINE, WIS.

Shipped on Approval

Write at once for particulars of shipments and my 48-page catalog. Agents wanted to drive and demonstrate the Bush Five-Pass., 34.7 H. P. 32x3½ tires

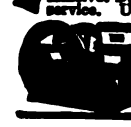


Car. Opportunity to pay for it out of your commissions. Agents making money. Shipments are prompt. Bush cars guaranteed as represented or money back. 1918 models ready. Addr. J. H. Bush, Pres. Dept. K 5

116-in Wheelbase
Delco Ignition—Elect. Stg. & Ltg.
BUSH MOTOR COMPANY, Bush Temple, Chicago, Illinois

OTTAWA KEROSENE ENGINES

Latest design. Durable, Powerful, Reliable. Massive. Built to do hard, heavy work—to give lasting service. Uses Cheapest Fuel. Pulls 25 to 50% more H-P. than rated. Shipped on three months' trial. Easy terms. Sizes 1½ to 22 H-P. 10-Year Guarantee. Book free—postal gets it.



OTTAWA MFG. CO.
1781 King St., Ottawa, Kan.
FREE BOOK

ABSORBINE
TRADE MARK REG. U.S. PAT. OFF.



will reduce inflamed, swollen Joints, Sprains, Bruises, Soft Bunches; Heals Boils, Poll Evil, Quittor, Fistula and infected sores quickly as it is a positive antiseptic and germicide. Pleasant to use; does not blister or remove the hair, and you can work the horse. $2.50 per bottle, delivered. Book 7 R free.

ABSORBINE, JR., the antiseptic liniment for mankind, reduces Painful, Swollen Veins, Wens, Strains, Bruises; stops pain and inflammation. Price $1.25 per bottle at dealers or delivered. Will tell you more if you write. Liberal Trial Bottle for 10c in stamps.

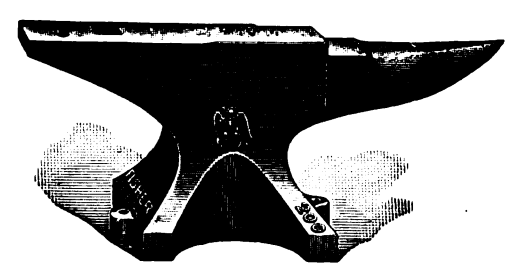
W. F. YOUNG, P. D. F., 55 Temple St., Springfield, Mass.

1843 **EAGLE ANVILS** 1918
AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE

BLACKSMITH AND WHEELWRIGHT

Vol. LXXVIII. No. 3. NEW YORK, SEPTEMBER, 1918. TERMS ONE DOLLAR A YEAR

Design, Construction, Operation and Repair of Automobiles and Motor Vehicles

Part VIII—The Action of Single Unit Motor-Generators and the Elementary Principles of Storage Battery Construction and Repair

In our last issue we took up the generator and the two-unit starting and lighting apparatus and described the various methods used for regulating the current output of ordinary generator apparatus.

Now a single unit system apparatus in so far as the units themselves are concerned, is similar to the two-unit arrangement except that both the generator and the starting motor are combined. By this we mean that the starting motor and the generator utilize the same set of field magnets but have an armature or rotating member that is used both for the motor in starting and for the generator in furnishing the storage battery with current.

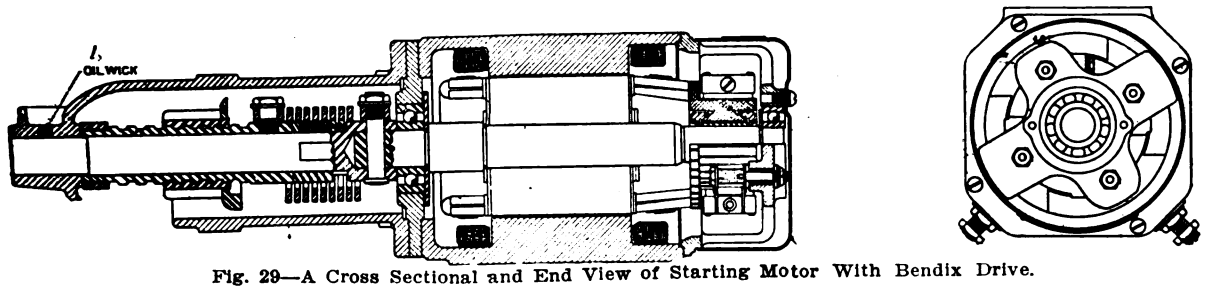


Fig. 29—A Cross Sectional and End View of Starting Motor With Bendix Drive.

In general the means adopted for starting the engine from the motor shaft are the same as those used where a single unit is provided. In Figure 29 we illustrate particularly the Bendix drive arrangement which was described in the last installment. This drive is on the end armature shaft and is so arranged that when the unit is being used as a starting motor, the pinion gear slides along the shaft and meshes with the flywheel.

As soon as the engine begins to operate, the pinion gear above the armature shaft automatically runs back from the flywheel and unmeshes. A careful study of the diagram together with our explanation will make this action clear.

Before we describe the single unit system, let us review the requirements of the two units. The starting motor operates upon current furnished by the storage battery and is so arranged that when the starting pedal is pressed downward, current travels through the armature. The armature is automatically coupled with the engine crank shaft usually through the flywheel and a set of gears or the Bendix drive arrangement. The engine, therefore, is cranked at a low speed until it starts. As soon as it starts, however, if the starting motor does not disconnect automatically, the motor armature would be driven at a terrific speed and so the above described devices are used for disconnecting the armature from the engine.

The speed of the armature, however, during the whole operation is variable, that is, it depends entirely upon the speed of the flywheel. The generator, on the other hand, is usually driven from the timing gears and the armature is never called upon to travel at such excessive speeds as the motor armature.

In a single unit system the same armature answers both for the generator and for the motor and if some means were not provided for disconnecting the armature from the timing gear drive while the machine is operated as a motor, the driving shaft would be twisted off. In a single unit system between the armature and the generator driving shaft there is placed usually a device called an overrunning clutch.

The overrunning clutch consists of a ratchet shaped piece of metal mounted upon the armature shaft and surrounding it a housing which is connected to the driving shaft. Between each ratchet tooth is placed a steel ball. When the machine is operating as a motor and the armature is traveling faster than the driving shaft, the steel balls drop back into the lowest portion of the ratchet tooth. As soon as the motor shaft is disconnected from the flywheel or crank shaft and the armature driving shaft runs as fast as the armature, the steel balls roll outward and wedge between the ratchet tooth and the casing, thus driving the armature through its shaft.

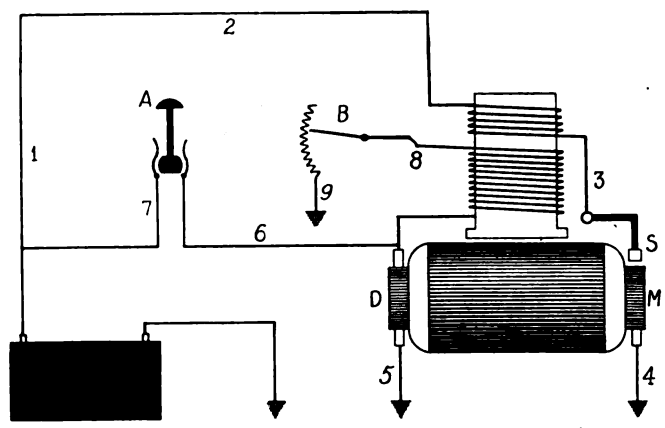


Fig. 30—Circuit Diagram of Typical Motor-Generator.

The armature itself in a single unit system has two windings instead of one as in the ordinary motor or generator. It is also provided with two commutators as shown in Figure 30. The field magnets of which only one is shown in Figure 30 may be wound in the same manner as any generator while a separate winding is provided which works in conjunction with the machine when it is being used as a starting motor. The two windings are clearly shown in the drawing together with a simple wiring diagram.

Let us follow through the operation of this machine from the starting position until it begins its operation as a generator. We will assume that the motor end is fitted with a Bendix drive as shown in Figure 29.

The starting switch is pressed downward and this switch presses the brush S against a commutator on the motor end of the machine. The current flows from the battery through wires 1 and 2 to the series wiring of the fields, thence through the brush S to the commutator, from the armature windings back to the other brush, through wiring No. 4 to the ground connection and back to the battery. This causes the armature shaft to revolve and the little steel balls in the overrunning clutch at the other end of the machine drop back into the lower portions of the ratchet, allowing the armature shaft to revolve faster than the driving shaft from the timing gears.

As the motor shaft revolves it turns the worm which is mounted at the end of it, and upon which is carried the Bendix pinion gear. Since this small gear is out of balance because of a weight on its circumference, it remains practically still while the worm inside it revolves. It therefore runs along the worm until it meshes with the gear on the outside of the flywheel.

As soon as it meshes deeply and comes to the end of its path, the recoil is absorbed through the spring upon the end of the worm it is therefore practically fixed on the end of the armature shaft and revolves with the shaft driving the flywheel slowly.

The engine shortly begins to operate and as soon as the cylinders explode, the flywheel begins to rotate faster than the armature. It turns the Bendix pinion gear faster than the armature and consequently the gear travels back upon the worm.

In the meantime the starting button has been released and the armature shaft gradually slows down in speed until it travels at the same rate as the driving shaft from the timing gears. When it reaches this point the little steel balls roll outwards upon the ratchet and couple the shaft to the armature shaft. This drives the armature shaft at the speed required for generating the electrical current.

The current is generated in the generating windings of the armature and passes through the cut-out to the storage battery and continues to do so as long as the armature speed is sufficient to generate enough current to charge the battery.

Figure 31 shows the motor generator, the motor of which drives the flywheel through a chain of gears which are operated by the

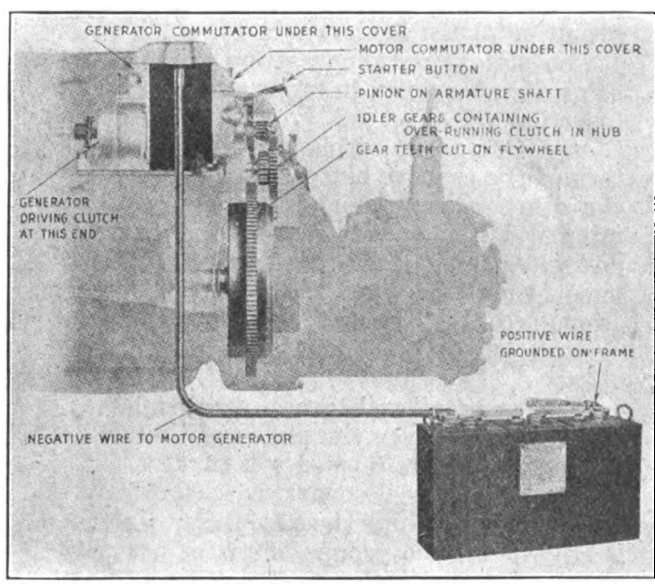


Fig. 31—Phantom View of Single Wire, Single Unit Motor-Generator.

Digitized by Google

starting button. The majority of machines operate in this manner rather than through the Bendix drive. We gave the action of the Bendix drive simply to make the operation of this unit clear in the minds of our readers. The chain of gears method illustrated in Figure 3 is simple and only requires that the gears be slipped into place by the starting lever.

We are now coming to one of the most important units on the car, namely, the storage battery. At the present time this device is found on practically every car manufactured except the Ford car, though many owners fit their Fords with a starting and lighting system which naturally includes a storage battery.

This unit merits a careful explanation and repairmen should understand thoroughly the construction of the ordinary type of lead batteries generally used.

A storage battery usually consists of three or more cells. Each cell has an output of two volts and a large majority of the cars are equipped with 3 cell 6 volt batteries. Figure 32 shows a cross section of an ordinary storage battery. The cells are arranged side by

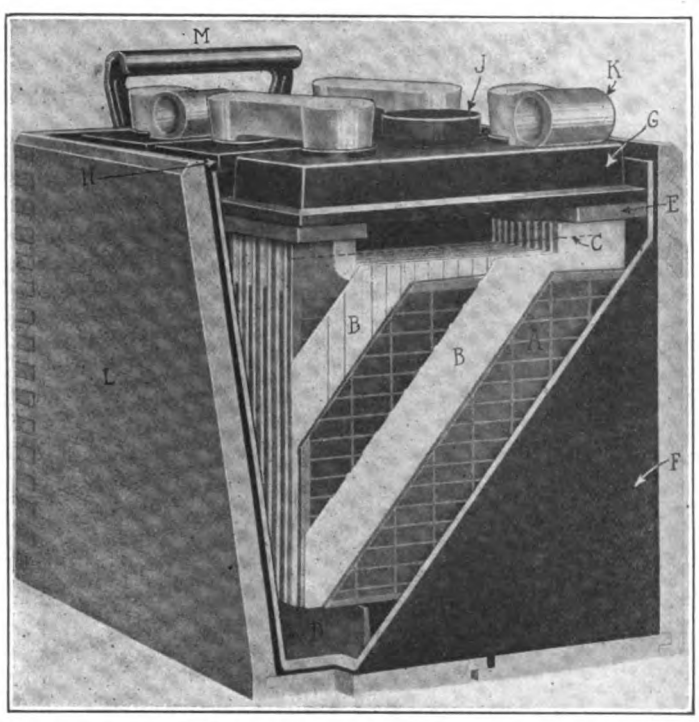


Fig. 32—Sectional View of Prest-O-Lite Storage Battery.

side and the battery shown, cut diagonally across one of the cells. We will describe but one cell, since the others are similar to it. As a container for the liquid and the plates, a hard rubber jar forms the outside of the cell. This is shown at F in the figure. The plates themselves rest upon projections cast in the bottom of the jar as shown at D.

One of the plates is shown at A and there are a number of smaller plates all attached to the same connection while a second group of plates is attached to a second connection or terminal located on the other side of the cell. A clear illustration of one set or group of plates is shown in Figure 33.

The plates in a single group are spaced some distance apart in order to permit the insertion of a second group in between them. One group of plates forms what is termed the positive battery terminal, while the other group forms the negative terminal. There is one more plate in the positive group than in the negative. This means then that when the two groups are assembled the two outside plates will be positive while the alternate plates will be negative.

The plates of each group are insulated and separated from the plates of the next group by what is termed a separator. A sketch of a typical separator is shown in Figure 33 at B. In the same figure at C is shown the two groups of plates assembled together with the wood separators between them. Such an assembly is termed an element.

In assembling the battery the element is put into the jar so that it rests upon the projections at the bottom of the jar. Over this is placed a hard rubber cover which has three holes. Two of the holes slip over the posts of each group while a third one at the center, is fitted with a cap which permits access to the interior of the jar.

After the cover is in place, a sealing compound is poured upon the cover thus making it liquid tight except for the center hole or filler opening. Three cells form a six volt battery and are usually mounted in one wooden box. They are put in the box in such a way that the positive post of one cell comes next to the negative terminal of the next cell.

The positive post of the first cell is connected with the negative post of the second cell by a lead connecting strip which is soldered or burned into place, making an electrically tight joint. After all the cells have been connected in this way there will be left one positive terminal and one negative terminal.

In many cases where these connections have been made the box is filled with melted wax or a special sealing compound which covers up the connecting post and leaves nothing in view except the filler holes and the two terminals.

After the battery has been assembled, as described. it is filled with the electrolyte which consists of a mixture of sulphuric acid and distilled water. The sulphuric acid is chemically pure in order that it may not introduce any impurities in the battery.

There are a great number of ways in which plates may be constructed. In general, however, they consist of a lattice work frame called a grid which is filled or pasted with lead peroxide in the case of the positive plate and sponge lead in the case of the negative plate.

We now have the construction of the storage battery. Let us see how the device operates. As a matter of fact, the term storage battery is a misnomer. The battery does not store any current at all. As a matter of fact, current is generated by chemical action only.

When the battery is fully charged as it is termed, the plates are composed of lead peroxide and pure sponge lead, positive and negative respectively, immersed in a solution of sulphuric acid. Sulphuric acid consists of two atoms of hydrogen together with another element which is termed the sulphate radical consisting of sulphur and oxygen in combination. Lead peroxide is really a certain form of oxidized lead.

When the positive and negative plates are connected through an outside circuit, chemical action at once commences. That part of the electrolyte, termed the sulphate radical, combines with the lead plate as well as the lead peroxide plate, thus sulphating the two plates. The atom of oxygen which was combined with the positive lead plate is liberated and combines with the hydrogen itself left in the electrolyte when the sulphate radical has been taken away.

As the battery gradually discharges, the

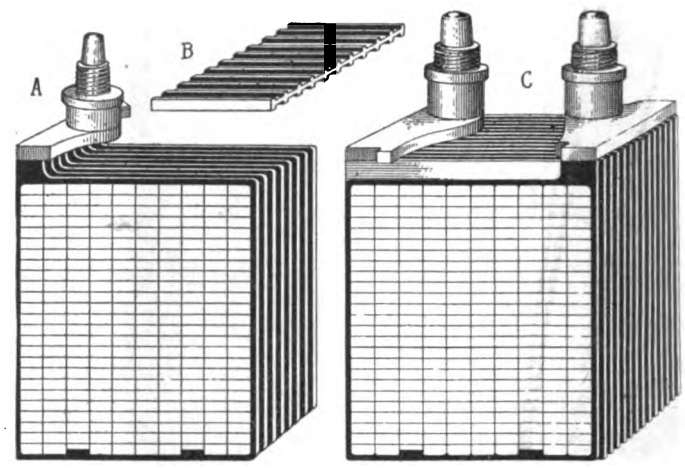


Fig. 33—A Group of Plates at A; A Wood Separator at B; and An Element at C.

two plates slowly turn into lead sulphate and the electrolyte gradually loses in strength and becomes more or less water.

It would seem then that if a battery could be fully discharged no sulphate would remain in the acid, but all of the sulphate would combine with the plates, then we would have two plates a lead sulphate and a solution of pure water. As a matter of fact, however, chemical action does not proceed as far as this.

After a battery has been partially discharged, it is very possible to restore the plates and the electrolyte to nearly their original conditions. If a current should be passed through the battery in the opposite direction in which the current came from the battery the sulphate would be driven away from the plates and into the electrolyte again. The electrolyte would gradually become stronger and stronger, the positive plate would gradually become lead peroxide and the negative plate pure lead until the battery was fully charged.

Both pure lead and lead peroxide are comparatively soft substances and each time the battery is charged or discharged a portion of this substance is separated from the plate and falls to the bottom of the cell. It is for this reason that the bridges or projections are provided in the bottom of the cell.

Aside from the gradual destruction of the plates, one can see that there is no actual loss in any of the elements of the battery. The only thing that has to be replaced is the water which has a tendency to evaporate. This water is put into the battery through the filler hole which we have previously described.

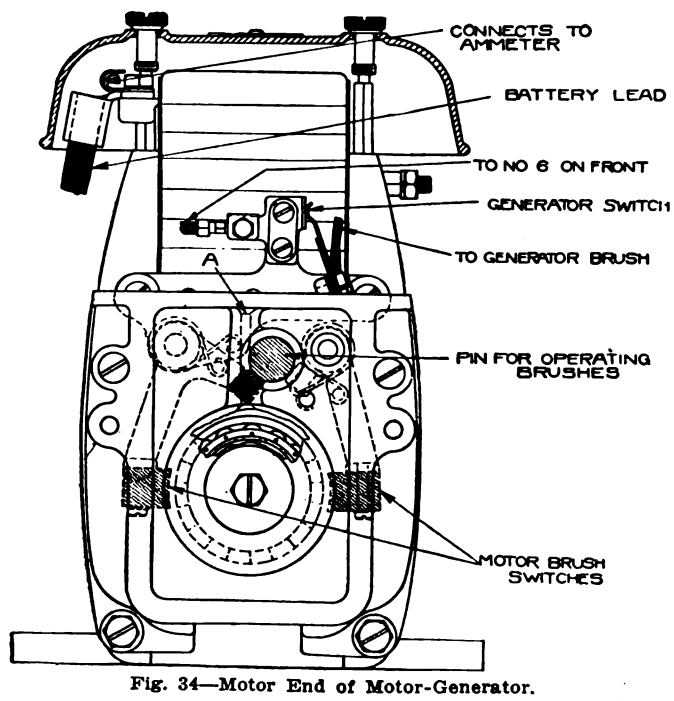


Fig. 34—Motor End of Motor-Generator.

WHAT HAVE YOU GIVEN UP?

Have you given up your job and let your business future take care of itself?

Have you said good-by to your family and friends and all you hold dear?

Have you begun an entirely new career that may end, if you live, with health impaired, an arm off, a leg gone, an eye out?

Have you given up your business future and said good-bye and taken a chance on coming back alive and well, and done it all with a cheerful heart and with a grim determination to do all you possibly can for your country?

And do you only at times—in the evenings, perhaps, when the light in the sky slowly fades away—feel so homesick and so lonesome that you are fearful you will not have the courage to do your part after all?

You have not done these things? Ah, I see, are not one of our Army or Navy boys; you are a stay-at-home person.

Well, there have to be 20 or more stay-at-home persons for every one who goes, and so certainly no disgrace attaches to being one if you fully appreciate what those boys who do go have to give up and if you support them to the limit of your ability.

Digitized by Google

The Rock Drill Blacksmith

Part 1—The Importance of Hardening the Drills Properly and the Necessity for Having the Size

Copyright, J. F. SPRINGER*

Rock drills are used in metal mining, in quarrying and in excavating through rock. The cutting work is done by the face and side edges of a steel bit. Naturally, the bit becomes dull with use and requires to be put back into its original condition. Forging is required for the purpose of restoring the cutting edges of the face to their proper form. Heat treatment is required in order to reproduce the hardness destroyed by the heating preparatory to forging.

These are the principal blacksmithing preparations necessary to what is somewhat loosely termed "sharpening." That is to say, "sharpening" a dull drill bit requires that the smith first heat the metal and use the hammer and other hand tools of a special character or instead to employ a special machine; and second to re-harden the bit.

Upon the accuracy and excellence of the blacksmith work a good deal depends. Many workmen may be able to do a good day's work or a poor one, according to whether the blacksmithing is all it should be or is something different. It will be well to have a good understanding of this matter. Then the blacksmith will realize his responsibility better.

Drill Decreases in Size.

As a drill bit goes down it wears on its side edges as well as on its face. The result is that the further down the bit goes into the rock the smaller the diameter of the bit becomes. In short, the hole gets smaller and smaller the deeper it goes. After a bit has become dull it is replaced by another from the blacksmith shop. Ordinarily this fresh bit will be a resharpened old one. It may, of course, happen to be a brand new one. But whether old or new it must be smaller than its predecessor in the hole. That is, its diameter must be smaller than the original diameter of the bit that it replaced. The reason has already been indicated. The dull bit has lost its original diameter and is now cutting a hole of smaller size. The fresh bit must be no larger than the size of the hole partially completed.

And so the drilling goes on from beginning to end. We start with a certain size bit but every time we change bits we put on a smaller size. Each bit wears on the side, little by little, and produces a tapered hole. The continual side wear of bit after bit means a tapered hole from top to bottom. This tapering of the hole makes all kinds of trouble.

The bottom of the hole must be large enough to accommodate the dynamite cartridge. Otherwise that cartridge will not rest on the very bottom and will stick at some other level. Whoever controls the blasting operations will probably want and insist on holes reaching down to a chosen level. If the cartridges cannot be put down that far because the holes have tapered too much, then the holes might just as well have been stopped at the points where the cartridges stick.

But the blasting foreman will not want short holes. He will want holes of full depth. It is important then that the holes be started with a bit large enough to permit the changes to smaller ones and yet have the bottom of the final section of hole large enough for the dynamite cartridge.

Finding the Bit Sizes.

Suppose the hole is to be 13½ feet deep and that each bit when properly hardened will cut a depth of two feet before it will need resharpening. We shall want, accordingly, seven different sizes of bit. The seventh bit must finish with a diameter of, say, 1⅛ inch, the diameter of the dynamite cartridge being taken as 1 inch. When this bit begins, however, at the 12-foot level, it must be still larger—say 1 5/16 inch—to allow for wear. If we allow 3/16 inch as the difference in size between one bit and the next preceding one, then, for the six bits above we will have a total change of size, amounting to six times 3/16, or 1⅛ inches. Consequently, we shall have to start with a bit having a diameter of 1 5/16+1⅛ or 2 7/16 inches. The seven bits for the full depth will have the following sizes:

2 7/16, 2¼, 2 1/16, 1⅞, 1 11/16, 1½, 1 5/16.

The blasting boss or superintendent makes his calculations and adopts the foregoing set of sizes for the holes. There may be, perhaps 40 holes, all to have this same depth of 13½ feet. The blacksmith shop is directed to furnish the sizes determined upon and the work begins with the 2 7/16 inch bits, the hole tapering down as shown in Figure 1.

Suppose now the blacksmith shop fails to give the steel the hard cutting surface combined with a tough backing that is really possible. Then it may be the 2 7/16 inch bit will fail to cut its full 2 feet of hole. The second bit is accordingly started at a higher level than was contemplated. It may be now that this second bit—the 2¼ inch size—will also fail to do its full amount for precisely the same reason that caused the failure of the first bit.

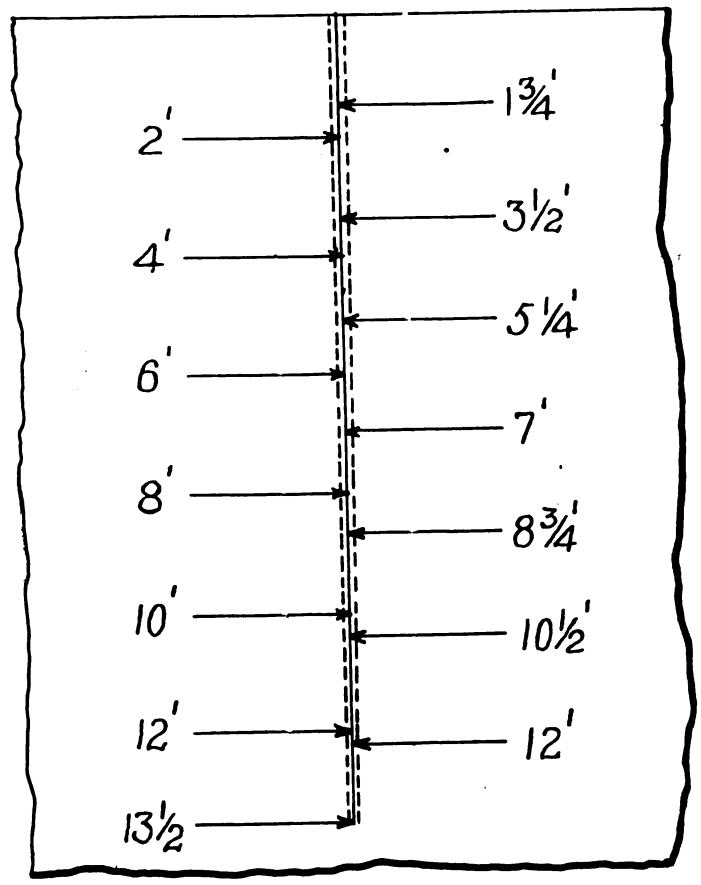


FIG. 1.

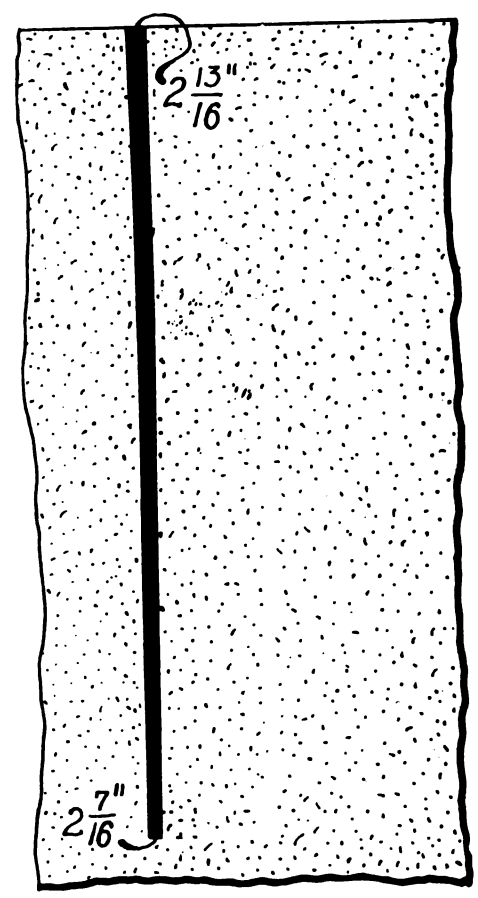


FIG. 2.

In short, if the blacksmith shop does not succeed in producing bits capable of taking a 2-foot cut, but only bits which fall short by, say, 3 inches in doing the required amount, then a very serious result may follow. With a 3-inch loss for each of the first six bits, we have a total loss of 1½ feet before the seventh bit is started. Instead of 12 feet only 10½ feet have been drilled. The full depth is to be 13½ feet. Consequently, there remain 3 feet yet to be done.

A Lot of Useless Work.

The seventh bit will do 2 feet, less 3 inches—that is, 1¾ feet. When the seventh bit has bored the hole this much further there will still be 1½ feet yet to be drilled. It is useless to drill this remaining distance. The hole is already as small as it should be to receive the dynamite cartridge. To drill deeper would mean tapering below this size. Consequently, the hole is stopped when the seventh bit has added its 1¾ feet to the 10½ feet done by the first six bits. That is, the hole is stopped when it is 12¼ feet deep. This hole may be useless for the blasting operation it was proposed to carry out.

Some may think that the error could be corrected and that the hole need not be abandoned. Thus some might think it possible to use a special seventh bit somewhat larger than the 1 5/16 inch size and finish with it. This bit would halt above the 10½ foot level. If it gets deeper it will have to cut away rock.

Now, rock drills operate mostly by chipping away the rock immediately under the cutting face. They operate thus largely because of the manner in which they are made to advance. They are either thrust against the floor of the hole or they are hammered against it. They do not operate by a rotary cutting action but by a forward movement. The cutting on the side edges is incidental. The bit in question has practically no rock immediately ahead of it—practically nothing but an empty hole. To thrust it forward or to pound it forward would result, probably, merely in the bit sticking. What is needed to cut away the rock on the sides is a rotating cutting movement. A different machine than the rock drill would be required. In fact, when a hole has tapered too quickly to the size of the dynamite cartridge there is nothing to do but stop. If the short hole is useless then the drilling has been wasted.

It is to be understood from the foregoing that if the blacksmith shop fails to produce by its heat treatment, drill bits of the proper combination of hardness and toughness, to drill the full section amounts, then we may have a lot of useless holes. Unless the blacksmith shop can improve there will be nothing else to do but to start new holes. These new holes will begin with bigger bits in order to provide for the increased number of changes from one size to the next smaller size.

In the present case we will have to reduce the section of hole per bit to 1¾ feet. As there is a total of 13½ feet to be drilled we will have to have eight different sizes. That is, there will be seven sizes bigger than the eighth. The eight sizes will be as follows:

2⅝, 2 7/16, 2¼, 2 1/16, 1⅞, 1 11/16, 1½, 1 5/16.

Now while the sizes are only 3/16 inch bigger than before, still this bigger size means a bigger hole all round. It is a bigger hole than it would have been if the former bits had done their full duty. This bigger hole means more time and more money.

The preceding explanations will, perhaps,

Digitized by Google

assist superintendents and blacksmiths to see clearly that failure in the heat treatment may result in abandoned holes and in the necessity to drill bigger holes. These things mean time and expense.

There is another way in which the blacksmith shop may fail and in consequence bring about a great deal of trouble, loss of time and waste of money. If the bits are not made very close to the required sizes, we may have much difficulty and expense.

In the example we have just had before us the difference between one size and the next was given as 3/16 inch. Thus, we may have just put on a 1 11/16 inch bit. This would mean that the dull bit just taken off had been originally 1⅞ inches in diameter and that the next bit to follow the 1 11/16 inch size would measure 1½ inches. But suppose that the blacksmith shop should turn out bits that varied quite a little from the desired size. What then? Three-sixteenths of an inch is not a great deal. The smith might aim to make a bit of 1 11/16 inch size, but he may in reality make one that is 1¾ or 1⅝ inches in diameter.

If the blacksmith shop cannot be relied on to turn out work very close to size, then the use of the 3/16 inch difference between sizes will have to be given up and a bigger difference chosen. This is a very important matter, and the superintendent and head blacksmith should make sure they grasp its significance.

A Second Example.

Consider an example. Suppose that we have, as before, a 13½ foot hole to drill and that we can rely on each bit holding out for a full 2-foot section. We need, as we found before, seven bits. If the blacksmith shop can turn out bits so close to size that the 3/16 inch difference can be employed then the biggest bit will have a diameter of 2 7/16 inches. But if we have to allow ¼ inch between sizes then the biggest bit will have to be 2 13/16 inches in diameter, even if we keep the 1 5/16 inch size for the final bit.

This will make a very big difference in the amount of rock that will have to be cut. See Figure 2. Perhaps the reader does not realize how great the difference is. Let me say, then, that at the moment the 2 13/16 inch hole is started, about 33 per cent more rock will have to be cut through than would be the case if one started with a 2 7/16 inch bit. The excess percentage falls off, it is true, as we go down. Nevertheless, the total amount of rock that we have to cut as an extra cannot be far from 30 per cent of what we would have to cut with the set of smaller bits. This is a good deal of waste—it means wasted time, wasted money.

Perhaps enough has now been said to impress upon the superintendent and the head blacksmith the wonderful importance of two things:

(1) The best possible heat treatment;
(2) The utmost accuracy in size.

It is the purpose of this article to emphasize these two things and to show the attentive and intelligent reader how to get high-grade results along both lines.

(To be continued.)

* We have secured from Mr. J. F. Springer the right to advance publication of his new book, "The Rock Drill Blacksmith," and begin with this issue. It is proposed, ultimately, to issue the whole in book form. Orders for this book may be placed by remitting $2.00 per copy to The Blacksmith and Wheelwright. The page size will be about 4½ by 7 inches.

NEBRASKA BLACKSMITHS' CONVENTION.

The Nebraska Blacksmiths, Horseshoe and Wheelwrights' Association will hold their twelfth annual convention on Wednesday and Thursday, October 16th and 17th, at Auburn, Nebraska, in the Community Club Rooms and the headquarters at the Auburn Hotel. At the request of the secretary, we reproduce a letter from the president together with the program of the meeting:

Dear Brothers:

Our former annual convention, eleventh in number, showing a uniform growth in attendance, in genuine good accomplished and a further cementing of the bonds of co-operation, attests the undoubted need of an organization, as ours, among our kindred workers in this great State of Nebraska.

We now approach our twelfth annual convention with the knowledge that the benefits to be gained by every one in attendance will be measured only by the desire of the individual to take such benefits to himself.

In the past each member has been expected to take the opportunity of giving his best to the common good, and this fundamental should be emphasized this year, when our larger democracy is risking its very life to make the world a place where the individual shall be guaranteed his proper rights of thought, speech and action.

We invite and expect you to be with us on convention dates, October the 16th and 17th, 1918, in the enterprising and hospitable little city of Auburn.

(Signed) JENS MILLER,
President.

Program.

Oct. 16th—9 a. m., registering and receiving of badge; 10 a. m., address of welcome by Mayor Lafe, Higgins. Discussion and selection of price committee. The price committee has some important measures to present. Adjourn for dinner. Dinner served by the W. W. Ladies, Ladies' Circle.

1 p. m., demonstration of oxy-acetylene welding at shop of C. C. Good, 1313 J Street.

2 p. m., unfinished business. Workman's Compensation Law and Acts. The Mutual Fire Insurance Company will hold their meeting and election of officers.

7.30 p. m., the representatives of the Iron Company, Horseshoes Company, Horse Nail Company, will be given a chance to talk to the blacksmiths of Nebraska.

9 p. m., Auburn Commercial Club will furnish a smoker and luncheon. This will be a general get-together meeting.

Oct. 17th, 9 a. m., local districts and State organization. Regular order of business, report to committee.

Subject for discussion: How much a blacksmith horseshoer should receive per hour, per day, per week; how much an apprentice should receive for same.

Mr. Deitrich Spethman, Grand Island, will speak. Subject: Looking back fifty years.

Mr. Bob McIntyre will speak on organization.

Selection of the 1919 convention. Election of officers.

1 p. m., dinner served by the W. O. W. Circle Ladies. Photographs of the members of the association. Sight-seeing auto ride over the hill to Peru State Normal. President Hays of the Peru State Normal will arrange for a gym play in full costume and entertainment for the afternoon.

6.30 p. m., back to Auburn for the banquet given under the auspices of the Auburn Commercial Club.

The Auburn Commercial Club, The Auburn Hose Company, The Auburn Community Club have instructed me that you will not want for entertainment while inside of the gates of our beautiful city during your short stay at the convention.

(Signed) C. C. GOOD,
Secretary-Treasurer.

The Blacksmith and the Tractor

The Village Smith Didn't Worry Himself Sick Because Tractors Were Taking the Place of Horses

BY F. L. PHILLIPS

"Well, I see that old Bill Hopkins' Polly is dead," said the old timer as he blew a ring of smoke into the air and replaced a particularly villainous looking corncob pipe between his teeth. The remark was addressed to the village blacksmith who was shoeing a horse in the most up-to-date manner.

"Can't say as I'm particularly sorry 'bout that," said the smith. "The old mare was 'bout the most vicious animal I ever tried to set a pair of shoes on. Last time she was here she nearly kicked my head off, and one of my toes is black and blue where she stood on it. I almost cost him a big doctor's bill to shoe her, and though I don't generally wish Bill any bad luck, still I'm glad he hain't got any more horses like Polly."

"Should think you'd be kinder sorry to see horses dyin' off 'round these parts," said the old timer, "but I don't see as your hair is growin' any grayer out of worry."

"Well, I'll tell you how 'tis," said the smith, straightening a kink out of his back. "You see I aim to keep up to date pretty much and you may have noticed probably that I haven't quit goin' down to the Farmers' bank to deposit money have you? I guess my bank account in the past eight months is growing faster than it ever did before just because I know a thing or two about modern affairs. I don't want to throw any bouquets at myself, but along the last part of the last year I began to wake up and I saw that the farmers weren't goin' to be able to get very many hired men to do their work.

"I knew that up-to-date fellers, or up-to-date fellers' sons, or the out-of-date fellers' sons would still continue to keep their affairs going about as usual, and if they could not do that with hired men and horses they would find some other way. I guess I was right, too, 'cause most of the farmers around here are using machinery to replace the hired men.

"Remember old Jimmy Tompkins who lives over the hill and owns that big hay field? Well, old Jim is about the hardest shell crab I ever saw when it comes to spending money. He used to pay me about two dollars a year for shoeing his horses. One spell he used to bring in old horseshoes that he picked up on the road, rusty and worn to pieces. He wanted me to shoe his horse with this and charge him half price.

"Well, I fixed him all right. I did just as he said, once, and his horse went lame in less than a day; took her about a week to get well again. Don't know as the horse is really well yet. She walks with a bit of a limp, and she can't pull like she used to. Well, the old skinflint has got a son in college.

"He says it's jail, and the name sounds about like it. I guess he must throw a fit every time he foots up the expenses. Well, the son came home for a vacation along in February and made so much fun of the old man on account of his old-fashioned notions that the old man began to sell off and kill off some of the rattlebone horses that he had.

"Of course that didn't worry me at all 'cause old Jim always worked the horses until the shoes fell off anyway. Jim's son came down to see me one day and we had a heart to heart talk about his dad.

"Along about in March the old man decided that he would buy a tractor. I guess 'twasn't the old man's decision so much as it was his son's. I understand that the son said he would disown the old man if he didn't scrape the mold off his whiskers and make some use of his big farm.

"Old Jim stopped down at the bank one day and pulled out quite a hunk of money. He made quite a ceremony of it and it took him a month to get over it, but he had a tractor and he began to make it work just like he did his horses.

"You could hear that old tractor engine chugging away, along about four o'clock in the morning, and you could wake up in the night and hear the engine still chugging. He tried to fool it twice by using water 'stead of gasoline, but the darn thing was almost human and didn't fool one single bit. His son came home on his summer vacation, and believe me he sure did some work for the old

Digitized by Google

man. He plugged away from morning until night and between the two of them they got their money's worth out of the tractor before the thing was two months old.

"They used it for darn near everything except for milkin' the cows, and I don't know but what they tried that stunt but the cows objected. Things went along fine for four weeks, then the tractor balked. 'Twasn't the tractor's fault so much as it was Jim's.

"Jim's darned penuriousness made him forget to put in oil and forget to put in water and forget a few other things, so Jim made a visit to the village blacksmith under the spreading chestnut tree, bein' me (I don't usually go into poetry very much unless it affects my business), and so I went out to look over the tractor.

"You remember, a while back I told you that I woke up along last December. I meant by that I began to study into the automobile repair game, so I guess I know a thing or so about engines.

"I soaked old Jim ten dollars for that visit. I told him that 'twasn't what I did so much as it was what I knew, and I was trying to get back some of the money that he really owed me because he had never given me much work before.

"Jim was a bit put out as usual, and we had some harsh words, but I've got him at my mercy and he has been over to see me about a dozen times since then. Every time he thinks that I will do the work for nothing. I have squeezed more money out of Jim since June than I ever did before for all his horses, and it looks as though I was bound to get quite a bit more.

"Jim doesn't know it, but I got a commission on the tractor which he bought and that commission itself made my eyes stick out almost a mile. I am working pretty hard now-a-days to sell tractors, gona sell one to you when you get ready to do some farmin'. Just now 'bout all you're doin' is turnin' over an acre or so of land and lettin' the rest lie idle.

"I notice that Carol Brothers are gettin' quite a little of your money for grain and horse feed. I s'pose you would rather give five dollars of your money to Carol Brothers than a couple of dollars to the Standard Oil Company. Well, anyway, Carol Brothers need your money more'n the Standard Oil, and so long as you got so much of it somebody might as well get it out of you.

"By the way, I just saw Calvin Butterworth, who owns the farm up Long Meadows Way. He was up to see me yesterday about one of these 10-20 tractors, which are earnin' so much money for the farmers. He's only got two hired men now, and one of them I guess will have to go in the next draft. Looks as though Cal would have to do without that new barn he intended buildin' next fall unless he sells off some of his horse-feed eaters and buys a machine.

"No, I don't know as I'm sorry to see the horses goin'. I wish there wasn't a horse within fifty miles. If there wasn't I'd know that I could do some real business and see some real money because I could do tractor repairing instead of horse repairing."

"Say, look here, how do you s'pose you're goin' to sell me a tractor after you have handed me a line of talk like this," said the old timer. "D'you s'pose I'm going to buy a tractor just to make work for you? Goodness knows it's hard nuff to make money now-a-days without givin' it all to you. I s'pose that if I bought a tractor you'd charge me ten dollars every time you took a squint at it, wouldn't you? S'pose that every time it got the cholic or threw a wheel or got cast, you'd come over and charge me two week's salary for half an hour's work. If you want ter sell tractors, mister, you'd better can that sort of talk."

"No, don't see as I'm hurtin' my own business a bit by tellin' you how much money I am makin'. If you buy a tractor I'll be makin' about three dollars more a week than I am now. Of course if you don't want me to make money, don't buy a tractor, but I'll tell you one thing right now, you'll be cuttin' off your nose to spite your face, 'cause for every three dollars that you pay me you'll be makin' about fifteen for yourself, 'cause a tractor will make more money for you than half a dozen horses.

"The way you're runnin' your farm now an' keepin' six horses, feedin' them all the year 'round, you cultivate only about one-third of your farm. That means that you've got to hire a couple of men to keep the horses busy, unless you want them to lie around in the stable eatin' their heads off. If you bought a tractor you could run the tractor yourself, eatin' the horses if you want to; I don't care what you do with them, but you won't need them, and do all the work of the horses with the one tractor.

"Better than that, though, you can cultivate the rest of your farm in the same length of time. In other words, you'll be makin' in one day as much money as you make now in a week. If you don't believe it, go over and see the old skinflint we were talkin' about a few minutes ago. I'll tell you what you might do if you want to be sure that you can save money by buyin' a tractor. On your way home today, stop and see four or five of the farmers hereabouts that own tractors. Offer to take the tractors off their hands for the price they paid at the beginnin' of the summer.

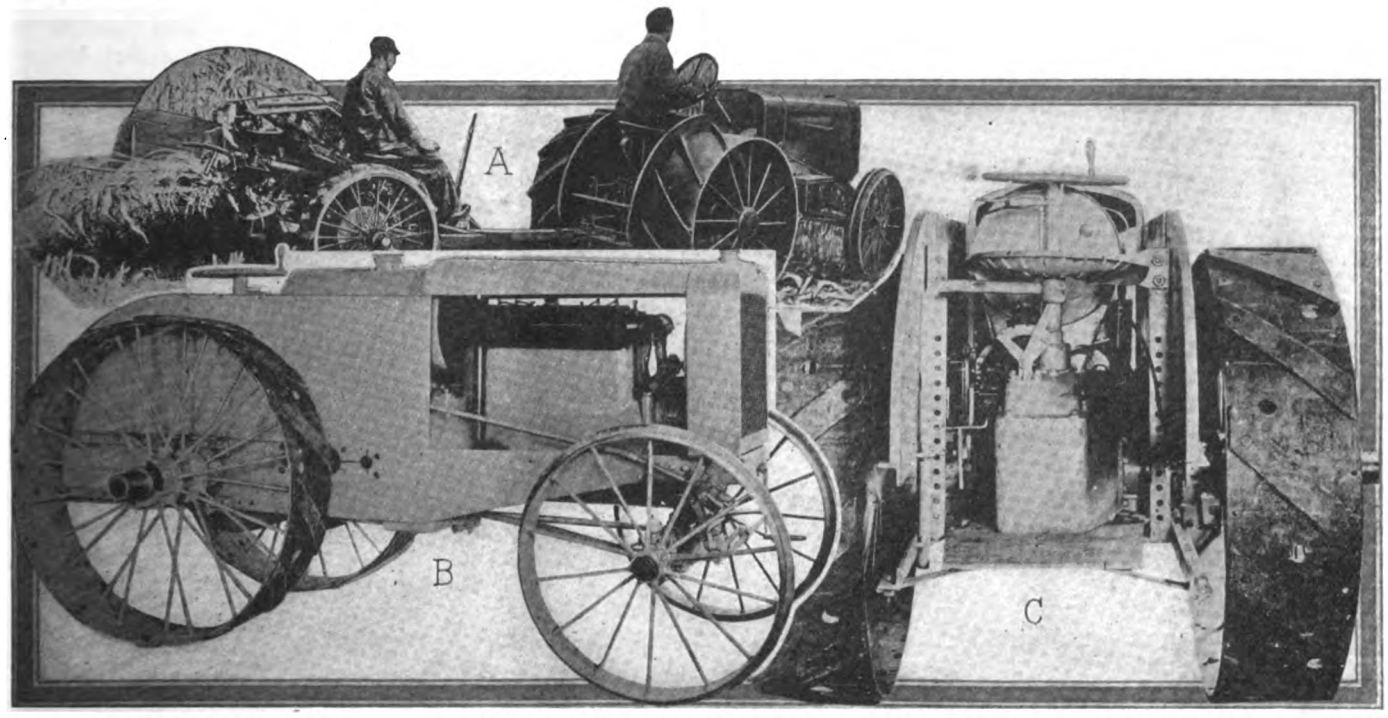
"I'll bet you a good five-cent cigar that they'll sic the dog onto you. Offer to trade them your stable of horses and your hired men for one of their tractors, and if you don't smile when you say it, you'd better get ready to run, because I know that none of these farmers will lend one of their tractors for even a day just now.

"Maybe you can make a dicker with them later on this winter. That'll give them a chance to buy a new tractor before spring. You know they've got one big joke on you, and if you'll keep quiet about it, I'll tell you what it is. This winter feed is going up to the moon, and then some higher, and you'll be mighty glad your horses ain't elephants. You'll wish they were ants. These fellers that have been wise enuff to buy tractors will run the darn things into a shed and forget about them until the spring again.

"You'll be gettin' up around two o'clock in the mornin' to hold the foot of one of your horses that has decided to come down with a colic. Maybe you'll be sittin' up with him nights just to keep him warm and keep him from gettin' lonesome.

"That's the funny part about a tractor, it don't get sick, it don't get lonesome, it don't have the colic, and it don't eat a darn thing unless it works for it—and work, say! I'll put a tractor up against one of your horses and I'll bet that I'll plow four furrows while you're sayin' giddap to your horses.

"Well, there's your old horse. I guess these shoes will last for a little while. You owe me $3.50, and I won't charge you a thing for my spiel. If I charged you what it was worth you'd owe me about ten dollars more, but so long as we're old friends you can have it for nothin'. You'll pay me the ten dollars before next spring because as I said before, I'm going to sell you a tractor!"



Showing the Maxwell Tractor. A, Pulling Corn Binders, a Difficult Task for Horses or Mules; B, Three-quarter View Showing Tread and Hood Removed to Show Power Plant; C, Rear View, and Showing How Gears Are Protected From Dust, Mud and Dirt.

LEST WE FORGET!

During the Third Liberty Loan campaign there appeared in a New York paper the following advertisement:

LEST WE FORGET!

He who can forget the little ones that lie mangled fifty fathoms deep under the shattered hulk of the Lusitania; who has no reverence for the dead and their devotion, no prayer for the dying and their anguish, no pity for the bereaved and the broken; whose blood is not quickened by our perils, whose heart is not softened by our pains; who reads unmoved of blasted homes and wasted countrysides, of desolated cities, and desecrated shrines, of heroic Belgium, overrun but not conquered; of epic France and the noble dead that lie buried there—the great dead that fought and the innocent dead that merely wept and waited. He who can forget these things, or be indifferent to the sacrifices and the sorrows, the bereavements, and the burdens of Freedom's Gethsemanes—that man is a Hun at heart, for the crimes that none but a Hun can commit, none but a Hun can forget!

After reading this do you not feel more desirous than ever of saving to the utmost of your capacity and of buying War Savings Stamps?

Digitized by Google

Final Entries in the Prize Photograph Contest

The Pictures Reproduced Below are the Last of Those Entered in the Prize Contest. The Winners Will Be Announced in Our Next Issue

This ends the prize photo contest, the last of the photographs in this office have been printed, though we have received a number since we announced that the contest had closed.

The interest has been great as the number of pictures would indicate, and we are sure that our brother smiths in various parts of the country have been as interested as the smiths who entered the pictures.

Do you know—everyone is interested in things located at distant points, particularly if those things pertain to the business one is in? We find it so—we like to see pictures of things from California or Washington or Florida, and in a way the pictures are just as good as a trip to that part of the country—that's why we started the picture contest and it is why we intend starting another very soon.

If you haven't already entered a photograph send it to us so that we can enter it for the next contest. In our next issue we will announce the winners of the present prize photo contest.

Prize Photo No. 37.

From W. R. Jones, Colorado.—I am enclosing a photograph of my shop and would like to enter it in the prize contest. I have been in this town for the last three years and



Mr. Jones' Smith Shop and Garage.

was located formerly at Concordia, Kansas; all of that time I have been a subscriber to The B. and W.

When I first came to California I quit the blacksmith shop and engaged in the building business at Los Angeles, but found that the shop was the place for me. I built the garage which is attached to the blacksmith shop last year, and will say I have found it a very good investment, though I have not as yet done much repair work. I sell oil, gasoline and accessories.

Since the picture was taken I have put in a gasoline filling station and take in quite a little money in this line. I am peculiarly situated here and I think I have a dandy location for the repair business but do not think that a smith should go into the repair business unless he is pretty sure of his territory, as there is always a lot of hard competition. Square dealing, however, will get business if there is any to get.

I do not sell many tires, but every little helps, and as we have no hardware store in this place I handle a little of that line also, especially a line of ready-fitted plow lays. Lots of smiths say they would not sell ready fitted lays, but if a smith can make almost as much money and not have to sweat too hard in making it, I say that is good business.

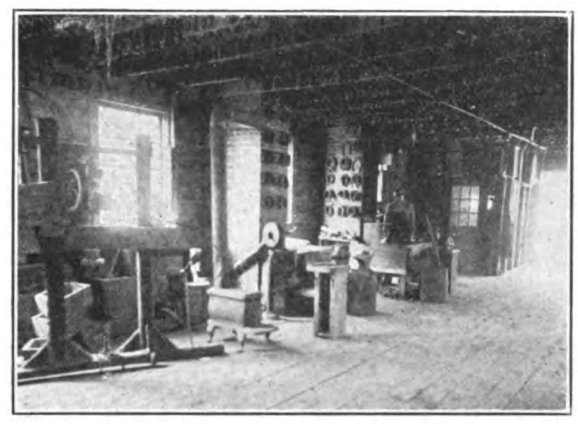
I find lots of good in The Blacksmith and Wheelwright and wish you all success. I was a subscriber to it while I was in Kansas, where I was known as "The Advertising Blacksmith." I frequently used a quarter page in our local paper to tell my customers what new machines I had that were money-savers for them, and I found that advertising paid.

The Kansas City Star gave me a write-up about it, and I had work coming into my shop from 100 miles away. That sounds funny, but nevertheless it is true.

At the present time I am doing all the work myself, as it is almost impossible to get help. My shop this month will run about $350 and the garage will bring in about $275. Of course there is not as much profit in the garage at present as in the shop.

Prize Photo No. 38.

From Harry Babcock, New York.—Mr. Babcock was kind enough to send us two fine pictures of his shop but did not forward any



Inside the Shop of Mr. Babcock.

letter about what he did or how business was going in his section of the country. We have reproduced but one of the pictures, the best one, though the other photograph was "mighty fine."

We want to compliment Mr. Babcock upon the neatness of his shop and tell our readers that the other picture is almost as good as the one shown.

Prize Photo No. 39.

From Bert Jewell, Michigan.—I am sending you three photos of my shop, an inside and an outside view. I like your paper very much, as I find many helpful articles therein. Have been a subscriber for four years—ever since I have been in the business.

I may say that I am probably one of the youngest blacksmiths in the business, so please excuse me from giving any advice.

I started to learn the trade when I was 15 years old. Worked four years for my old employer, T. H. Parks, bought him out and have been plugging for myself four years, with good success.

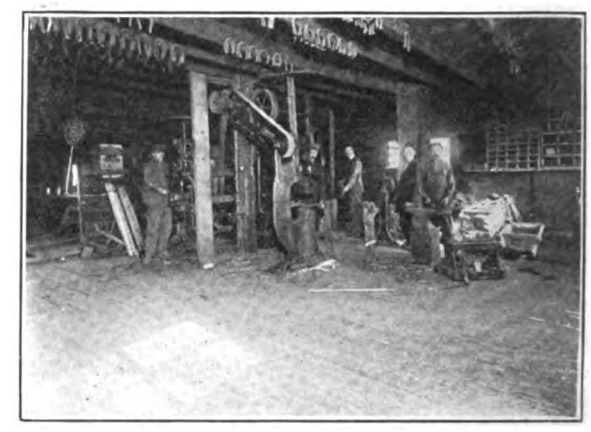
I keep one man all the time, sometimes two in the summer. Besides general blacksmithing and woodwork, I do lots of auto repairing, so your paper suits me fine in my business. Would be pleased to get a cut of my shop.



Showing the Shop Conducted by Bert Jewell Who Is Shown at Blower and at Work Bench.

Prize Photo No. 40.

From W. Shaw, Canada.—I am sending you a photograph of my shop to enter in the prize photo contest. It has been some years since



The Orderly Shop of Mr. Shaw.

the picture was taken and during that time I have made many improvements.

I have been a subscriber to The B. and W. for the last ten years and though I have only written articles of information for the well being of my brother smiths about thrice, I have asked many times for pointers and always found the papers interesting—not only interesting but beneficial.

I am now very much interested in oxy-acetylene welding and read-up the items with added interest since I purchased my welding outfit.

Prize Photo No. 41.

From Abe Hocker, Indiana.—I am enclosing a picture of my shop, showing me at my forge, and also a picture of the outside of the shop. My shop measures 40 by 80 feet, two stories with a basement for coal and supplies.

I use the first floor for blacksmithing and the second floor for woodworking and painting. The smith shop is equipped with all necessary machinery and run by power.

This is my 45th year at the trade and if I



Mr. Hocker at His Forge.

live long enough to put in 50 years I want to retire. I came to this town in 1877 and started out for myself in 1880. When I came here I carried all I had in one hand, and that "all" consisted of a hogskin apron, a pair of pinchers and a shoeing hammer.

The present shop is my third, and my first shop is still standing. It measured only 20 by 30 feet. My second shop is at the right of my third shop and is being used as a jacket



Mr. Hocker's Shop From the Outside.

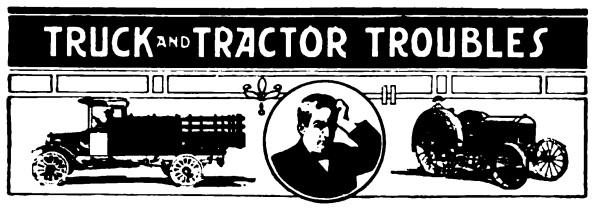
Digitized by Google

store. At the left of the picture you can see a part of the Alpine Hotel, a very fine place and if you ever come to this town stop at the Alpine.

I am right in the heart of the town. I feel that I have done pretty well. I have worked hard, lived economically; I don't smoke, chew nor drink whiskey and I cannot tell you how glad I am that I have escaped these habits.

I have my own comfortable home with over a section of good land, in the west. I will be 62 years old next October and am safe in saying that I can do as big a day's work as ever; that is, at the forge, but not at horseshoeing. I attribute my vitality to keeping away from the bad habits above mentioned.

My advice to all young men is, "keep away from booze." To encourage the young man that is just starting in the trade, "stick to it—it is one of the best trades and is going to be better in the future. Everybody goes to the blacksmith and good smiths are going to be scarce because so few are learning the trade. That will make prices better, hence I say to the beginner, stick to it and you will make no mistake."



Come on, boys, keep the ball a-rolling, put your shoulders to the wheel just like you did when we started the "Workshop Experience" department, and give it such a good big push that it will keep on running for the next thirty years.

Two of our brothers this month got busy and sent in some real "stuff," and after you have read it over, you will agree with us—it's worth a year's subscription money just to read what they say. If it's worth a year's subscription, surely you can afford to pay three cents for it and spend a little time writing a letter to us.

By the way, here's a proposition for you. If you will write us a letter about your automobile repair work—or about your shop—or about anything that will interest your brother readers, we'll pay the postage, and if the letter is good enough to print (we are pretty sure it will be, they always are), we'll send you a book entitled "Steel Working and Tool Dressing."

The Ford Coil and Trouble.

From J. W. Certain, Kentucky.—I have just looked through the latest number of The B. and W. I always try and look through it as soon as it comes out of the mail. I am down here in old Kentucky, working at the old job in a shop, all to myself, for help is scarce this year. Still I manage to get hold of a few extra dollars for Uncle Sam's boys and hope that every one of my brothers can help them a little by buying bonds or stamps.

I do a general business, do lots of Ford work. I had a little job the other day that was pretty interesting so I thought I would write about it.

The man that owned the machine came into the shop and said that it would run fine, but would "take fits" every once in a while. He said the coil box would buzz all of the time.

When I went out to the machine, the engine was running fine; I asked him what the matter was, and he said that it was going all right then, but he didn't know how long the goodness would last. Just as he got up from the seat the engine stopped, but the coils kept on buzzing.

I began to look for a short circuit in back of the coil box; when I took off the cover the coil stopped buzzing and I told him to crank the engine. It started right off, but when I put the box lid on the coil I thought it would knock me down. I got quite a shock. Then the engine stopped again.

I found that the top of the adjusting screw touched the metal box lid. The lid had been hammered upon until it was dented against the screw. I fixed that up in a hurry with a punch and a hammer.

A Handy Trailer Car.

From W. J. Ott, California.—Brother C. P. J., of Canada, wants some information as to a trailer. I will call Brother J.'s attention to how the auto trailer "falls down." It is the same thing with the garage, so to speak. Some of the garage mechanics don't know how to set an automobile tire. I will say "set it the same way as the original blacksmith of forty years ago set them."

See that the spokes don't ride the hub, tighten the flanges, as an auto wheel is only a Warner patent worked over. Wedge the spokes at the side of felloe as at A in Figure 1. (Too many smiths as well as garage men, wedge the center of the spoke where it goes into the felloe as at B and this splits the spoke). Wedge any spoke at one side.

Build over felloe with 9/32 by 2/32 bond iron as at C, until the wheel is 3/16 larger

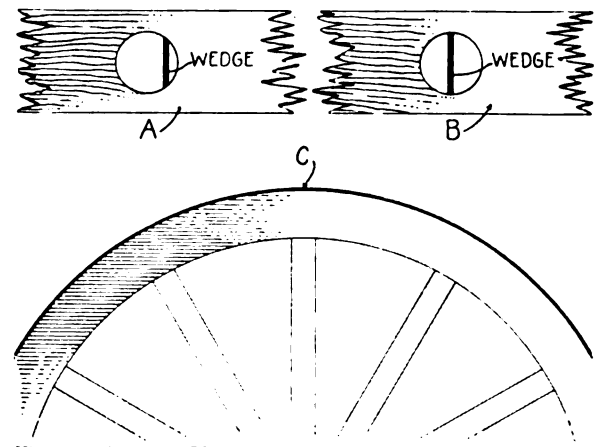


Fig. 1—Showing How to Wedge the Spokes and Apply the Rim.

than the tire. Heat the auto tire until it is red hot, and will slip over the wood rim and see that the wheel runs true after putting on the car. If it is not true, knock the felloe on the side until it runs true (same as setting on axle box. If you don't do this it will wear spots in your casing).

Now as to trailers: The factory built trailer or the manufacturer never stops to think of the result or what he has to contend with when the car is loaded with an 800-pound load. He never stops to think of the power required to stop 800 pounds. Just try it once. Put 800 pounds in a swing, get it going, then stop it quickly.

Seems as though some of the cars would make good aviators. They can make an automobile fly. Take a trailer and move 800 pounds behind it. Take into consideration the side motion. Don't forget that some of those speed bugs drive as fast as a runaway horse. Why, you can't see a spoke in an ordinary wagon wheel that they use for a trailer. I would advise Brother C. P. J. to use a heavy spring. I am going to try to draw my idea in Figure 2.

Never connect the tongue to the axle, because the rubber casing keeps the axle bobbing up and down. Look at the rear axle when one is going away from you and you will see it quiver up and down.

Attach the tongue to the sill piece that is mortised (B B Fig. 2) at the back of the

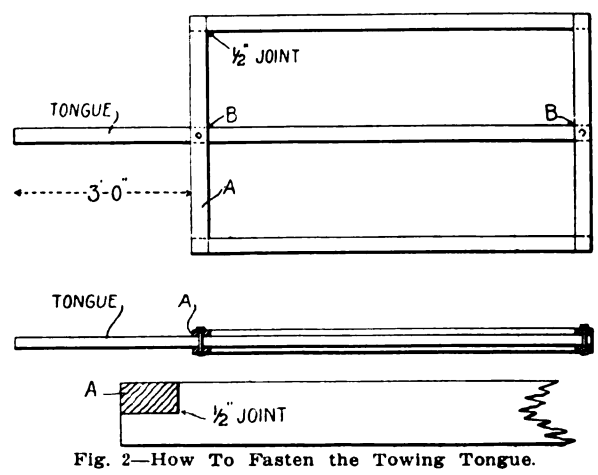


Fig. 2—How To Fasten the Towing Tongue.

car. This leaves the tongue free at the car. Take a heavy spring and set it so that the load will be about four inches in front of the center of the sill or box. Set the spring under the axle as in Fig. 3, if possible. That is why you should use a rather heavy spring.

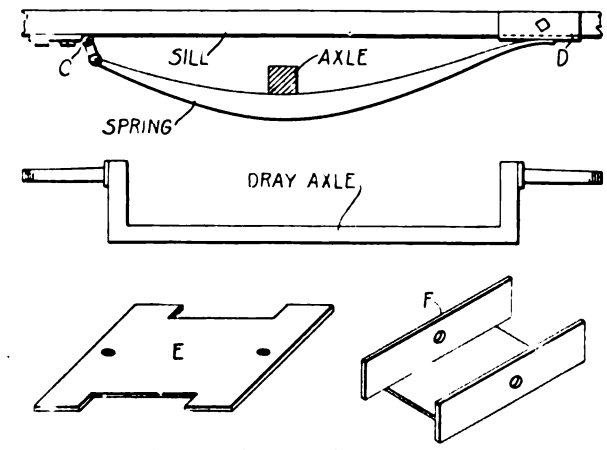


Fig. 3—Application of the Spring and How To Bend the Axle.

Have the load down as close to ground as possible. That's why the old style dray was so successful. Fasten the front of the spring to the shackle C and make a slotted piece as shown at E. Bend it so that it will look like F end ways, and the slots will be on the inside.

The two holes are for bolts to hold it on the sill at D. This will take care of the spring action and E will form the wearing plate connection on back of the Ford car.

Make two irons to fit around the housing and two irons to fit over the drive shaft housing behind the gear housing and the irons G G in Fig. 4 will fit in between the pieces. This braces the ball connection just as the Pitmond connection on the mower. This allows a side sway of the 800 pounds, when it begins to swing.

Take any good old wagon axle and make it straight. Any machine or lathe man can turn it up. Use the 30x3 front wheel for Ford car. There is something about a trailer that is interesting. It doesn't wear out a

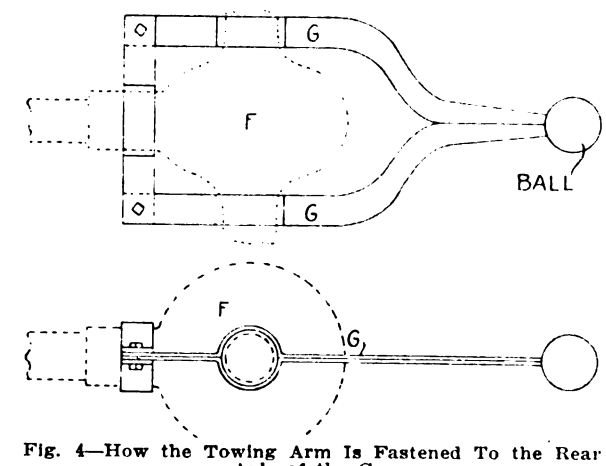


Fig. 4—How the Towing Arm Is Fastened To the Rear Axle of the Car.

tire or casing like anything else. They will last longer than the 30x3 front wheel on the Ford car.

You can buy front wheels for $1.25, less the hub. The 30x3 is a good size and will do the work. Use a tight tire, for if you put on a loose tire it will creep and cause you trouble. This holds good anywhere.

TRAINED MEN WANTED.

Men or women who have a scientific education, particularly in higher mathematics, chemistry, physics and French or German, and who are not subject to the draft for military service should take the Civil Service examination for Government positions in the examining forces of the patent office.

At the present time there is a big call for especially trained persons in this department. The details of the examination, places of holding the same, etc., may be had upon application to the Civil Service Commission, Washington, D. C., or to the Department of Interior, United States Patent Office, Washington, D. C.

Digitized by Google

BLACKSMITH & WHEELWRIGHT

The Pioneer Journal of Its Class in the World.

Member of the Audit Bureau of Circulations.

PUBLISHED MONTHLY BY

M. T. RICHARDSON COMPANY,

71-73 MURRAY STREET, NEW YORK.

POST OFFICE BOX, 654. TELEPHONE—7377-7378 Barclay.

CHICAGO OFFICE, 608 SOUTH DEARBORN STREET.

Entered as second-class matter at the Post Office in New York City.

M. T. RICHARDSON, President and Treasurer
F. R. WHITTEN, Secretary
M. T. RICHARDSON, Editor
FRANK L. AVERY, Managing Editor

F. R. WHITTEN, Advertising Manager
H. F. LUDINGTON, Western Representative
GEO. A. SMITH, Eastern Representative
FRANKLIN MYERS, Art and Copy Dept.

FOREIGN AGENTS:

NEW ZEALAND
MR. R. HILL, Matlock House, Davenport, Auckland, New Zealand.

GREAT BRITAIN
ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance.....$1.00
One Copy, six months, in advance.....60 cents
Single Number.....10 cents
Canadian subscriptions.....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English Money.

Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

ADVERTISING RATES SUPPLIED ON APPLICATION.

SPECIAL NOTICE

Subscribers failing to receive their magazine regularly will favor us by giving us notification to that effect.

CHANGE OF ADDRESS

Subscribers who desire the address of their paper changed should send us the old as well as the new address.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

OUR EDITOR'S LETTER.

Every time I have looked over The B. and W. for the past few months I felt that there was something lacking in it and I have been cudgeling my brains to find out just what that "something" was.

When I sat down to punch out this editorial page, this month, like a flash I found what was the trouble—just as plain as day—just as plain as the nose on my face (rather a big one too), and I almost found it last month when I wrote the editorial, "Our Subscription List is a List of Our Friends." I'm pretty well acquainted with all the readers—but they don't know me.

Every time I write anything in the magazine I crawl behind the word "us," or "we," and so you never really get a letter from me. Every time I get a letter from one of you it makes me feel good, and so I have decided to write you a little letter every month—maybe about the weather—maybe about the war—or most anything; but it will be my only chance to meet you or greet you.

A short time ago I received a letter from a brother in California; he writes me quite regularly and you see his letters often in the Workshop Experience Department. His name is Mr. Ott and though I have never met him I feel just like asking him out to dinner—he is so jovial and fine. I can imagine him as being a great big fellow, with a kind face and honest disposition—ready to give everyone a "square deal." That's just the way his letter always sounds.

He is so very willing to help everyone out that I feel as though I couldn't do enough for him. If the world were peopled with men like him there would never be any wars or fights and our lawyers would all have to go to the poor farm.

It is men like him; men that are willing to help; men that go out of their way to do a fellow worker a good turn, that make life worth living. And then, too, when a man does something he is proud of, or a kindness toward a fellow man—it makes him feel pretty good—it does me at least, and I guess I'm just like most other men.

Iron and Coal Are Important Products; Do Not Waste Them

DOUBTLESS our readers are beginning to realize that the blacksmith business today is being hit upon all sides, and especially at the present time the worries are increasing. Iron is beginning to increase in value. Coal also is becoming a scarce article.

The foresighted blacksmiths already have a stock of both iron and coal on hand. We advised all our readers early in the spring to purchase both of these essentials, and if you followed our advice, you have stock on hand to last you well into next spring, and by that time we expect to have bill kaiser begging for mercy.

If, however, you were unable to carry coal or iron in stock, you had better do your best to obtain both of these things right away. Don't make the mistake, however, of purchasing too much. Buy just enough to supply your present demands and the estimated demands for the next six months. In that way you will not stand the chance of losing money should iron drop in price. Then again you will not rob other blacksmiths of their iron.

We Should Not Allow Such a Waste of Power at Niagara.

IN an address delivered before the Schenectady Section of the American Institute of Electrical Engineers Mr. C. A. Winder recently made the statement that 3,000,000 horse-power could be developed by the water flowing over Niagara Falls without impairing their scenic grandeur. This power when converted into electricity would mean a saving of 52,000,000 tons of coal a year and the release for other purposes of 62,000 cars now used to transport this coal. He stated further that Niagara is an ideal location for the electro-chemical industry. He goes on to say: "Not a shell is made that is not shaped by electrically made abrasives. The electric furnace from which the armor plate is poured uses electrodes made from coal by the aid of electric power, the resisting power of this same steel is given by electrically made ferro alloys. Merchant vessels are now using smoke buoys in which quantities of phosphorus and other electro-chemical products are burned, emitting large quantities of smoke, thus protecting the boat from the submarine." Its products also go into high explosives, airplanes, balloons and almost every tool of the modern army. War demands many things not produced in time of peace. The electro-chemical industries already located at Niagara make use of the 250,000 horse-power developed on the American side and formerly imported another 150,000 from Canada. Owing to the increased needs of the Dominion, much of the latter has been shut off. The full utilization of the power of the falls would not benefit the present generation alone; the world's supply of coal is not inexhaustible, and the day will come when other sources of energy must be found.

Let Us Anticipate Our Needs and Conserve Our Resources

EVERYONE remembers the old fable about what Mother Hubbard did when her dog was hungry. You remember how surprised she was and how hard it was upon the dog when she opened the cupboard door and discovered that instead of the nice fat bone which should have been there, she found nothing but a lot of empty shelves?

That is one of the things old Uncle Sam may "run up against" if everyone does not watch out. At the present time there is an alarming shortage of coal and iron and undoubtedly this shortage will become more acute as the war advances.

Production of raw iron and coal at the mines must be increased. If there are not men enough to mine the coal, men must be drafted into this service. Under no consideration should men be taken from the mines and put into other work, for if this is done we may find ourselves in a situation where we have plenty of men to manufacture articles, but nothing to manufacture these articles with.

Our readers can do their part by conserving both iron and coal at the present time. Just remember that if you do not do your part willingly at present you may be forced to do it in the near future. The Government must have the raw products for carrying on the war, and unless we conserve our resources we are bound to suffer.

The Blacksmith Can Make Money By Building Car Bodies.

WE want to call the attention of our readers to an article dealing with the making of a trailer car for a small automobile. Now is a good time to build such a vehicle. A trailer car is much more practical than an ordinary lumber cart and the average blacksmith should be able to build one in his spare time. He should find a ready sale for it to some neighboring farmer who owns an automobile. In fact he may be able to sell many such machines if he is "on his job." The blacksmith should file away in his brain all the different ways in which he can make money by his labor. While he is busy in the spring, he should look ahead to his dull months and plan out some way for making the dull months bring in an income. There are many ways in which he can utilize his time during the slack season and we suggest one in the trailer car.

Shall We Continue to Publish Articles Relating to Automobiles

SHORTLY after the last issue of the "Blacksmith & Wheelwright" was off the press we received two letters in this office from two of our subscribers and both of them happened to live in the same state. One of these subscribers said that he hoped that we did not intend to make the "Blacksmith & Wheelwright" magazine an automobile publication—the other subscriber complimented us upon the fact that we were trying to help the blacksmith out, by giving him automobile information.

We answered the first subscriber and told him that we did not intend to devote this magazine to the automobile field. The "Blacksmith & Wheelwright" has always been published for the blacksmith. Its editorial policy has always been to help the blacksmith and wheelwright in every way possible and in following this editorial policy we have been obliged to publish automobile, truck and tractor stories.

We feel that in this way we are helping the blacksmith as much as possible. We know that in many parts of the country blacksmithing does not pay, and that both the blacksmith and wheelwright are forced to take up other branches of the trade in order to make enough money to live.

The blacksmith has been termed the king of mechanics. In this issue we are starting a series of articles, which go to show that the art of blacksmithing is one of the oldest in existence. Blacksmiths carried on their trade many thousands of years ago, and it necessarily follows that the blacksmith is one of the most skilled in the working of metals.

The blacksmith then should be the logical man to repair automobiles in a small town. He is the first one to whom the automobile owners go. If he is familiar with the construction of these machines he can add to

Digitized by Google

his income by repairing automobiles, without interfering with his other work.

We have in mind a small blacksmith shop in this state; that is to say, it was small when it was founded,—at the present time the blacksmith employs two blacksmith helpers and six automobile repair men. He has a complete smith shop, a fairly complete machine shop and equipment for repairing practically any automobile. This blacksmith is not "putting all of his eggs in one basket." We wish that more of our readers would write in and tell us what they think of our magazine. We want to publish stories to interest the majority of our subscribers, but, unless we know just what they want we cannot do this. Sit down to-day and write us a little note, for you will surely benefit by it.

The Common House Fly Is a Dangerous Insect, Swat Him.

THE ordinary house fly is an innocent looking insect. We get so familiar with him that he doesn't appear to be in the slightest degree dangerous. And yet it has been discovered that the fly has no equal as a germ "carrier," as will be understood when it is stated by the highest authority that as many as five hundred million germs have been found on the body of a single fly.

The fly is a "carrier" of the germs of typhoid fever, and other diseases, including, perhaps, infantile paralysis. It is only within a few years that the people have awaked to the necessity of "swatting the fly," wherever he can be found, and that work should be done this Summer, as vigorously as ever. All windows and outside doors should be carefully screened, and every fly that comes into the house should be destroyed by a fly swatter, or something else. The United States Government makes the following suggestions for the destruction of the house fly:

It says that formaldehyde and sodium salicylate are the two best fly poisons. Both are superior to arsenic. They have their advantages for household use. They are not a poison to children; they are convenient to handle, their dilutions are simple, and they attract the flies. The following is approximately the correct strength for the use of formaldehyde: 3 teaspoonfuls of the concentrated formaldehyde solution, commercially known as formalin, to a pint of water. Similarly, the proper concentration of sodium salicylate may be obtained by dissolving 3 teaspoonfuls of the pure chemical (a powder) to a pint of water.

Here are some simple preventives recommended by the Government: "Any odor pleasing to man is offensive to the fly, and vice versa, and will drive them away. Take five cents' worth of oil of lavender, mix it with the same quantity of water, put it in a common glass atomizer and spray it around the rooms where the flies are. In the dining-room spray it lavishly even on the table linen. The odor is very disagreeable to flies, but refreshing to most people."

Geranium, mignonette, heliotrope and white clover are offensive to flies. They especially dislike the odor of honeysuckle and hop blossoms.

According to a French scientist flies have intense hatred for the color blue. Rooms decorated in blue will help to keep out the flies.

Mix together one tablespoonful of cream, one of ground black pepper, and one of brown sugar. This mixture is poisonous to flies. Put in a saucer, darken the room, except one window, and in that set the saucer.

To clear the house of flies, burn pyrethrum powder. This stupefies the flies, but they must be swept up and burned.

The solutions described above may be kept in a container, made as follows: An ordinary thin-walled drinking-glass is filled, or partially filled with the solution. A saucer, or small plate, in which is placed a piece of white blotting-paper cut the size of the dish, is put bottom up over the glass. The whole is then quickly inverted, a match placed under the edge of the glass, and the container is ready for use. As the solution dries out of the saucer the liquid seal at the edge of the glass is broken, and more liquid flows into the lower receptacle. Thus the paper is always kept moist.

CARRIAGE DEALERS' ANNUAL EXHIBITION.

During the week commencing September 23d, 1918, in Cincinnati, Ohio, will be held the forty-sixth annual meeting of the Carriage Dealers' National Association. At the same time and in the same building will be held the annual exhibition of parts of vehicles, automobiles, models, new inventions, harnesses, horse equipment and materials pertaining to the carriage, wagon, automobile and accessory industries, all in elaborate display.

The committee have arranged with the Hotel Gibson for the staging of this exhibition, and all of the different parts of the convention will be held in this hotel. The exhibits must be either by active or associated members of the association and confined to the subjects as listed above. No finished vehicles will be admitted.

The exhibits can be placed in position on Saturday, September 21st, and must remain upon exhibition until Thursday, September 26th. The following program has been adopted:

On Tuesday, September 24th, a general meeting of the association will be held at 10 o'clock and will last until noon. On Wednesday, September 25th, there will be no morning meeting, but instead there will be a meeting of all vehicle builders at 3 o'clock p. m. On Thursday the general meeting of the association will begin at 10 o'clock.

Those concerns desiring to obtain space for the exhibition should write to Henry C. McClair, Secretary, Mt. Vernon, New York. Floor space only will be sold. The hotel will probably provide desks, chairs, tables, etc., as desired, and a list of recommended local dealers may be had upon application to the Superintendent of Exhibits.

The space allotted to any exhibitor must not be sublet to any exhibitor not a member of the association. This exhibit bids fair to be well attended for the very reason that the exhibits are not restricted to carriage and wagon appurtenances, but thrown open to automobile exhibits as well. Doubtless many of our readers will gain much information in attending this show. Further details may be had from the secretary, whose address is given above.

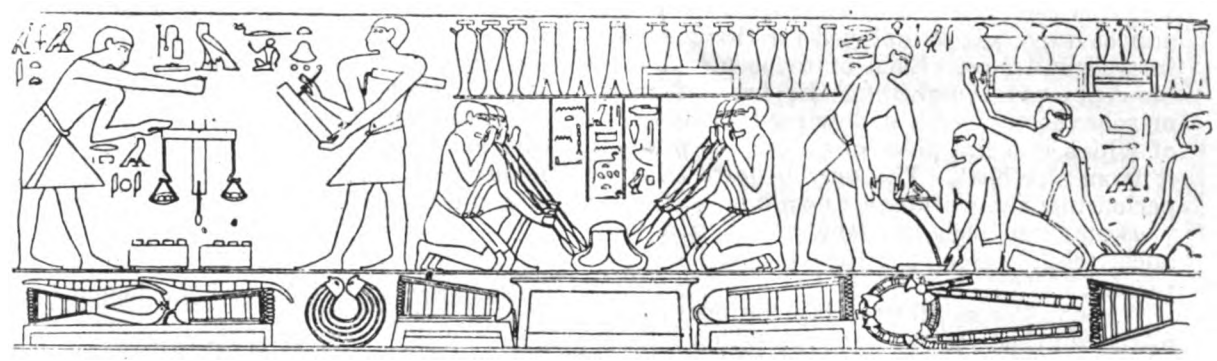
An Illustrated History of Smithing

Part 1—The Blacksmith at the Dawn of History and the First Forms of Tools Used by the Workmen

BY H. H. MANCHESTER

Historic pictures of ancient blacksmithing which were published in former numbers of this magazine have aroused so much interest that I have been asked to go further into the subject.

To start at the beginning, what was the condition of blacksmithing at the dawn of history? In answering this question, the "dawn of history" may well be considered the period of the first dynasties in Egypt, five or six thousand years ago. At that time the rulers of the Nile valley had just begun to depict on the walls of their rock tombs the most important scenes of their official and every-day lives. From these pictures, as well as from articles discovered in the tombs themselves, it is possible to get quite a conception of conditions then existing in industry.



Scene 1—Smiths Weighing Metal, Blowing a Furnace, Casting and Beating, 5500 Years Ago.

The metal worker, it is important to observe, was not then a specialist, as he is at present. There was no blacksmith, goldsmith, coppersmith or tinsmith, but one general smith, who wrought in all available metals, as well as even in flint.

At the beginning of historical records, Egypt was just advancing from the Stone to the Copper Age, and there is little doubt that the most ancient smiths wrought in both materials. Stone axes, adzes and hammers without handles were still in use; knives, saws and sickles of flint were still common; while bone pins, needles, awls and even drills were long retained.

The Coming of Copper.

When copper came in to take the place of stone it was beaten into much the same form as its stone prototypes, and from the pictures it is often impossible to tell the material of which the tool or utensil was composed.

Gold was also wrought by the smiths as early as prehistoric times. A particularly interesting example is a flint knife with a beaten gold handle which dates back before the First Dynasty.

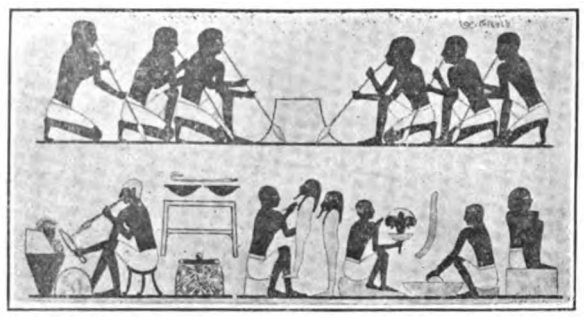
Silver was known, but had to be imported from abroad, probably from Asia Minor, and because of this was considered more valuable than gold.

The earliest knowledge of iron must go back to almost as early a date. A flat plate of this metal has been discovered fastened between two inner stones of the great pyramid of Gizeh, which was erected in the



Scene 2—Smiths at Work 5500 Years Ago. In This Scene Is Shown the Workmen Beating, Blowing a Furnace, and Weighing Metal.

Digitized by Google



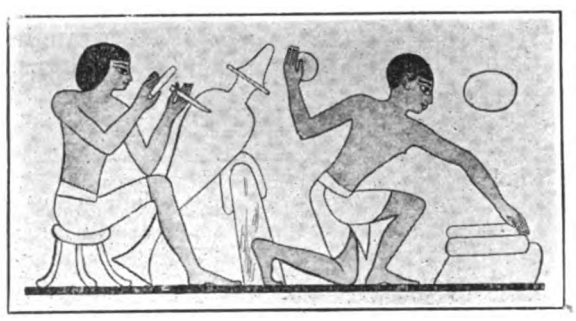
Scene 3—Showing Men with Blowpipes at a Furnace, 4500 Years Ago, Above. Below, a Man at a Furnace with Tongs and Blowpipe. Making and Painting Metal Statues, 4500 Years ago.

Fourth Dynasty, possibly 5,800 years ago. There is little doubt, however, that although the Egyptian smith occasionally worked in iron, it did not become common until some 2,000 years later.

Tin was not produced in Egypt, and probably was not imported until the time of the so-called Middle Kingdom at Thebes, 1,500 years later. Its principal use was to be mixed with copper in forming some sort of bronze. Just how early the Egyptians learned to do this we do not know, but no bronze relics are recorded from the era of Memphis, which includes the first six dynasties.

The Earliest Pictures.

Only a few pictures of smiths at work which date from the Old Kingdom of Memphis, from 5,500 to 6,000 years ago, have been discovered. In one of these a workman at the right of the picture is beating a piece of metal. His hammer is merely a stone in the form of a half globe without a handle. His anvil is simply a flat rock placed on what is probably a wooden block. In the center, two men are seated by a fur-



Scene 4—Engraving Vases and Shaping Them 4500 Years Ago.

nace, which is in the shape of a jar with a segment out of the upper part of one side. The fuel used is probably charcoal which was almost universally employed for this purpose in ancient times. Each of these men has a blow pipe for quickening the fire. This is merely the tube of a hollow reed, at one end of which is a fire piece of pottery to protect it from the heat. The only bellows at this period was the workman's own lungs. Other workmen are weighing the metal in a balance, while a scribe is keeping tab on the results.

A second scene illustrating the operations of the smiths is even more interesting. Here the workman at the right is weighing the metal and the ever present scribe is recording the weights. In the center, several workmen with blow pipes are seated around a small furnace. The material to be melted seems to be enclosed in little jars of pottery, the smallness of which implies that the metal was precious. In the next scene to



Scene 5—How They Polished Metal Vases 4500 Years Ago. Note the Rest for the Vessel.

the left, workmen are pouring the contents of one of these jars into what is probably a cast. From this scene and from relics that have been discovered it is believed that casting of the softer metals was already practiced. At the right of the picture several workmen are beating metal into a more finished form.

Besides the tools already mentioned, the Egyptian smith under the first dynasties used knives and saws of flint and copper, chisels of stone and copper, drills of flint and smoothers of sandstone. He was enabled to drill, chisel and saw stone and copper by the use of sand to increase the cutting power of his tools.

The First Machine Tool.

The bow drill had probably already been invented, and if so may be considered the first attempt at a machine tool. In this the bow string was wrapped around the drill, which was turned when the bow was drawn back and forth. The bits were separate from the drill, and this hand was protected by half of a palm nut, against which the drill was turned.

Many of these tools long showed and in fact still show their descent from flint originals. The jagged teeth of the saw is still patterned like the edge of a chipped flint while the point of the bit is still given the shape of a flint drill. For several thousand years the smith made the Egyptian sickle of wood with bits of flint inserted to give cutting teeth.

The smith of course manufactured all such tools for the use not only of himself but for others. Besides such products, he made all sorts of metal utensils, vases and furniture. He manufactured even wire by pounding the soft metal into a thin plate, cutting it into strips, and then beating it round.

Altogether, the smith at the beginning of history was the representative of an immensely important industry, the development of which in Egypt probably goes far to explain the superiority of the Egyptians to the surrounding peoples and the rise of civilization along the Nile.

(To be continued.)



We were very much pleased at the flow of the letters which we received in response to our plea for contributions to this department. We had begun to think that our readers were losing interest and that they did not care to see the "Work-Shop-Experience" department maintained in the magazine. This department depends entirely upon contributions from our readers.

If you have any good ideas or interesting suggestions don't hesitate to forward them to this office. In fact, even an interesting letter is very acceptable. Don't hesitate to write if your grammar is poor, or because you don't write well. Just because you cannot make a clear sketch does not excuse you from sending in some sort of a contribution. We promise not to reproduce your letters in pencil or to insert your sketch, as you sent it, if you don't want us to.

Our editorial and artist's departments are here just to fix up your letters or make the sketches just as you want them to appear. We have a book in this office entitled "Steel Working and Tool Dressing," which we usually send to those subscribers who are kind enough to send us an interesting letter for this department.

Soldering Cast Iron and Hardening Plow Shares.

From G. W. Hardy, Idaho.—In the last issue of The Blacksmith and Wheelwright I noticed a request from J. K. B., of Rhode Island, for a method of soldering cast iron. I have done some of that kind of work and will give my way. First I file the parts to be soldered and wash well with a solution of blue vitriol dissolved in warm water. I then apply muriatic acid, in which are dissolved a few pieces of zinc. I then apply the solder and rub well with a soldering iron. If the piece is very heavy, the solder will stick better if the piece is well warmed.

In the same issue Mr. H. H. Braaks, of Iowa, asked for a way to harden plow shares. I get very good results from the following: I have a barrel which I have cut off just above the bulge so as to get the most room possible, and it holds about 40 gallons. With the water I mix about five pounds of salt and one box of lye, to every 20 gallons of water. I heat the share to a very dark red evenly along the edges from the point to the heel by moving it through the fire slowly with its edge down. Then I plunge it in the barrel, edge down, unless it is very long, when I plunge it in endwise. If one is careful not to get it above a dull red, it will harden and will not break easily.

Curing a Balky Horse.

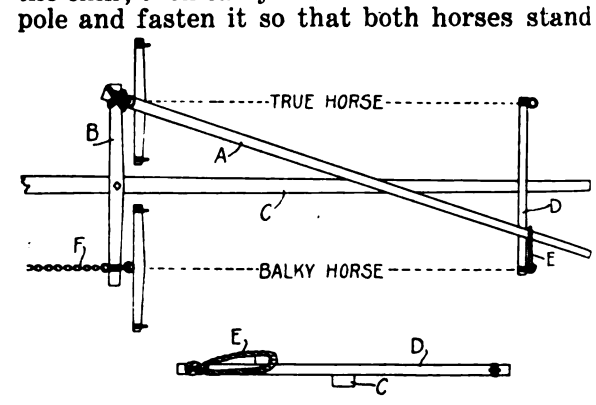
From J. G. Jones, Colorado.—Mr. M. R. Lessing of Mississippi, in the June issue of The Blacksmith and Wheelwright, wants to know how to cure a balky horse and I am sending a rough sketch of how I broke them 30 years ago when I was on the farm.

In the first place, you want a good, true horse, one that will pull every time you give him the word to go. Take a good stiff pole, A, long enough to reach from the end of the double-tree B, to about 18 inches in front of the balky horse's head. Tie this pole fast and tight to the end of the double-tree as shown in the drawing and have it behind the true horse and across the tongue C as well as the neck yoke D, as shown.

Tie a short piece of rope, E, to the ring in the neck yoke and then bring the other end over the pole A and tie it to the neck yoke again, forming a loop for the pole to slide through.

Next take the stay chain from the true horse leaving it upon the balky one as shown at F. (If there are no stay chains, better put one on the balky horse as you will need it.)

Now hitch the team up and take a short piece of chain, tie one end to the ring of the balky horse's bridle bit and run it through the other bit ring, forming a loop beneath the chin; then carry the end to the end of the pole and fasten it so that both horses stand



END VIEW
How To Cure a Balky Horse.

about even on each side of the pole. It is best to leave about six inches of slack in this chain.

After you have arranged everything as above, start up the team and walk the horses around for a time, encourage the true horse to keep moving. I required about a day to break a horse but when the horse quit it quit for good.

It is always best to have a load of from 1,000 pounds to a ton on the wagon, for when the balky horse begins to dance, the load is more solid and harder to move than an empty wagon.

Digitized by Google

An Interesting Shop.

From Fred F. Kasserman, Illinois.—As it seems impossible for me to get time and things in shape to have a photo taken of my shop I am sending a pencil drawing which may benefit Mr. N. H. Browning, of Montana, in locating his machine tools, though I do not know if he has room on either side of his new shop for either light or entrance.

My shop fronts east with a side street on the north, a residence 16 feet south and back yard west. I can drive in front door outside, or back door. The shop is 25 x 70, two-story No. 2 paving brick. Have not floored upper story, as I use it for storing lumber, shafts, poles and other light material. If Mr. Browning will notice, all my machines are run from one line shaft and my shoeing floor is opposite both fires, giving ample room back of the horses to do repair work.

At present I have an International Manure spreader raised by the chain hoist, and yet have room for other work. The circle saw is used on same arbor as the emery wheel and is centered with a window, giving light for grinding and a place for ripping long lumber, letting it extend through the window.

The drill is most used, therefore place it as close to the forges as possible. Often in riveting pieces it is necessary to drill one or two holes, put in rivets and drill more holes, thereby saving time, especially in repairing sickles and much other work. Just outside the 3 ft. 8 in. door on the south is a well, where we get our water to drink and use. You will note that the engine is just inside the door. The Disc sharpener is set back by the wall and the belt is taken off and hung up on pins when not in use, thereby giving room to take down or put up iron on the rack which is directly behind the Disc sharpener.

The grindstone is not used so much and is located so that in grinding sickles they extend out under the disc sharpener one way, and across the doorway the other.

The trip hammer is located between the two forges, which I think is the proper place, being in easy access to either forge.

The mower knives and accessories are used only for a short season, therefore place them back out of the way, if you are working mower over, run it into that corner and all your material will be handy there.

The tire oven is placed where it is shown, out of the way and in reach of a few mower knives and accessories. No. 1 vise bench in the corner is shelved underneath, the top shelf is a sliding one and contains a set of standard screw plates and taps, as well as a Dalton axle cutter threading right or left up to 1¼. The second shelf contains toe calks, both sharp and blunt. Third shelf contains toe calks stored in back part, "sharps" in summer and "blunts" in winter, also box of old nuts, washers and rivets; a box of bits to fit brace for drilling iron or wood.

My drill is a Champion No. 203, bolted to a post set purposely for the drill, and set low enough to turn easily by hand with hole cut in floor for boring tire, cutting tenons and other work which at times is necessary.

The space above corner bench No. 1 is boarded up and nails driven to hang tools, such as hammers, wrenches, hack saws, pipe wrenches, large monkey wrenches, fullers, hand punches and a number of other articles always needed near a vise bench and anvil.

The anvil tools proper, are set in a board which the "E" blower is set on. Over the blower is a board on which hand punches, cold chisels, center punches, a can of Trinkle tempering compound, is always found and handy. I am very much pleased with the arrangement of my shop and can't see how I could arrange it better for my class of work.

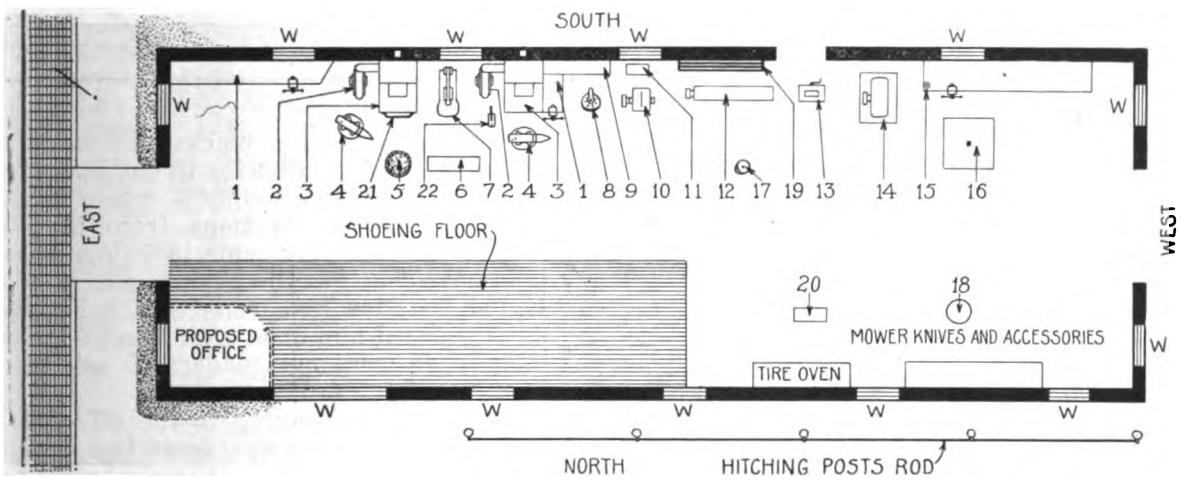
I built my tire oven after the pattern of W. S. Owens, of South Dakota, published in the October, 1917, issue of the Blacksmith and Wheelwright, and suggest Mr. R. Tedingham, of Montana, obtain a copy of both October and November, 1917, issues of Blacksmith and Wheelwright, as both issues obtain a tire heating oven of different type.

I have been located in my present shop just about one year and think I have a good location, while do not try to get a location which is high priced. If one does good work the public will find his place.

As I do not wish to take up too much space of your valued paper, I trust the article will help some hard working smith to some extent. I want to thank Mr. W. S. Owens for his courtesy, and sketches of tire oven in last October issue, also the measurements accompanying it.

Referring to the sketch, the following key will explain the machinery:

W, indicates windows; 1, vise bench; 2, electric motor blowers; 3, forges; 4, anvils; 5, tub; 6, tire shrinker (large stove in winter); 7, trip hammer; 8, drill;; 9, bolt rack; 10, emery and circle saw; 11, tire bolting machine; 12, disc sharpener; 13, grindstone; 14, engine or motor; 15, woodwork bench; 16, wheel bench; 17, half-ton chain hoist; 18, stove; 19, iron rack; 20, cold tire shrinker; 21, tong rack; 22, small shear.



Sketch Showing Mr. Kasserman's Shop.

Adopts New Prices.

From H. A. Nash, Canada.—I am sending you a copy of the new prices adopted by the smiths in our town, as I see that other readers of The Blacksmith and Wheelwright and associations have published their prices. The enclosed is a copy of the prices used in an advertisement in the paper in our place. The prices went into effect Jan. 1, 1918.

Horseshoeing.

Common, each	75c
Bar Shoes, each	$1.25
Removes, each	40c
Never Slips and Giant Grip Shoes	1.00
Never Slips or Drive Calks, each	8c

Plow Work.

New Points, each, per share	$1.25
Sharpening Shares, 12 and 14-inch	35c
Sharpening Shares, 16-inch	40c
Steam Plowshares, Pointing, each	1.50
Steam Plowshares, Sharpening, each	50c

Tire Setting.

All Tire Setting up to 3-inch, each	$1.25
Wagon Axles	6.00
Wagon and Sleigh Poles	4.75
Buggy Poles, single bend, each	5.00
Buggy Poles, double bend, each	5.25

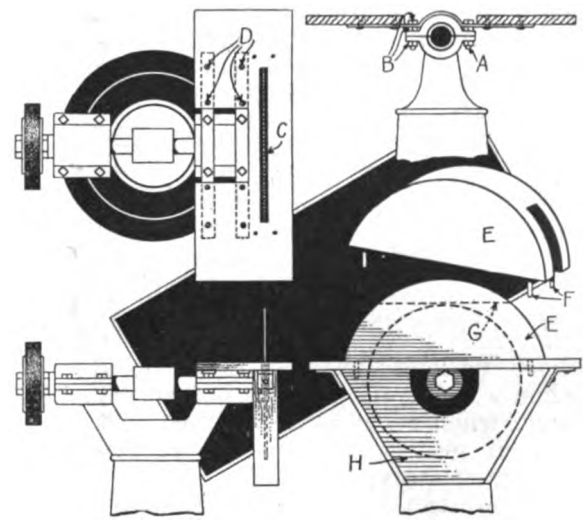
Sleigh Work.

Sleigh Runners, 2-inch	$4.00
Sleigh Runners, 2½-inch	4.50
Sleigh Bunks, 5-inch	4.00
Sleigh Bolsters, each	3.25
Sleigh Shoeing, 5/16x2¼, each	2.50
Sleigh Shoeing, 5/16x2½, each	2.75
Cutter Shoeing, per pair	6.00
Light Bobs, each	2.50

(Signed) H. A. NASH,
PETER SPOGBUG,
W. M. ELSTROM.

Emery Wheel and Circular Saw.

From L. L. Ott, California.—In my shop I have a machine tool that might interest some of your readers. It is a combination emery wheel and saw stand, and originally was just for an emery wheel. As we have lots of boxes and scrap lumber, I decided to convert the stand so that I could use it for a saw, and with it cut wood for the stove.



The Emery Wheel and Circular Saw Stand.

If you will refer to the sketch herewith you will get an idea of how the stand was remodeled. A shows the bolts which clamp on frame in place. These bolts should be long and threaded most of their length and serve to hold the bearing caps in place also. The bolt should be put into place in the bearing and a nut B used to clamp down the cap, the clamps for the stand should next be put into place and the lock nut clamped over them.

For the stand I use a board 16 by 20 inches, 1 inch thick. It is countersunk so that the retaining bolts do not extend above the surface. C shows the hole for the saw and D the holes through which the board is bolted to the braces or frame.

A circular saw is a dangerous tool unless it is protected. For this purpose I cut two half circles and nailed them together so that they would fit over the saw as shown at E. F represents four screws with their heads removed, and these screws fit into holes in the stand when the saw is not in use.

Beneath the machine I arranged a similar guard, as shown at H. But in this case I used two braces or angle irons and bolted the guard to the table. The whole device didn't cost me over $1.50, while the saw cost but $3.00.

Prices in Oregon.

From F. C. Moore, Oregon.—I give below prices I am receiving for my work for horseshoeing:

Nos. 1, 2 and 3 shoes	$2.25
Nos. 4 and 5	2.50
Nos. 6, 7 and 8	3.00
Horse resetting up to No. 5 shoes	1.50
Horse resetting over No. 5	2.00
Bar shoes	1.00 to 1.50
Shoe shoeing stallions	5.00 up
Resetting	4.00
Four hand made racing plates	4.00
Four new rubber pads, No. 4	5.00 or less
Nos. 5 and 5½ pads	5.50
No. 6 pads	6.00
No. 6½ pads	6.50 to 7.00
Leather pads	.30 to .50
Plow work sharpening, 12 in	.35
Plow work sharpening, 14 in	.40
Plow work sharpening, 16 in	.45
Plow work sharpening, 18 in	.55
Taking off share, extra	.10
Road plow, each	.75
Plow pointed	1.25
Road plow pointed	1.50
Plow cutter sharpened	.25
Spring teeth	.10
Spike teeth, each	.02½
Sharpening road gardner blade	4.00
Kimball knives	.25
Acme knives sharpened	.25

Digitized by Google

An Economical Water Supply System For Blacksmith or Farmer

How the Farmer or the Blacksmith May Install at Low Expense a Dependable Water System

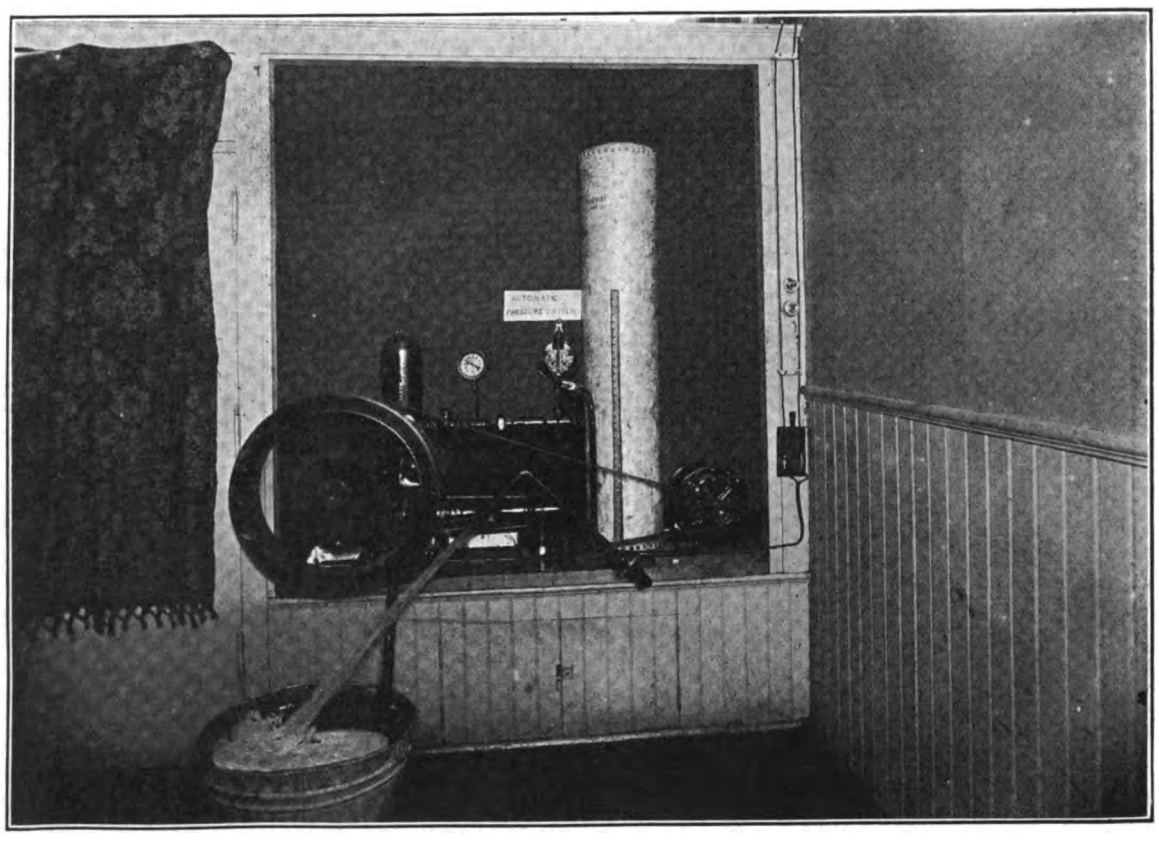
The question of water supply is one of the most important of all the problems which confront the dweller in suburbs and country. A large part of this problem has to do with distribution and pressure. This subsidiary problem is comparatively easy of solution after we have successfully dealt with pressure.

If we have pressure in sufficient degree and at the times desired, the distribution involves but little more than arranging a system of piping and providing for its protection against the weather. But to develop sufficiently high pressures through the many short and long periods of the day and month when water is desired has proven rather difficult, when we add—as we must—the necessity of getting the desired results in an economical way.

A high tank will give us the pressures we want. It will operate automatically in doing this. All we have to do is to keep the tank filled to a certain level. Many have no doubt been deterred from adopting this system by the considerable first cost of the tank, tower and pumping equipment. I do not mention the cost of the distributing system: that cost will belong to pretty much all supply systems.

Then there is the high pressure pneumatic system. Water is pumped into a sealed reservoir in which an air cushion is trapped. The result is a compression of the cushion, which then reacts against the water, producing a pressure which may be utilized t drive it through the pipes. This system is very convenient and satisfactory; but it also involves a fairly heavy first cost for the big tanks and the pumping apparatus.

Many will accordingly be more interested in a system which has recently been tested



Showing the Farm Water Supply System in Use.

out by a large gas and electric company in California. This system has proved to be quite economical under the conditions obtaining at the test. The principal condition was the existence of a supply of electric current. The apparatus consisted of a ½ horse-power single phase motor, a double-acting piston pump, a 30-gallon drum, and an automatic pressure switch.

The motor was connected with the pump by a suitable belt. The automatic switch was arranged to cut off the current from the motor when the tension of the air in the drum rose above a pre-determined point—say 30 pounds per square inch—and to close the circuit and consequently start the motor again, as soon as the tension fell back to the predetermined point mentioned. The drum itself was, in addition to its connection with the automatic switch, also connected with the pump and with the distribution system.

The operation is simple. At the beginning, the drum will have in it no water at all—only air. The switch will now be closed, so that the motor will start to run and the pump to perform its duty. We will suppose that no cock of the distribution system is open. Consequently, the water as it is pumped will rise to higher and higher levels in the drum. The air will withdraw into the remaining space, its quantity remaining always the same.

The maintenance of the amount of air simultaneously with the reduction of its volume will result in a constantly increasing tension of this air. After a time, this tension will rise to the point for which the automatic switch has been adjusted. When this point has been fairly reached, the switch will operate to shut off the electric current and so stop the motor. We may now draw off water by opening one or more cocks on the distributing system. If we draw off no more than the pump supplies, we shall have continually a pressure of 30 pounds less the loss through friction and the overcoming of hydraulic heads.

In one plant tested, the water was elevated from the source of supply for a vertical distance of 17 feet and discharged in a jet having a pressure of 15½ pounds. This pressure of 15½ pounds might have been utilized to elevate the water through a distribution system to a level of, say, 22 feet and still have a fair flow.

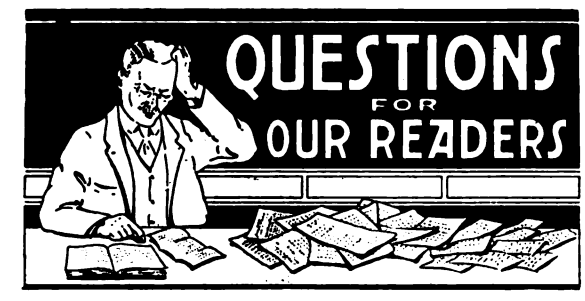
A plant such as this has a capacity of 13 gallons per minute. It is capable of taking water from a well of moderate depth and putting it into the second story and there maintaining a reasonable pressure. Perhaps the test which will set forth its capacity most clearly is one where the plant is put to the service of sprinkling a lawn. Two fair sized sprinklers will demand no more than 10 gallons per minute; so that this small plant will easily meet this requirement continuously. When the sprinklers are shut off, of course the whole capacity of the plant is available for other service.

This type of plant seems especially suitable for small requirements. Similar plants are in operation at various ranches in California where there is a good sized lawn near the house and where there is stock to the number of 15 or 25 head to water. These plants are performing their service satisfactorily, so it would appear.

Of course, a larger drum could be installed. This would not add so very much to the first cost, and would have the advantage of making the plant capable of supplying for a longer interval a considerable demand for water.

As the pressures contemplated are low, these tanks or drums do not have to have the high qualities otherwise necessary. The requirements as to power of the pumping plant are in excess perhaps of what would be necessary with high pressure pneumatic equipment; but this will not make such a great difference in cost. If a ½-horse-power motor and corresponding pump will perform the duty, the expense will not be so much in excess of a ¼-horse-power motor and a corresponding pump.

The automatic character of the plant is of course in its favor. Absolutely no regular attention is required.



A week or so ago, a blacksmith wrote in and said he would subscribe to our magazine if we would answer a couple of questions for him; also answer questions from time to time. If he had only come in to see us we would have done like the French general does when he is bestowing a medal of honor upon a soldier—kissed him upon both cheeks, for we certainly do want our readers to ask questions.

There is an old saying to the effect that any fool can answer a question—but it takes a wise man to ask one—that's why we reserve the right to answer, rather than ask the questions.

When you pay your subscription money to us, brother blacksmith, you are entitled to something more than twelve numbers of The Blacksmith and Wheelwright—you are entitled to the answers to any questions you may ask, which pertain to the trade or to the automobile business.

We answer all of our readers by letter, then publish the questions so that any other reader can answer the questions as well. In that way you get the benefit of our experience as well as that of all our readers.

"The Wise Man Asks Questions—That's Why He is Wise."

Why Not Organize?

From Lewis & Lacy, Kentucky.—If any of the brother smiths who are not organized will write us we will gladly give them a cheap plan for a uniform price list for their country or city.

The blcksmiths should be brothers, instead of enemies and competitors. The blacksmith nearest to us is our best friend. We won't allow anyone to knock him, without taking his part. It's not more work that we want—it's a better understanding that leads to better prices.

Welding Malleable Iron.

From W. Shaw, Canada.—I would like to know how to weld malleable iron. If I s using brass as a filler rod, should I bring the malleable iron to the flowing stage while I use the brass, or should I simply bring the iron to a white heat and allow the brass to flow onto it?

Digitized by Google

Northwestern Horse Nails.

The Northwestern horse nails havo been favorably known throughout the country for a great many years. These nails are made of the best quality material. They are perfect in form and finish and they will hold the shoe firmly on the horse's hoof. The re-enforced point makes this nail easy to drive and safe to use. Readers should write for complete literature and samples of these nails to the Union Horse Nail Co., Chicago, Ill.

Tools and Supplies.

The Beckley-Ralston Company, 1801-1815 Michigan avenue, Chicago, Ill., carry supplies, tools and equipment for garages and repair shops. Their line is exceedingly large and their prices extremely low. Our Blacksmith readers who are in the repair or accessory business should obtain the prices from this house. In writing for their catalogue No. 82, be sure and use your letterhead, for this company sells at wholesale prices only to dealers. Their prices are confidential.

Have You a Crippled Horse?

As evidence that Absorbine is successful on Splints, I quote the following letter, received under date of October 2, 1909, from R. S. Monsell, West Hampton, L. I. He writes: "Some time ago I wrote you in regard to my two-year-old colt having a bunch on his shin. Some called it splint and some said it was where he had cuffed himself. At any rate, he was so lame I could not use him. I purchased a can of your Absorbine, used it by rubbing it on two or three times a day. Have taken the bunch off and last night drove him, and he is going sound as a dollar. Also made a liniment as per your book on page 35, which has taken the soreness out."

Absorbine, a splendid preparation for Bog Spavin, Thoroughpin, Curb, Shoe Boil, Capped Hock, Puffs and Swellings, etc., is sold at druggists for $2.00 a bottle, or sent express prepaid upon receipt of price. Write for further information, W. F. Young, P. D. F., 55 Temple street, Springfield, Mass.



Free 512 PAGES OF BARGAINS

POST PAID

WE WANT TO SEND YOU THIS 512 PAGE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

Tells how you can work up a profitable auto supply and repair business.

Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories

1117 W. 11th Street, Cleveland, Ohio, U. S. A.

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

will be inserted under this head at 3 cents a word, including the address, for each insertion, payable in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York.

PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT.

Patents

PATENTS FOR INVENTIONS.

H. W. T. JENNER, patent attorney and mechanical expert, 622 F Street, Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trade-marks registered.

PATENTS.

C. L. PARKER, attorney-at-law, and solicitor of patents. American and foreign patents secured promptly. Handbook for inventors sent free upon request. McGILL BUILDING, Washington, D. C.

For Sale

FOR SALE.

Shop and garage, well equipped for all kinds of work. Work for two men. Good big territory to draw from. Will sell a new Barcus shoeing stock and shoeing vise separately. CHAS. O. MORRIS, Sand Springs, Montana.

FOR SALE.

No. 4 scientific cold tire setter, hydraulic, hand or power, cheap. Sets tires up to 4 inches. Owner retiring from business on account of age. Write J. H. TUTTLE, Lake Charles, La.

FOR SALE.

Immediate delivery, new machines: 13 in. Jointers, $75; 9 in. Jointers, $50; 5 in. Jointers, $30; 20 in. Band Saw, $45; 14 in. Pattern Lathe, $100; Emery grinder, $25; 50 Circular saws, Band saws, and 12 in. Jig saws; send for list. 2 in. Bignall & Keeler Pipe Machine, $35, second hand; also a number of Saw Arbors, Grindstone Fixtures, Cutter heads for wood table jointers, and combination outfits. Send for circular and prices. W. L. SHERWOOD, Kirksville, Mo.

FOR SALE.

In a good locality, blacksmith shop, stock, tools and all. Garage in connection. Can rent building if desired. For information write OLE SLOTTO, Fillmore, N. D.

For Sale

FOR SALE.

Blacksmith woodworking tools and stock in best city in California. Brick building, 40 x 60 feet. Splendid location for blacksmith and auto repairing. Fine climate. For particulars address G. E. STEWART, Blackstone and McKinly Ave., Fresno, Calif.

FOR SALE.

Carriage and Wagon Shop. Main building 80x26, with hand elevator. (Three floors). Wing, 24x12. (Two floors). With stock and tools: One 36" Band Saw with Tilting Table. One Buzz Saw. One 10 h.-p. Electric Motor. One 24" Wood Planer. One Drill Press. Two Fires with tools for same and furnace for heating heavy tires inside of shop. Or will sell stock and tools and rent shop to responsible party. Reasons for selling, poor health and advancing age.

Also have one-family brick house; 11 rooms and bath, with hot water heat. Address C. W. BENDER, 1019 Seymour Avenue, Utica, N. Y.

FOR SALE.

Carriage implement and blacksmith business in a lively town of 6,000. Railroad center; located on Colorado River. Fine farming country; healthy. Doing a good business. Will sell half interest or the entire business. Good reasons for selling. Address all letters to P. O. BOX 608, Smithville, Tex.

FOR SALE.

Blacksmith Shop, stock and tools. Shop 28x40. Small house in connection 16x24. Good location. Work year around. Information, S. T. FIELDING, Gruver, Emmet County, Iowa.

FOR SALE.

Old established horseshoeing and wagon shop doing a good business. Also nine-room house and barn with 1¼ acres of land. Will sell at a bargain. Reason for selling, poor health. For price and particulars write JOSEPH ALEXANDER, R. D. No. 2, Winsted, Conn.

FOR SALE.

Blacksmith shop and lot can be bought for a reasonable price in wideawake town of 4,000. No opposition. For further information write WEHE REALTY CO., Pasco, Wash.

Tires

BUY EARLY AND SAVE MONEY

Double Tread Tires and Tubes

GUARANTEED

Come to the Tire Clearing House—here are prices—clear cut and plain as daylight. We buy wholesale the best "try out" Tires—and you get the benefit—you want truthful tires, and truth is never crushed to earth if *given* a square deal—real truth is puncture *proof*—

SO ARE OUR TIRES.

Size	Plain	Non-Skid	Tubes
28x3	$4.40	$4.95	$2.00
30x3	5.50	6.05	2.00
30x3½	6.60	7.15	2.50
32x3½	7.15	7.70	2.75
34x3½	8.25	8.80	3.00
30x4	7.70	8.25	2.75
32x4	8.80	9.35	3.00
33x4	8.80	9.90	3.50
34x4	8.80	9.90	3.50
35x4	9.90	11.00	3.60

Get your order in quick for goods listed here—by all means get in touch with us for further information about our special process—it means money in your pocket. Get in right—write today—yes—today.

Look up rating in Dunn's or Bradstreet's.

Size	Plain	Non-Skid	Tubes
36x4	$9.90	$11.00	$3.60
32x4½	9.90	11.00	3.75
34x4½	11.00	12.10	4.00
35x4½	11.00	12.10	4.10
36x4½	11.00	12.10	4.25
37x4½	12.10	13.20	4.35
34x5	11.00	12.10	4.50
35x5	13.20	14.30	5.00
36x5	13.20	14.30	5.00
37x5	13.75	14.85	5.00

For (non-skid) sizes up to 32x4, 50c extra; all other sizes $1.00 extra.
For rebuilding your old tires we charge you 60% of the above prices.

B. LIBEN & COMPANY

261-A West 54th Street NEW YORK CITY 112-A East 110th Street

THE HOME OF DOUBLE TREAD TIRES

For Sale

FOR SALE.

Blacksmith and garage business and all tools and machinery for sale cheap. Address J. W. CHAMBERLAIN, Lackawaxen, Pike County, Pa.

FOR SALE.

Blacksmith shop and tools. In good town. Doing good business, mostly cash. Have been at the business over twenty years and want to quit it. Address FRANK KAFKA, Enterprise, Kans.

FOR SALE.

18 in. by 8 ft. Fitchburg screw cutting lathe complete, countershaft, face plate, etc., $275; 36-in. band saw, $125. J. L. LUCAS & SON, Inc., 3 Fox Street, Bridgeport, Conn.

FOR SALE.

One Brooks Cold Tire Setter No. 2. In good shape. Cheap. Cost $155 year ago Will go cheap. Going out of business. W S. WAGONER, Nola, Ark.

FOR SALE OR TRADE.

Power blacksmith shop with good business. Address E. J. DORMAN, Wakeeney, Kansas.

FOR SALE OR TRADE.

Only blacksmith and wagon shop in a good, live North Dakota town. Will sell at a bargain or trade for North Dakota land. JOHN LIEN, Sheyenne, North Dakota.

FOR SALE OR TRADE.

Blacksmith shop, power machinery and tools. Brick building, 25x50. Good business. Reason for going out of business, short of help. Address WILLIAM ZIETLOW, Annandale, Minn.

Miscellaneous

AUTO TIRE VULCANIZING PLANTS.

We buy, sell or exchange. Catalog is free—you save 30%. Instruction book on Vulcanizing, 75c. EQUIPMENT CO., 360 Eighth St., Cincinnati, O.

PRINTING FOR BLACKSMITHS.

Write for prices on printed letter heads, envelopes, statements, etc. NEWS PRINTING CO., Stockton, Ill.

Wanted

WANTED.

Second hand House Cold Tire Setter, with punch and shear, or with shear. Must be cheap. J. L. SCOTT, 4048 Laclede avenue, St. Louis, Mo.

WANTED.

Good all-around blacksmith. Young married man preferred. Top wages for right man. Address M. W. ABTS, Morrill, Nebr.

WANTED.

To buy a good blacksmith stand with from ten to forty acres of land, with some fruit. Address with particulars to L. L., box 33, Prairie View, Ill.

Gears

GEARS & SHAFTS

Transmission gears and shafts, differential gears and axle shafts in stock for over 125 makes (500 models) of pleasure cars and trucks. Obsolete, Orphan and Current models.

Dealers and repairmen, send for our 125-page price list and make a good profit on your repair work.

AUTO GEAR CO., Inc.

844 Eighth Avenue, New York, N. Y. 1461 S. Michigan Ave., Chicago

275 Marietta St., Atlanta, Ga.

NO SECOND-HAND PARTS OR JUNK

Tires

DOUBLE TREAD TIRES

GUARANTEED

SPECIAL OFFER TO AGENTS. Write for Catalogue

Get our special price on new tires

M. LIBEN & CO.

205-AK West 48th St. New York City

Double Tread Tires

Notice Our Prices Before Going Elsewhere

PRICE LIST

Size	Plain	Size	Plain
30x3	$5.00	35x4	$9.00
30x3½	5.50	36x4	9.50
32x3½	6.50	36x4½	10.00
32x4	7.00	36x5	10.00
33x4	7.50	37x4½	10.00
34x4	8.00	37x5	10.50
34x4½	8.50		

For Non-Skid, 50 cents more on all sizes.

We Carry a Full Line of New and Used Tires & Tubes

GINSBERG & BERKOWITZ, Inc.

236 WEST 48th STREET, NEW YORK

Personal

PERSONAL.

BROTHER—Tobacco is foolish, expensive habit, injurious to heart, nerves, eyesight and sexual system. Quit easily with nature's pleasant antidote. Glady send necessary particulars. G. S. STOKES, Mohawk, Florida.

F. S. Paints.

Many blacksmiths manage to pick up quite a few odd dollars during the winter time by painting carriages as well as automobiles, particularly the latter, and we know of no better colors or paints than those manufactured by Felton, Sibley & Co., 136 North 4th street, Philadelphia, Pa. The colors and paints as well as the automobile and garage dressings put out by this manufacturer are the result of years of experience, experiment and constant study.

Nicholson Files.

The file that is the cheapest is not always the best—it all depends upon who makes the file. The product made by the Nicholson File Company of Providence, R. I., is well known throughout the industry and the trade mark "Nicholson" stands for quality.

These files are made by men who have spent many years of their lives in the study of cutting tools and the product has been produced only after many experiments. Nicholson Files are said to cut the best and wear the longest and be comparable with any other file on the market.

Mails Probably Lost.

Any of our readers who sent inquiries in response to the full-page advertisemen of the Mechanical Hammer Co. Ltd., Stayley Iron Works, Stalybridge England, which recently appeared in ou magazine, are urged to duplicate thes inquiries as we understand that severa mails have been lost owing to the depre dations of German submarines. Th Mechanical Hammer Company is, o course anxious to get the full respons from their advertising and we feel sur that our readers will be glad to compl with this request.

Digitized by Google

Index to Advertisers

Aetna Nut Co., horseshoe calks....Front cover
Akron-Selle Co., gears....243
American Calk Co., calks....Front cover
Anti-Borax Compound Co., welding compounds....3d cover
Armstrong Mfg. Co., bolt dies....242
Armstrong-Blum Mfg. Co., punches and shears....Front cover
Barcus Mfg. Co., horse stocks....227
Barnett, G. & H., Co., files and rasps, Front cover
Beckley-Ralston Co., supplies....226
Bertschy-Bermo Co., welding plants, Front cover
Bradley, C. C., & Son, shaft coupler 2d cover
Buchanan, C. G., Chemical Co., industrial chemicals....3d cover
Buffalo Forge Co., blacksmiths' tools....227
Burden Iron Works, horseshoes....3d cover
Bush Motor Co., automobiles....228
Butterfield & Co., taps, dies and screw plates....228
Campbell Iron Co., supplies....243
Canedy-Otto Mfg. Co., blacksmiths' tools....224
Capewell Horse Nail Co., horse nails, Front cover
Champion Blower & Forge Co., blowers....223
Champion Tool Co., blacksmiths' tools....222
Childs, S. D., & Co., steel stamps, Front cover
Columbus Forge & Iron Co., anvils....226
Columbian Hardware Co., vises....226
Cortland Welding Compound Co., welding compounds....4th cover
Cray Bros., blacksmiths' tools....241
Crescent Machine Co., woodworking machinery....226
Diamond Calk Horseshoe Co., horseshoes....244
Edwards, C. D., Mfg. Co., shears....243
Electric Blower Co., blowers....221
Electric Wheel Co., wheels....4th cover
Empire Mfg. Co., wheels....Front cover
Felton, Sibley & Co., paints....221
Firestone Tire & Rubber Co., tires....222
Fisher & Norris, anvils and vises....228
Franklin Steel Works, toe calks....244
General Welding Co., welding outfits 4th cover
Gogel Mfg. Co., tire heaters....242
Greenfield Tap & Die Corporation, screw plates and blacksmiths' machinery, 2d cover
Gwilliam Co., ball bearings....4th cover
Hart Mfg. Co., stocks and dies....4th cover
Harvey Spring & Forging Co., auto springs....228
Hay-Budden Mfg. Co., anvils....4th cover
Heller Bros., horse rasps, tools, etc....228
House Cold Tire Setter Co., tire setters, hollow and spoke augers....4th cover
Jenner, H. W. T., patents....241
Kerrihard Co., hammers....Front cover
Kimball Tire Case Co., tire protectors....243
Leonard-Morton & Co., shoes....221
Linde Air Products Co., oxygen....228
L. S. P. Calking Machine Co., calking machines....227
Macgowan & Finigan Cordage Co., hammers....4th cover
Mayer Bros. Co., hammers....2d cover
Ness, Geo. M., Jr., steel stamps....Front cover
Nicholson File Co., files and rasps....2d cover
Oneida National Chuck Co., chucks....4th cover
Ottawa Mfg. Co., kerosene engines....228
Parker, C. L., attorney....Front cover
Parks Ball Bearing Machine Co., woodworking machinery....226
Peck, Stow & Wilcox, pincers....244
Phoenix Horseshoe Co., horseshoes and toe calks....225
Porter, H. K., bolt clipper....4th cover
Prentiss Vise Co., vises....4th cover
Rosewater Electric Co., blowers....226
Sampson & Murdock, directories....243
Shaler, C. A., Co., vulcanizers....243
Sheldon Axle & Spring Co., axles....224
Standard Horse Nail Co., horseshoe nails, 4th cover
Standard Horseshoe Co., horseshoes, 3d cover
Star Mfg. Co., agricultural implements, 3d cover
Stokes Bros. Mfg. Co., rasps....Front cover
Superior Oxy-Acetylene Machine Co., welding outfits....Front cover
Thompson Tuyere Iron Co., tuyere iron, 4th cover
Union Horse Nail Co., horse nails....
Western Newspaper Association, books....221
West Tire Setter Co., tire setters, hammers....243
Whisler Mfg. Co., nut splitters, jointer heads....242-243
Witte Engine Works, engines....243
Young, W. F., veterinary remedies....228

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co. ....3d cover

Anvils
Columbus Forge & Iron Co....226
Fisher & Norris....228
Hay-Budden Mfg. Co....4th cover

Attorneys
Parker, C. L. ....Front cover

Automobiles
Bush Motor Co. 228

Automobile Springs
Harvey Spring & Forging Co....228

Axles
Sheldon Axle & Spring Co....224

Blacksmiths' Tools
Buffalo Forge Co....227
Butterfield & Co....228
Canedy-Otto Mfg. Co....224
Champion Blower & Forge Co....223
Champion Tool Co....222
Cray Bros. 241
Heller Bros. Co....228
Nicholson File Co....2d cover
Peck, Stow & Wilcox Co....244

Ball Bearings
Gwilliam Co. ....4th cover

Blacksmiths' Machinery
Greenfield Tap & Die Corporation..2d cover

Blowers
Buffalo Forge Co....227
Champion Blower & Forge Co....223
Champion Tool Co. 222
Electric Blower Co....221
Rosewater Electric Co....226

Bolt Dies
Armstrong Mfg. Co....242

Bolt and Rivet Clippers
Porter, H. K. ....4th cover

Books
Western Newspaper Association....221

Calking Machines
L. S. P. Calking Machine Co....227

Calks, Horseshoe
Aetna Nut Co....Front cover
American Calk Co....Front cover
Diamond Calk Horseshoe Co....244

Calks, Toe
Franklin Steel Works....244

Chemicals (Industrial)
Buchanan, C. G., Chemical Co....3d cover

Chisels
Champion Tool Co....222
Peck, Stow & Wilcox Co....244

Chucks
Buffalo Forge Co....227
Oneida National Chuck Co....4th cover

Directories
Sampson & Murdock Co....243

Disc Sharpeners
Mayer Bros. Co....2d cover

Drills
Buffalo Forge Co....227
Champion Blower & Forge Co....223

Engines
Ottawa Mfg. Co....228
Witte Engine Works....243

Farriers' Tools
Barnett, G. & H., Co....Front cover
Champion Tool Co....222
Heller Bros. Co....228
Peck, Stow & Wilcox Co....244

Files and Rasps
Barnett, G. & H., Co....Front cover
Nicholson File Co....2d cover
Stokes Bros. Mfg. Co....Front cover

Forges
Buffalo Forge Co....227
Champion Blower & Forge Co....223

Gasoline Engines
Witte Engine Works....243

Gears
Akron-Selle Co. 243

Hammers
Champion Tool Co....222
Kerrihard Co....Front cover
Macgowan & Finigan Cordage Co., 4th cover
Mayer Bros. Co....2d cover
Peck, Stow & Wilcox Co....244
West Tire Setter Co....243

Hollow Augers
House Cold Tire Setter Co....4th cover

Hoof Parers
Champion Tool Co....222

Hoof Nippers
Champion Tool Co....222

Hoof Shears
Champion Tool Co....222

Horseshoes
Burden Iron Works....3d cover
Diamond Calk Horseshoe Co....244
Phoenix Horseshoe Co....225

Horseshoe Calks
Diamond Calk Horseshoe Co....244

Horseshoe Nails
Capewell Horse Nail Co....Front cover
Standard Horse Nail Co....4th cover
Union Horse Nail Co....

Horse Stocks
Barcus Mfg. Co....227

Kerosene Engines
Ottawa Mfg. Co....228
Witte Engine Works....243

Nut Splitters
Whisler Mfg. Co....242-243

Oxygen
Linde Air Products Co....228

Paints and Varnishes
Felton, Sibley & Co....221

Patents
Jenner, H. W. T. 241
Parker, C. L. ....Front cover

Pincers
Peck, Stow & Wilcox Co....244

Punches
Champion Blower & Forge Co....223

Punches and Shears
Peck, Stow & Wilcox Co....244

Screw Plates
Butterfield & Co....228
Champion Blower & Forge Co....223
Greenfield Tap & Die Corporation..2d cover

Shaft Coupling
Bradley, C. C., & Son....2d cover

Shears
Edwards, C. D., Mfg. Co....243

Shoes
Leonard-Morton & Co....221

Spoke Augers
House Cold Tire Setter Co....4th cover

Steel Stamps
Childs, S. D. & Co....Front cover
Ness, George M., Jr....Front cover

Stocks and Dies
Butterfield & Co....228
Champion Blower & Forge Co....223
Hart Mfg. Co....4th cover

Supplies
Campbell Iron Co....243
Beckley-Ralston Co. 226

Swages
Champion Blower & Forge Co....223

Tires
Firestone Tire & Rubber Co....222

Tire Bending Machines
Buffalo Forge Co....227
Champion Blower & Forge Co....223

Tire Heaters
Gogel Mfg. Co....242

Tire Protectors
Kimball Tire Case Co....243

Tire Setters
Buffalo Forge Co....227
House Cold Tire Setter Co....4th cover
West Tire Setter Co....243

Tire Shrinkers
Buffalo Forge Co....227
Champion Blower & Forge Co....223

Tire Upsetters
Buffalo Forge Co....227
Champion Blower & Forge Co....223

Tongs
Champion Tool Co....222

Tool Grinders
Phoenix Horseshoe Co....225

Trucks
Akron-Selle Co. 243

Tuyere Irons
Buffalo Forge Co....227
Champion Blower & Forge Co....223
Thompson Tuyere Iron Co....4th cover

Veterinary Remedies
Young, W. F....228

Vises
Butterfied & Co....228
Columbian Hardware Co....226
Fisher & Norris....228
Prentiss Vise Co....4th cover

Vulcanizers
Shaler, C. A., Co....243

Wagons
Akron-Selle Co. 243

Welding Compounds
Anti-Borax Compound Co....3d cover
Cortland Welding Compound Co....4th cover
General Welding Co....4th cover

Welding Outfit
Superior Oxy-Acetylene Machine Co, Front cover

Welding Plant
Bertschy-Bermo Co. ....Front cover

Welding Supplies
Linde Air Products Co....228

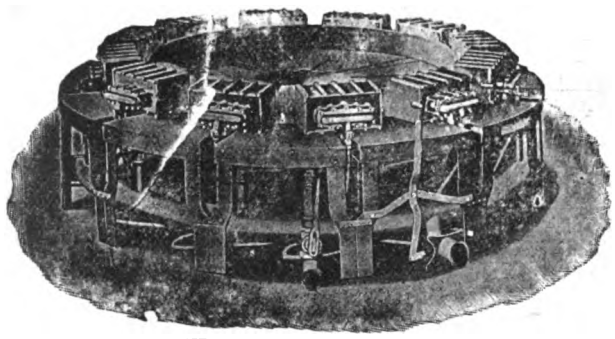
Wheel Dishers
House Cold Tire Setter Co....4th cover

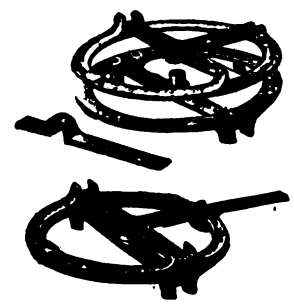
Wheels
Electric Wheel Co....4th cover
Empire Mfg. Co....Front cover

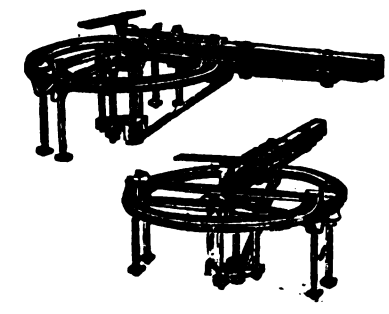
Woodworking Machinery
Buffalo Forge Co....227
Crescent Machine Co....226
Parks Ball Bearing Machine Co....226

Wrenches
Champion Tool Co....222

Wrenches (Knife Handle and Pipe)
Peck, Stow & Wilcox Co....244







TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.

OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.

Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE GOGEL MFG. CO., TOLEDO, OHIO.

THE ARMSTRONG MFG. COMPANY

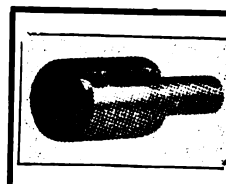
BRIDGEPORT CONN., U.S.A.

NEW YORK OFFICE 248 CANAL STREET

like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



"Makers of the Genuine ARMSTRONG Stocks and Dies."



THE only successful Chuck to hold square taper shank wood bits and drills so you can use them in your drill press. See the spring. It keeps the drills from dropping out of the chuck. Made right. Priced right. If your dealers won't supply you we can.

WHISLER MFG. CO., Gibson, Iowa

Subscribe to THE BLACKSMITH AND WHEELWRIGHT. $1.00 per year.

Len-Mort Shoes.

We want to call the attention of our readers to the advertisement of Leonard Morton & Co., Dept. 1208, Chicago, Ill., which appears in this issue. Because of the leather situation, the price of shoes is exceedingly high at the present time, nearly twice the price they were a few years ago.

Notwithstanding the extremely high prices prevailing, Leonard Morton & Company are retailing shoes at an extremely low figure and, what is more, they are willing to forward the shoes for examination. You only need to give your name, address, the size and width of the shoe you wear, and a pair of these shoes will be forwarded to you at once. If you are satisfied send them the money; if not, return the shoes.

Ferro Case.

Cyanide is poor stuff to keep lying around your shop and now that this chemical costs so much money, every blacksmith is wondering if there is not something or other he can use in its place for hardening steel. The C. G. Buchanan Chemical Company manufacture a non-poisonous chemical that is said to give the same results as cyanide. This product is called Ferro Case and readers will do well to investigate it.

History of the World.

Now that the big war is absorbing so much of our attention, we all like to know about happenings in the past and the different things that have led up to the present conflict. Our readers should investigate the set of books entitled "Ridpath's History of the World," published by the Western Newspaper Association, 140 South Dearborn street, Chicago, Ill. Should you care to find out about these books of history, write to the company whose address is given above and ask them for their thirty-two page free booklet, which will tell you all about the various volumes.

Harvey Springs.

Every country blacksmith, sooner or later, is called upon to replace both automobile and wagon springs and a large percentage of the smiths probably realize that the springs manufactured by the Harvey Spring and Forging Co., 919 17th street, Racine, Wisconsin, deserve their reputation. These springs are manufactured in very large numbers at low prices and are said to be unbreakable. The country blacksmith should have a catalogue, which he may obtain from this company, giving him the dimensions and sizes of the different styles of springs manufactured under the Harvey trade mark.

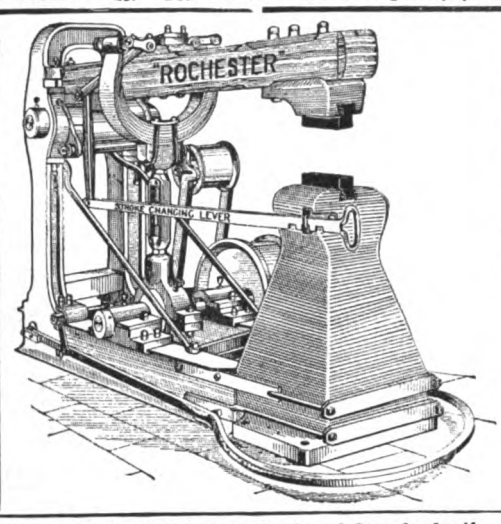
Digitized by Google

Boiling with Indignation is a Waste of Fuel—Don't Do It. Get the Right Equipment.

THE ROCHESTER HELVE HAMMER

is adjustable for length of stroke while running. The long stroke provides for handling larger work than other hammers of the same head sizes. The Hickory Helves give springy forging blows, combining the advantages of forging and drop hammer.

6 SIZES
2 Styles of Frames



THE ROCHESTER WEST TIRE SETTER

WEST HYDRAULIC SHELL BANDING MACHINES

Saves Energy. Does Quicker and More Satisfactory Work and Pays for Itself.

SEND A CARD TO THIS ADDRESS FOR OUR CATALOGUE AND PRICES

WEST TIRE SETTER CO.
ROCHESTER, NEW YORK

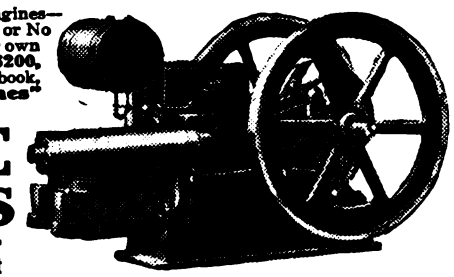
Direct to You—Factory Prices

BURN KEROSENE—BIG SAVING—BETTER ENGINES



Lowest factory terms on Engines—2 to 30 H-P. Cash, Payments or No Money Down—Write your own order and save $15 to $200, as explained in my new book, "How to Judge Engines"—sent FREE, postpaid.

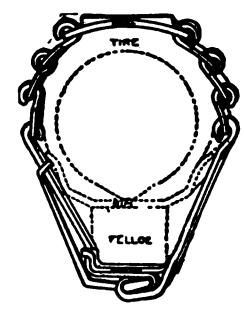
WITTE ENGINES
Produce Power at Lowest Cost



Built in the largest Exclusive Engine factory, selling direct. I build nothing else—back every engine I make with a good 5-Year Guarantee as to quality, durability, fuel requirements and workmanship. You take no chances. I guarantee safe delivery—make prompt shipment, all sizes: Stationary, Portable or Saw Rig. Money back if not satisfied on my new 90-Day Engine Offer. Write for new book to-day, and latest factory prices.—ED. H. WITTE, Pres.

32 YEARS SUCCESS

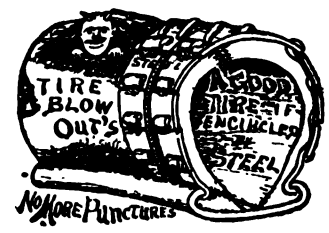
WITTE ENGINE WORKS
2445 Oakland Ave. Kansas City, Mo.
2445 Empire Bldg. Pittsburgh, Pa.



MUD CHAIN

Can be put on in a jiffy with one hand while standing on the run board. If you get in a mud hole, you will laugh out loud. Hook the ends together and pull the little lever and they are on tight. One or two will take you out of a hole, but it is better to use about 5 for continuous running. Good for blow-outs.

STEEL TIRE PROTECTORS



Tires can't wear out if covered with Steel. Try a few sections over any old blow-out. Tires are as flexible as ever. Can't Skid.

Special Inducements to Those in New Territory

KIMBALL TIRE CASE CO.
175 Broadway Council Bluffs, Iowa

Each Section 2 inches Wide, ¼ inch Thick
Write for Prices and Full Particulars



JUST PUBLISHED



AUTOMOBILE WELDING

WITH THE OXY-ACETYLENE FLAME

By M. KEITH DUNHAM

167 Pages. Price $1.00 Fully Illustrated

Sent Postpaid to Any Part of the World.

This is the only complete book on the "Why" and "How" of Welding.

EXPLAINS in a simple manner apparatus to be used, its care, and how to construct necessary shop equipment. Proceeds then to the actual welding of all automobile parts, in a manner understandable by everyone.

Gives principles never to be forgotten. Aluminum, cast iron, steel, copper, brass, bronze and malleable iron are fully treated, as well as a clear explanation of the proper manner to burn the carbon out of the combustion head.

AUTOMOBILE OWNERS, GARAGE AND SERVICE STATIONS, BLACKSMITHS AND MACHINE SHOPS, as well as industries using the oxy-acetylene flame, will find this book of the utmost value, since the perplexing problems arising when metal is heated to a melting point are fully explained and the proper methods to overcome them shown.

CONTENTS

CHAPTER I.—APPARATUS KNOWLEDGE.

Oxygen Supply—Care of Oxygen Cylinder—Acetylene Generator—Care of Generator—Regulators—Care of Regulators—Creeping Regulators—Gauges—Care of Gauges—Welding Torch—Care of Welding Torch—Effects of Heat—Hose and Goggles.

CHAPTER II.—SHOP EQUIPMENT AND INITIAL PROCEDURE.

Preheating Agencies—Welding Table—Location of Welding Outfit—Starting the Welding Outfit—Adjustment of Flame—Principle of Welding—General Welding Knowledge—Welding Rods and Fluxes—Choice of Tip—Expansion and Contraction.

CHAPTER III.—CAST IRON.

Simple Welding—How to Hold the Flame—Hard Cast Iron—Pin Holes and Blow Holes—Lug on Cylinder—Water Outlet—Cylinder Welding—Compression Head—Finishing and Testing—Scored Cylinders—Cylinder Parts—Fly Wheels—Pistons—Crank Cases—Babbitted Bearings—Valve Guides—Preserving Threads—Conclusion of Cast Iron.

CHAPTER IV.—ALUMINUM.

Use of—Welding Knowledge—Puddle System—Flux System—Comparison of Systems—Welding Rod—Preparation of the Weld—Inlet Manifold—Arm of Crank Case—Welding the Arm Without Taking Out the Motor—Break in the Body of Case Welding Cold—Wrong Method of Setting Up—Lug or Boss Welding—Preheating the Case—Gas Preheating Flame—One Side or Both—Collapse of Weld—Broken Bearings—Direction of Welding—Shrinkage Cracks—Missing Parts—Finishing—Die Mould Castings—Body—Other Parts.

CHAPTER V.—STEEL

Welding Knowledge—What the Flame Does to Steel—The Welding Rod—Simple Welding—Position of Flame—Reinforcing the Weld—Frame Welding—Lengthening the Chassis—Tube Housings—Worn Parts—Gear Welding—Case Hardening—Light Metal Welding—Gasoline Tank—Welding Adjacent to Rivets—Shaft Welding—Construction of Parts.

CHAPTER VI.—MALLEABLE IRON COPPER, BRASS, BRONZE.

How to Detect Malleable Iron—Brazing Malleable Iron—Rear Housing—Reinforcing the Braze—Brazing Tube to Housing—Building Up Worn Parts—Copper—Brass and Bronze—Silver Soldering.

CHAPTER VII.—CARBON BURNING AND OTHER USES OF OXYGEN AND ACETYLENE.

Principle of Carbon Burning—Method of Operation—Lead Burning—Soldering—Case Hardening—Heating Uses.

CHAPTER VIII.—HOW TO FIGURE COST OF WELDING.

Oxygen Consumption—Dissolved Acetylene Consumption—Torch Consumption Test—Acetylene Generator Consumption—Cost Card—Conclusion.

ADDRESS ALL ORDERS TO

M. T. RICHARDSON COMPANY, 71-73 Murray St., NEW YORK

The Campbell Iron Company

Wholesale Automobile, Garage, Machinists, Blacksmith and Implement Supplies, Hardware Specialties. Duplicate Parts for Fords carried in stock.
Write for New General Catalogue.
817 Cass Avenue St. Louis, Mo.

MAKE MONEY REPAIRING TIRES WITH A

SHALER Vulcanizer



Mends 12 Casings and 200 Tubes a Day. Anybody can operate it. Has Automatic Heat Control—SAFE! Can Be Had With Gas or Gasoline Burner.
Write at once for Catalog.
C. A. SHALER CO., 1805 Fourth St., Waupun, Wis.

What is it worth to you to have a correct list of over 300,000 Business Firms in New England?
You may have just such a list for only $7.50
Write the Sampson & Murdock Co.
246 Summer St., Boston, Mass.
and ask for the New England Business Directory



THE WOOD WORKER'S FRIEND

Get directions for building table and operating our Jointers. This information is valuable to wood workers. We manufacture 20 styles and sizes. Try a Jointer Head 30 days, if you are not pleased, return at our expense. Get prices.
Manufactured by WHISLER MFG. COMPANY, Gibson, Iowa

Edwards Shears

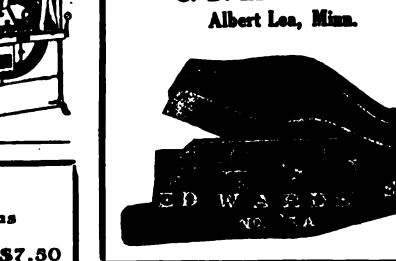
For twenty-four years the Two Leading Low Priced Shears in the U. S., representing the Greatest Value for the Least Money.

No. 5, weighs 200 lbs., cuts 4x½ inch soft steel.
No. 10, weighs 430 lbs., cuts 4x¾ inch soft steel.

At their price you should have had one long ago. Order one from the first iron man that calls on you. They All Sell Them.

Write for descriptive circular and prices.

C. D. EDWARDS MFG. CO.
Albert Lea, Minn.



"GEARS AND WAGONS"

Selle Gears

Forty years of success has placed "Selle Gears" and Wagons in the hands of the largest wagon users in the world. Express and Transfer Companies, Department Stores, etc., specify "Selle Gears" and will take no other after once tried. 230 Page Catalog Free.

THE AKRON-SELLE CO. Akron, Ohio

916 Pages instead of 824 **1918—SEVENTH EDITION** 3362 Illustrations instead of 2000

$3.82 prepaid **DYKE'S AUTO ENCYCLOPEDIA** $3.82 prepaid

Entirely re-written, hundreds of illustrations and many new subjects added. Practically a new book. A non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 50 Instructions—Simplified and Practical.

3362 Illustrations—the kind you understand at a glance.

2 Supplements, part printed in two colors, treating on the construction, operation, repairing and adjusting of the FORD and PACKARD—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.

776 illustrations and 279 pages on Electric Ignition, Electric Starters and Generators, etc.

81 pages and 79 illustrations on the Delco system alone.

60 pages and 254 illustrations on Adjustments, Tests, etc., of leading Electric Systems.

154 pages and 1189 illustrations on Repairing.

Oxy-Acetylene welding. Axle, Differential and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.

27 pages and 180 illustrations on Tires and Tire Repairing.

44 pages and 119 illustrations on Carburetion.

89 pages and 291 illustrations on Engines and Parts.

16 pages on Digest of Troubles.

6000 lines to the Index. This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. Index begins on colored paper, easy to refer to.

Dictionary is also included, which gives the meaning of motoring terms.

Inserts: There are five—printed in colors. New features you never before saw or heard of in one of the inserts.

Additions to the Seventh Edition:

TRUCKS, TRACTORS, MOTORCYCLES, AIRPLANES AND AIRPLANE ENGINES

HOW TO BECOME AN EXPERT AUTOMOBILE MECHANICIAN

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion subject so thoroughly, you can adjust any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

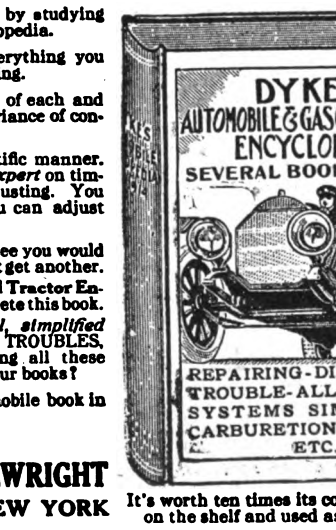
You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical Automobile book in America. Price $3.82, prepaid.

Address all orders to

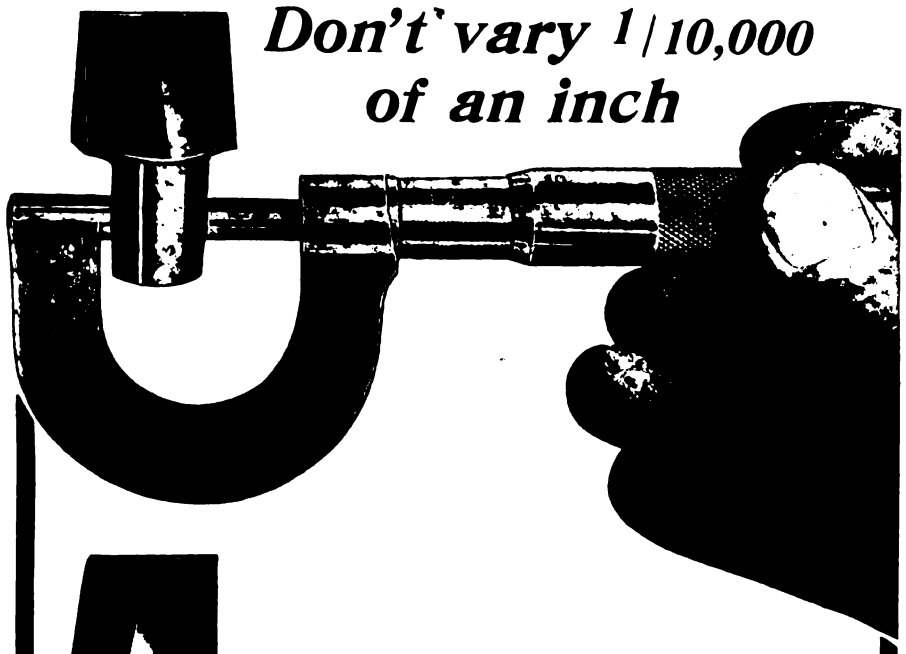
THE BLACKSMITH & WHEELWRIGHT
73 MURRAY STREET NEW YORK

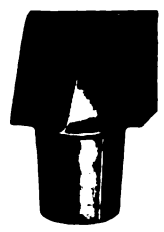


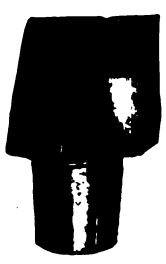
It's worth ten times its cost if only placed on the shelf and used as a reference.

Digitized by Google

Don't vary 1/10,000 of an inch









The Calk Shank fits the Calk Hole absolutely tight

That's why

DIAMOND Calks

don't twist in the shoe or fall out.

They *stay in* the shoe, so they *can* wear out.

Diamond Calks with Diamond Shoes are the best combination manufactured.

Diamond Calk Horseshoe Co.

Duluth, Minn.

Extract from page 324 of the June, 1917, issue of The Horseshoers' Journal.

Horseshoeing business in Albany opened very quietly this spring. In fact, we still feel the harmful effect that the drive calks has done the business, but strikes in the building line has also effected trade, a large number of horses owned by contractors are remaining unshod, and are still carrying (to May 10th) their winter shoes of drive calk variety.

CHARLES W. KIRK.

ARE YOU *in this boat?*



John Wiseman Says to Bill from Missouri:

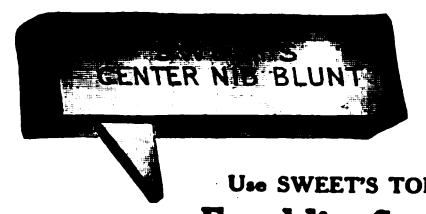
"It's time for a lot of you fellows to wake up. Ram your hand down into your pocket and see if the cash jingles with the merry sound as of yore.

"If not, why not?

"There's a Reason, of course. And that reason is that you've been using calks that the owner can replace himself. Naturally his horses come less frequently to your shop. You have less business—less cash to jingle in your jeans.

"Do you get the idea?"





Every set of welded calks you put on helps to keep your shop full because the horses must be brought to you to have the worn calks replaced. And the users are satisfied users, too.

Use SWEET'S TOE CALKS—"The Cold Cut Dreadnaught."

Franklin Steel Works, JOLIET, ILL. CAMBRIDGE, MASS. HAMILTON, ONTARIO.

No. 2.

THE SCREW-CUTTING LATHE

How to select, set up, adjust and operate

By JAMES F. HOBART, M. E.

THIS book is a concise and exhaustive treatise on everything pertaining to the SCREW-CUTTING LATHE, including costs, erection, operation and adaptability. It is written by one who thoroughly understands his subject in all its details, and is so copiously illustrated that everything in it will be readily understood.

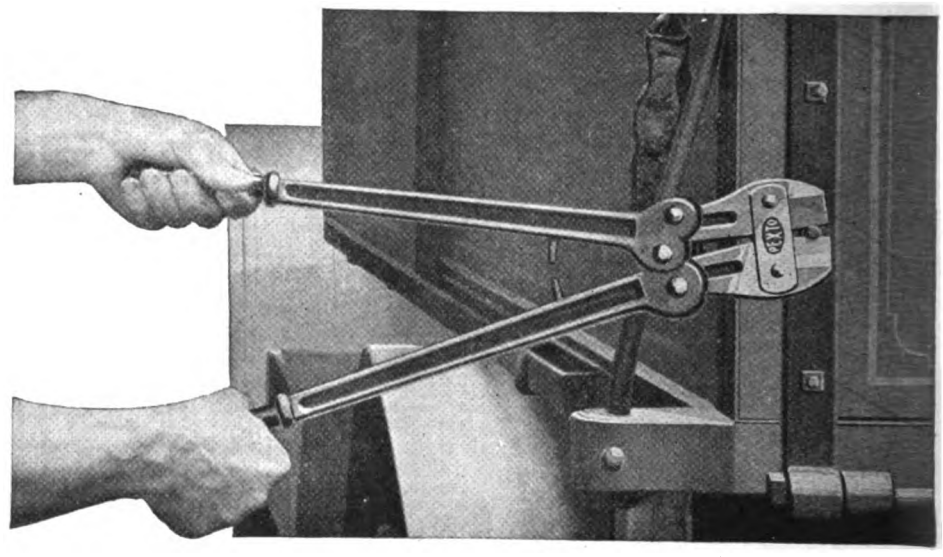
It will be found invaluable to those desiring to know just how a Screw-Cutting Lathe should be run.

There are ***92 illustrations,*** and the book is substantially bound in cloth. ***Price, $2.00.*** A copy will be sent postage prepaid to any address on receipt of price.

M. T. RICHARDSON CO.

PUBLISHERS

71-73 Murray St., New York



Pexto in Quality Moderate in Price

Read the heading again!

Here's a strongly constructed cutter that will clip bolts or wire up to ¼ inch—a moderate priced cutter with all the speed and easy cutting qualities of a high priced tool.

Designed especially to take care of the large variety of work for which you do not feel justified in buying a more expensive tool.

Sizes range from 9 inches to 15 inches, capacity to ¼ inch, medium in weight.

There's a large line of other Pexto Tools, including pincers, nippers, parers, butterises, farriers' hammers, etc.

If your dealer cannot supply you, write us.

The Peck, Stow & Wilcox Co.

PEXTO MFRS. Mechanics' Hand Tools, Tinsmiths' and Sheet Metal Workers' Tools and Machines, Builders' and General Hardware.

Southington, Conn. Cleveland, Ohio

Address correspondence to 209 W. Center St. Southington, Conn.

PEXTO BLACKSMITHS' TOOLS

Digitized by Google

THE NEW YORK PUBLIC LIBRARY

C. B. N. A. Convention Number

THE BLACKSMITH & WHEELWRIGHT

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U. S. Patent Office.

Entered as Second-Class Matter at the Post Office at New York, N. Y., under the Act of March 3, 1879

Vol. LXXVIII. No. 4 NEW YORK, OCTOBER, 1918 TERMS: One Dollar a Year. Foreign, $1.50. (6s. 3d.)

SELDOM SEE

a big knee like this, but your horse may have a bunch or bruise on his ankle, hock, stifle, knee or throat.

ABSORBINE

TRADE MARK REG. U.S. PAT. OFF.

will clean it off without laying up the horse. **No blister, no hair gone.** Concentrated—only a few drops required at an application. $2.50 per bottle delivered. Describe your case for special instructions, and Book 8 R free. ABSORBINE, JR., the antiseptic liniment for mankind, reduces Painful Swellings, Enlarged Glands, Wens, Bruises, Varicose Veins; allays Pain and Inflammation. Price $1.25 a bottle at druggists or delivered. Liberal trial bottle postpaid for 10c.

W. F. YOUNG, P. D. F., 55 Temple St., Springfield, Mass.

STEEL STAMPS
BURNING BRANDS
RUBBER STAMPS
STENCILS
GEO. M. NESS, JR.
61 FULTON ST. NEW YORK
Send for price list.

SUREGRIP CALKS
American Calk Co.
DETROIT, - - MICH.

"GEARS AND WAGONS"
Selle Gears
Forty years of success has placed "Selle Gears" and Wagons in the hands of the largest wagon users in the world. Express and Transfer Companies, Department Stores, etc., specify "Selle Gears" and will take no other after once tried. 230 Page Catalog Free.
THE AKRON-SELLE CO. Akron, Ohio

The Capewell Horse Nail

Horseshoers are the best judges of a horse nail. Quality is proved by actual test. The way the nail drives, sets, clinches and holds proves its value. The horseshoer is making these practical tests daily.

FOR YEARS

Capewell nails have "made good" under these tests. For that reason the vast majority of shoers use them.



The Capewell proves itself the most satisfactory and the most economical.

Not the cheapest nail regardless of quality but the world's best at a fair price.

The Capewell Horse Nail Co.
Hartford, Conn.
The World's Leading Horse Nail Makers

STEEL STAMPS
LETTERS and FIGURES
For Marking Your Tools and Your Product
NAME PLATES OF ALL KINDS
S. D. CHILDS & CO.
DEPT. 2
136 S. CLARK ST. CHICAGO

SEND US YOUR NAME
and Address and you'll get information worth while regarding this splendid Shear and Punch.



THE **MARVEL**
A Double Lever Machine.
One man does all the machine is capable of and he faces his work all the time.
ARMSTRONG-BLUM MFG. CO.
340 N. FRANCISCO AVE., CHICAGO, ILL.

MAKE MONEY REPAIRING TIRES WITH A
SHALER Vulcanizer
Mends 12 Casings and 200 Tubes a Day. Anybody can operate it. Has Automatic Heat Control—SAFE! Can Be Had With Gas or Gasoline Burner.
Write at once for Catalog.
C. A. SHALER CO., 180 Fourth St., Waupun, Wis.





MUD CHAIN

Can be put on in a jiffy with one hand while standing on the run board. If you get in a mud hole, you will laugh out loud. Hook the ends together and pull the little lever and they are on tight. One or two will take you out of a hole, but it is better to use about 6 for continuous running. Good for blow-outs.

STEEL TIRE PROTECTORS



Tires can't wear out if covered with Steel. Try a few sections over any old blow-out. Tires are as flexible as ever. Can't Skid.

Special Inducements to Those in New Territory

KIMBALL TIRE CASE CO.
175 Broadway Council Bluffs, Iowa

Each Section 2 inches Wide, ⅛ inch Thick
Write for Prices and Full Particulars



THE TEETH IN
BLACK DIAMOND RASPS
ARE MINGLED
So as to Cut Clean and Free and Leave no Furrows In the Work

Twelve Medals of Award by Jurors



At International Expositions

C. & H. BARNETT COMPANY
Black Diamond File Works, PHILADELPHIA, PA.
Owned and Operated by NICHOLSON FILE CO.
Copy of Catalog sent Free to any interested file users upon application.

AETNA STEEL TOE CALKS
Made by THE AETNA NUT CO., Southington, Conn.
BLACK HORSE BRAND

BEST SHAPE
BEST SPUR
TO DRIVE
BEST STEEL



TOE AND HEEL CALKS

SOLD BY ALL DEALERS

Stokes Bros.' Improved Horse Rasps
Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A.

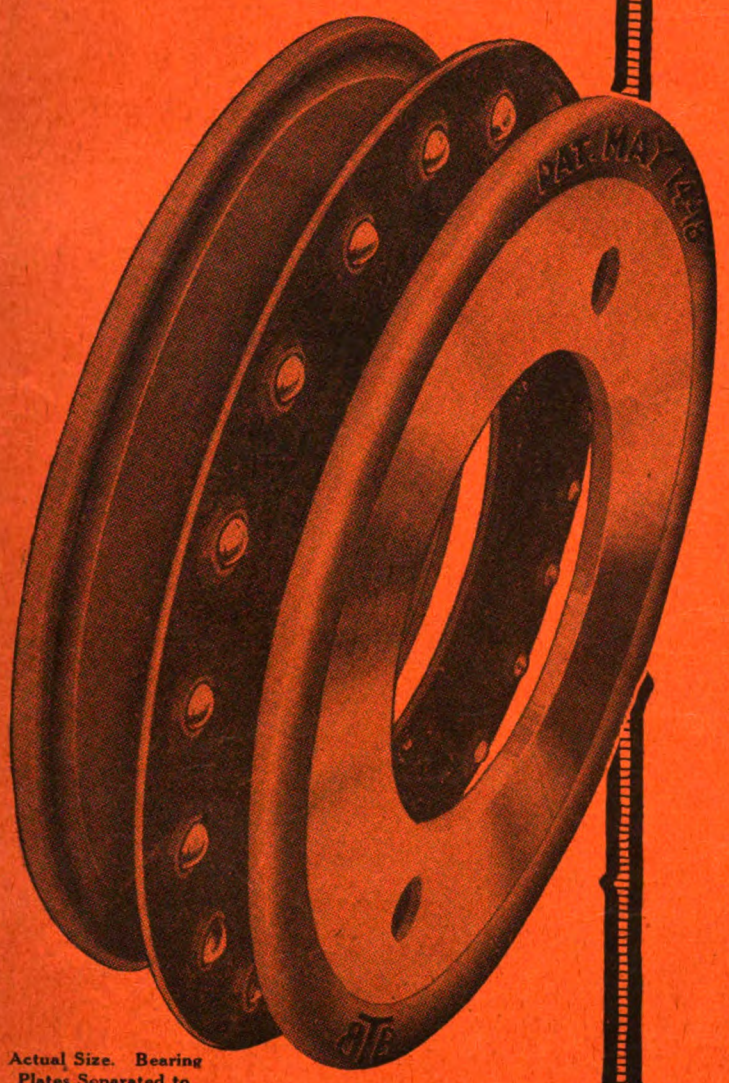
What Is it worth to you to have a correct list of over 300,000 Business Firms in New England?
You may have just such a list for only $7.50
Write the Sampson & Murdock Co.
246 Summer St., Boston, Mass.
and ask for the New England Business Directory

The Campbell Iron Company
Wholesale Automobile, Garage, Machinists, Blacksmith and Implement Supplies, Hardware Specialties. Duplicate Parts for Fords carried in stock.
Write for New General Catalogue.
817 Cass Avenue St. Louis, Mo.

BUYERS' GUIDE AND INDEX TO ADVERTISEMENTS, PAGE 265

Digitized by Google

Prevents Rear Axle Trouble in Fords—



Actual Size. Bearing Plates Separated to Show Ball Retainer.

The Bailey Ball Thrust Bearing replaces to the 1/1000th part of an inch, plain washers (parts 2528-29) at left side of Ford and Chevrolet 490 differentials—eliminating all trace of sliding or grinding contact and minimizing friction that results. Bailey installation does away with the danger of noisy or broken gears, due to ordinary washer construction.

Being a ball bearing it does not wear thin and consequently keeps gears in proper mesh.

Selling Points For Blacksmiths on Bailey Ball Thrusts

Plain washers having a friction creating, sliding contact, instead of a frictionless rolling contact as in a ball bearing, wear with these results:

1- The ring gear and pinion get away from the proper mesh and allow a contact of the teeth at the weakest point. Result is broken gears.

2- The lack of proper meshing of gears causes humming or noise in the axle. Bailey keeps gears meshed—hence no noise or breaks.

3- The friction of plain washers heats the oil and grease to such an extent that the lubrication qualities are destroyed.

4- The fine metal ground away in the wear of plain washers is bound to get into the bearings and hasten the deterioration of such parts.

5- When you get the heaviest thrust you get most friction—and friction means loss of power. The Bailey eliminates friction.

6- The Bailey Ball Thrust bearing having highest grade frictionless steel balls must affect a cut in fuel consumption.

The Bailey Ball Thrust is heavily advertised in the Saturday Evening Post and other national magazines. The field for blacksmiths to enjoy profitable returns is unlimited. Practically every jobber in the U. S. and Canada carries this bearing in stock. Blacksmiths everywhere find it little or no trouble to sell car-owners Bailey Ball Thrusts. Don't wait until all Ford owners in your locality have installed Baileys. Get this business now. Write your jobber or us for discounts.

Price, $3.75

GEO. D. BAILEY CO.

Factory and General Offices:

4506 N. RAVENSWOOD AVE. CHICAGO, ILL.



With Bailey Ball Thrust

Gears properly meshed—ball bearing stands up under pressure and holds the gears snug. Drive is exerted firmly on strong part of two teeth instead of on one, no noise, no lost power, no jerky "back-lash!" and no stripping or breaking of gears.

With the Ordinary Washers

Gears partly out of mesh because washers at left side have worn thin due to gear thrust. This results in drive being taken on one tooth only, and on weak part of that tooth—resulting in loss of power, noisy gears, jerky "back-lash" and stripping of gears.



BAILEY BALL THRUST

Digitized by Google

"F-S" PAINTS



The Superiority of "F-S" Products is Admitted

Automobile, coach and wagon bodies, when you finish them with "F-S" Raven Gloss Automobile and Carriage Paint, show a marked superiority. It's the combination of good workmanship and good paint that makes the job—neither is much good without the other.

FELTON, SIBLEY & CO., Inc.

Manufacturers of Colors, Paints, Varnishes since 1863

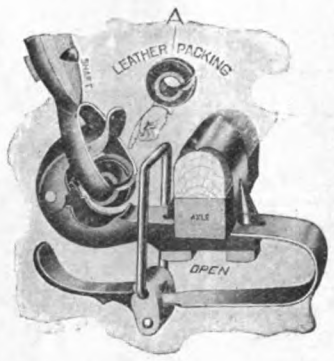
136-140 North Fourth Street, Philadelphia

(154)

C. C. BRADLEY & SON, Inc., Syracuse, N.Y.

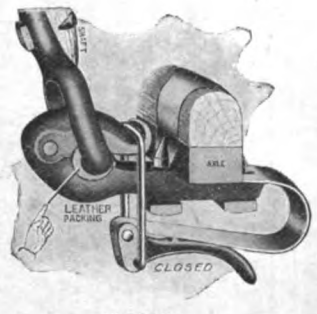
MANUFACTURERS OF

THE BRADLEY BALL BEARING SHAFT COUPLING



OPEN

ALL STEEL
ALL RIGHT
ALL THE TIME



CLOSED

Quick as a wink. Silent as the grave. Change from Shafts to Pole in 10 Seconds. One hand the only tool required.

The Bradley has been on the market 20 years. There are more than a million pairs in use and giving perfect satisfaction. They are made of STEEL drop forgings and will outwear any vehicle to which they are attached. Our Spherical Leather Bushing or Packing is self-lubricating and wears indefinitely. The SPRING automatically takes up all wear until packing is worn out. A new packing can be put in by anyone, its cost is a few cents, all the wear comes on the packing. The Bradley Shaft Coupling is the best that can be had regardless of price.



QUIT DRIVING YOUR TRADE AWAY

Stop! Look! Think! Every time you put on a set of calks that an owner can replace himself, you are driving trade away from your shop.

When you use ***welded*** calks, the owner must bring his horse to the shop when the calks need renewing.

Also, every horse's hoofs need the frequent attention of a horseshoer. You're doing the owner a good turn by using ***Sweet's Toe Calks***—"The Cold Cut Dreadnaught"—as well as keeping your shop full.

FRANKLIN STEEL WORKS

Joliet, Ill. Cambridge, Mass.
Hamilton, Ont.



No. 3



ADVANCE OF THE GRAND ARMY

NAPOLEON'S name fills more pages in the world's solemn history than that of any other mortal. The advance of the Grand Army into Russia is the turning point of his career and marks the beginning of his downfall. Mighty armies are once again marching over the same battlefields where Napoleon fought a hundred years ago. All the causes of this mighty struggle may be learned from the pages of history. The one complete, accurate, authoritative and reliable history, containing the rise and fall of every empire, kingdom, principality and power, is the world famed publication,

Ridpath's History of the World

Dr. Ridpath is universally recognized as America's greatest historian. Other men have written histories of one nation or period; Gibbon of Rome, Macaulay of England, Guizot of France, but it remained for Dr. Ridpath to write a history of the **entire World** from the earliest civilization down to the present. We offer the latest edition, 4000 pages, 2000 illustrations, brand new, down to date, beautifully bound in half morocco.

At a Great Sacrifice in Price

We will **name** our **special low price** and **easy terms** of payment only to Blacksmith and Wheelwright readers and in direct letters to all who mail the coupon printed on the lower corner of this advertisement. **Tear off the coupon,** write your name and address plainly and **mail now.** Our **plan of sale** enables you to buy by saving only about ten cents a day for the ensuing year. Mail the coupon now before you forget it. The sample pages are free.

32 Page Booklet Free

We will mail you 32 free sample pages without obligation on your part to buy. These will give you some idea of the splendid illustrations and the wonderfully beautiful style in which the history is written. You can purchase this great history at the **lowest price ever offered** and pay for it in **small sums monthly** if you prefer.

Six Thousand Years of History

Ridpath takes you back to the dawn of history long before the Pyramids of Egypt were built; down through the romantic troubled times of Chaldea's grandeur and Assyria's magnificence; of Babylonia's wealth and luxury; of Greek and Roman splendor; of Mohammedan culture and refinement; to the dawn of yesterday. **He covers every race, every nation, every time** and holds you spellbound by his wonderful eloquence. **Mail the coupon.**

Western Newspaper Association
CHICAGO



FOLD HERE, TEAR OUT, SIGN AND MAIL

10
18
FREE COUPON

Western Newspaper Association
H. E. Sever, Pres.
140 So. Dearborn St., Chicago, Ill.

Please mail 32 free sample pages of Ridpath's History of the World, containing photogravures of Napoleon, Cæsar and other great characters in history, and write me all particulars of your special offer to The Blacksmith and Wheelwright readers.

Name .....

Address ..... **Mail this Coupon**

Digitized by Google



INDIAN CHIEF VISES

Black-smiths' Horse-shoers'



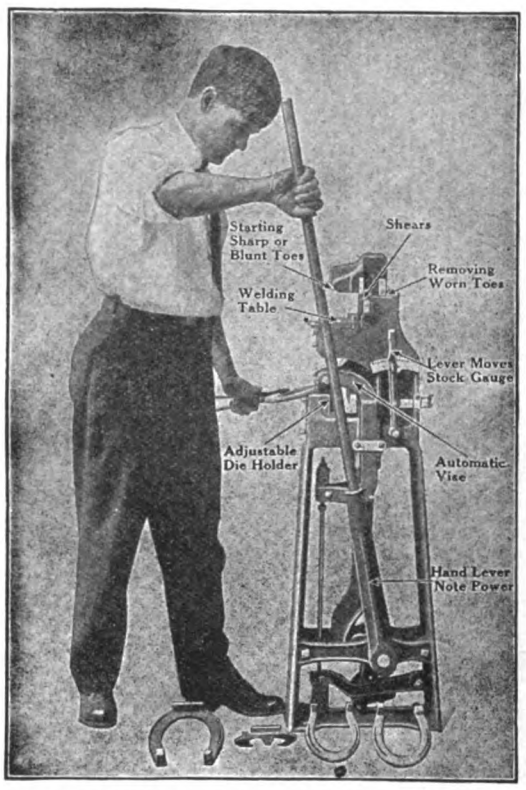
BOKER CUTLERY & HARDWARE CO., Inc.
Sole Sales Agents
101-103 Duane Street, New York City

Solid Box — Solid steel drop forged jaws faced with crucible tool steel. Improved screw of one piece of forged steel. Built right throughout.

THE COLUMBUS FORGE & IRON CO., COLUMBUS, OHIO.

1919 MODEL
THE L. S. P. CALKING MACHINE

The Greatest Time and Labor Saving Machine On Earth



1919 MODEL—Fully covered with Patents

OUR 1919 Model is the same as our 1918. We agree with the users and so would you, that it cannot be improved.

Do not mistake this for a machine which makes toe calks or a foot vise. This machine is for turning heel calks, both Blunt and Sharp, sticking and welding toe calks, clipping and trimming ends of shoes. IT CALKS SHOES, doing the work just the same as you do by hand with the hammer, only it is done much better and easier, and in a fraction of the time.

In turning heels, you can turn up just as much stock as you wish, upset or stoveup to make as heavy as you like and square up the calks without use of hammer. There is no losing of toes when you weld on the L. S. P.

It is a strong, handsome, well made machine and will last, as you might say, a life time, fully warranted for one year. It is in use in the best shops in the United States, users claiming more for it than we do.

Write at once for full information and prices.

L. S. P. CALKING MACHINE CO.

P. O. Box 225 WYALUSING, PA., U. S. A.

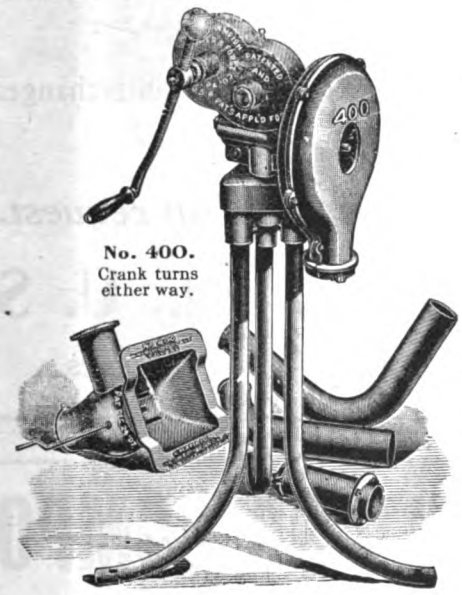
NATIONAL MACHINE CO., Brighton, Ontario, Canada

Digitized by Google

THE FAMOUS CHAMPION BLACKSMITH TOOLS

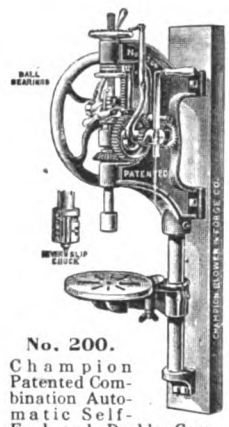
CHAMPION BLACKSMITH TOOLS ARE HELPING TO WIN THE WAR



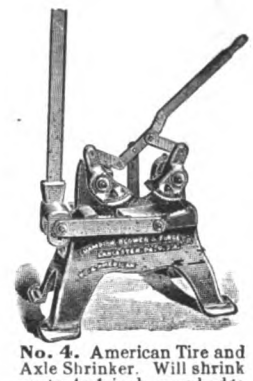


No. 400. Crank turns either way.

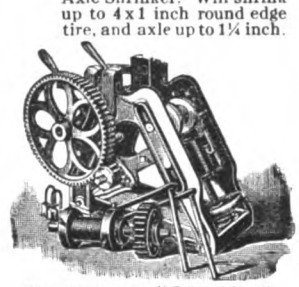
FAMOUS 400



No. 200. Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



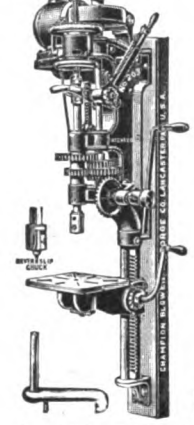
No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



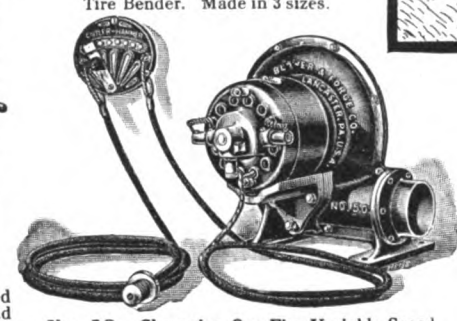
The Champion "Columbian" Tire Bender. Made in 3 sizes.



No. 408. Steel Blacksmith's Forge.



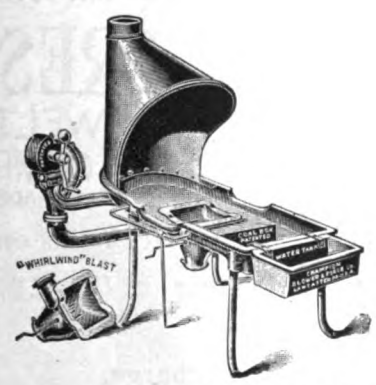
No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.



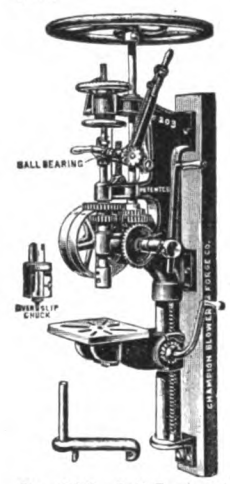
No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower.

Don't Fail to Get Our 1918 Catalog

Before purchasing a Hand Blower Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



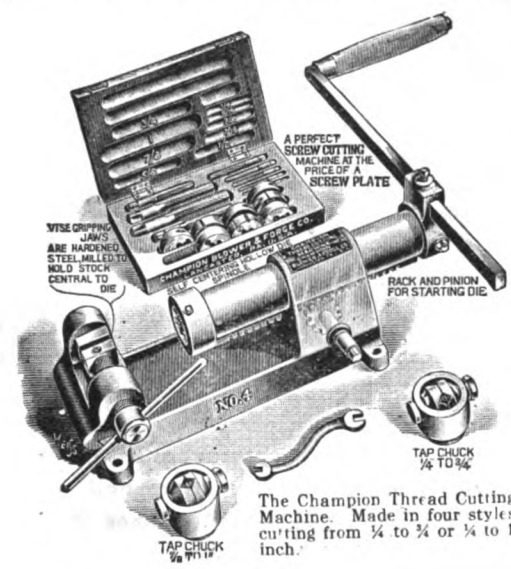
No, 433. Cast Iron Blacksmith's Forge



No. 203. Self-Feed and Double Compound Lever Feed Drill.



Hercules Patented Power Hammer. Weight of ram, 65 pounds.



The Champion Thread Cutting Machine. Made in four styles cutting from ¼ to ¾ or ¼ to 1 inch.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

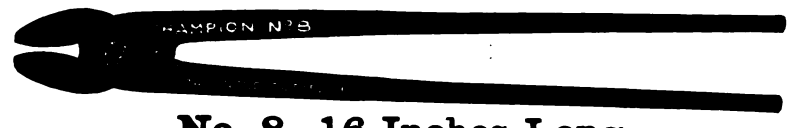
SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

Digitized by Google

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge

Nothing to get out of order.



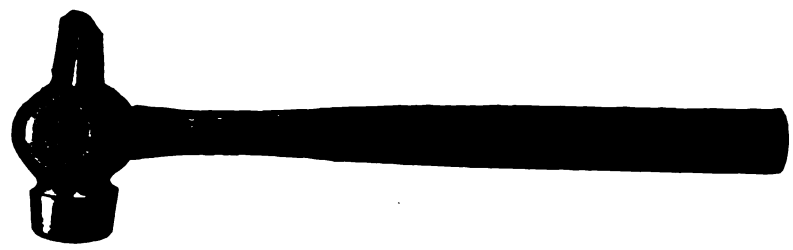
Will hold securely any size of shoe.

No. 8 16 Inches Long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

Weights, 1¾ to 3 lbs.

This Hammer is the most popular Sharpening Hammer on the market.

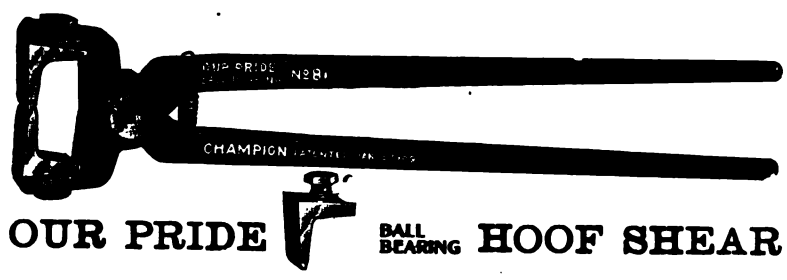


Corrugated Pein.

IT GIVES RESULTS.

No. 12 ELECTRIC SHARPENING HAMMER

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.



Blades easily replaced when worn out.

All parts interchangeable.

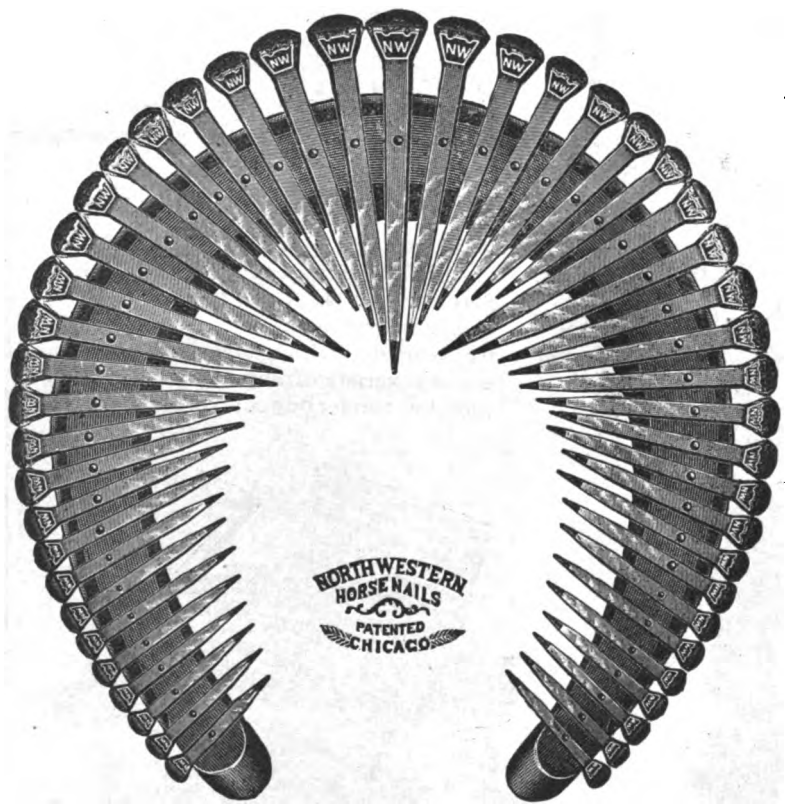
OUR PRIDE BALL BEARING HOOF SHEAR

Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY, - Meadville, Pa., U. S. A.

THE LIVINGSTON CO., 131 E. 23rd Street, NEW YORK, Eastern Representatives

NORTHWESTERN HORSE NAILS



MADE OF THE BEST QUALITY MATERIAL

The most perfect in form and finish and will hold a shoe longer than any other nail made.

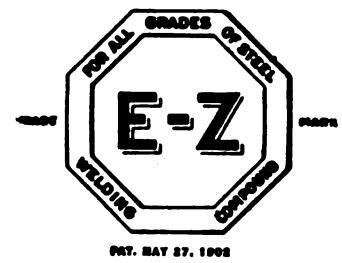
THE RE-ENFORCED POINT makes it the easiest to drive and the safest to use.

UNION HORSE NAIL COMPANY

Manufacturers

CHICAGO ILLS.

"E-Z" WELDING COMPOUND



is the best **BECAUSE**

It works Equally good on all Kinds of steel.

It welds at **lower heat** than any other.

It **sticks** to metal at a **very low** heat.

It leaves **no scale.**

USE IT ONCE AND YOU WILL ALWAYS WANT IT

Crescent Welding Compound

MAKES SMOOTHER WELDS THAN ANY OTHER

It is fine for plow work or where parts are fastened together before welding, or for making split welds, finishing heats, or for welding under dies, etc., etc.

CRESCENT WELDING COMPOUND TRADE MARK

It insures smooth finish and perfect welds on Toe Calks.

"Money back" from any jobber if "E-Z" or Crescent does not give perfect results.

We will send samples free of charge.

MADE ONLY BY

Anti-Borax Compound Co.

FT. WAYNE, IND.

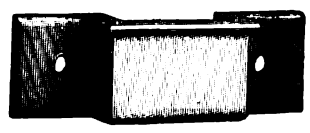
Digitized by Google

A Page of STAKE POCKETS made by

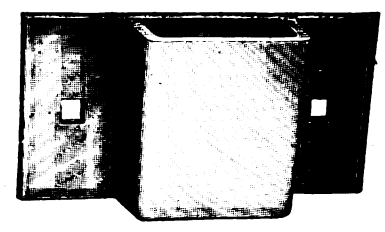
The Eberhard Manufacturing Co.

ORDER THROUGH YOUR JOBBER

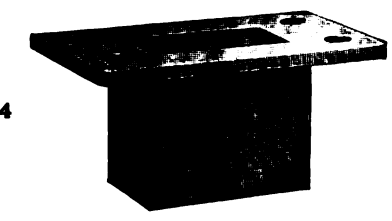
No. 5990



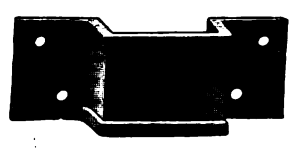
No. 6015



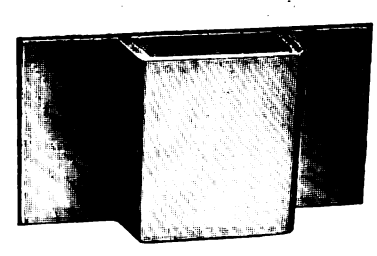
No. 6024



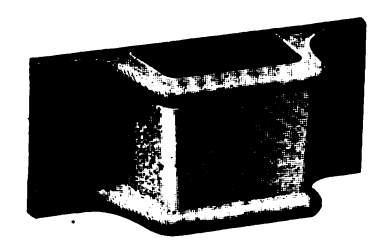
No. 5995



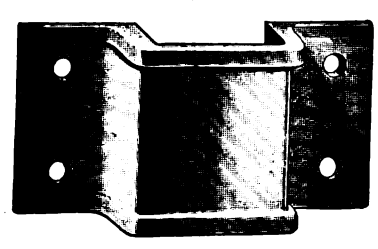
No. 6017



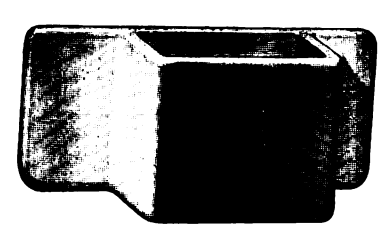
No. 6027



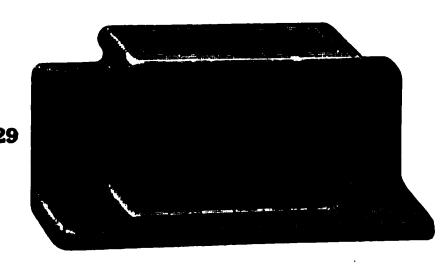
No. 6000



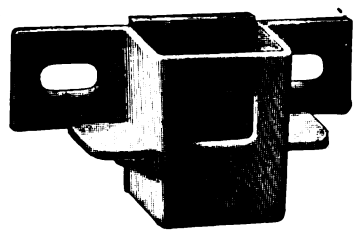
No. 6018



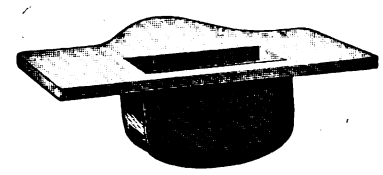
No. 6029



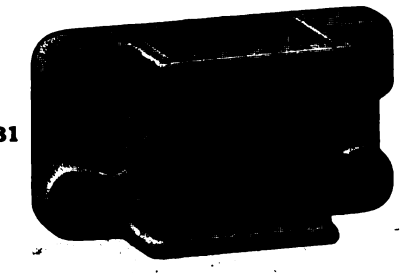
No. 6003



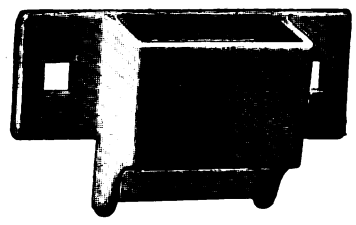
No. 6020



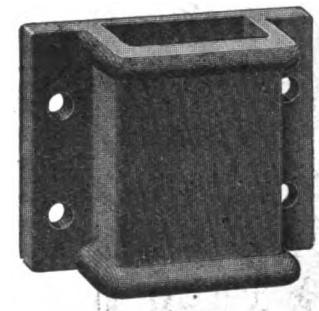
No. 6031



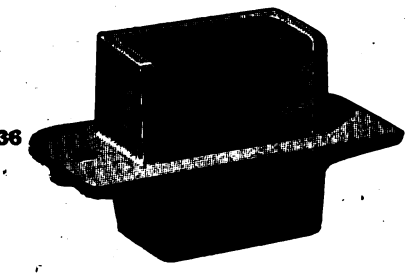
No. 6004



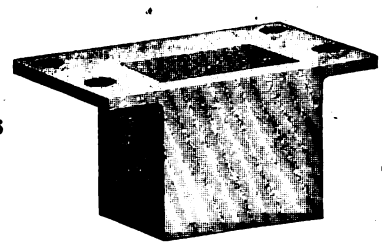
No. 6022



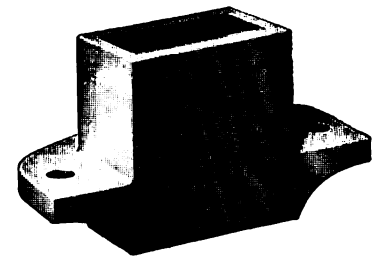
No. 6036



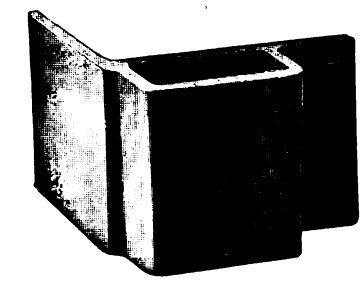
No. 6006



No. 6023



No. 6037



CLEVELAND, OHIO

Digitized by Google

The Better Your Equipment The Bigger Your Profits

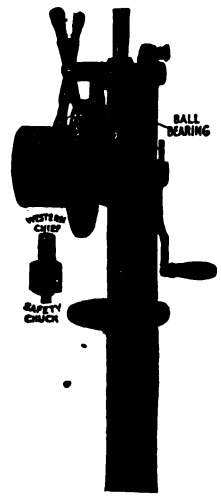
Buy CANEDY-OTTO

AND INCREASE YOUR INCOME

Once Tried, Always Used : There's a Reason—Quality

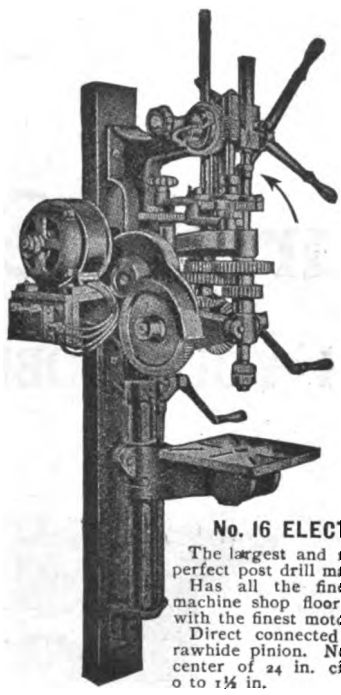
OVER 200 DIFFERENT STYLES

SEND FOR CATALOGUE No. 12



No. 19 DRILL

A low-priced combined hand and power self-feed drill.
Drills to center of 16½ in. circle.



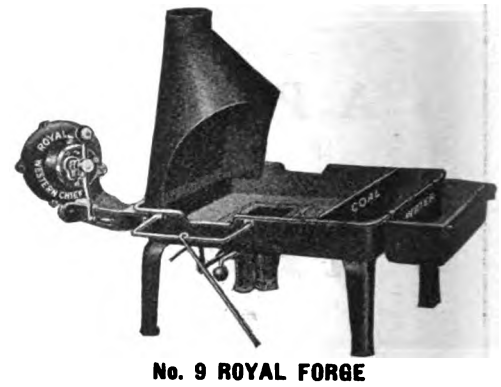
No. 16 ELECTRIC DRILL

The largest and most mechanically perfect post drill manufactured.
Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.
Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1½ in.



No. 100 ROYAL FORGE

The most popular forge ever made.
Fan, 12 in. Hearth, 31½x45½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x50 in. Blower, 14 in.



Blower, 12"
Wt., 135 lbs.
Height, 47"

ROYAL BLOWER

(Ask the man who owns one)

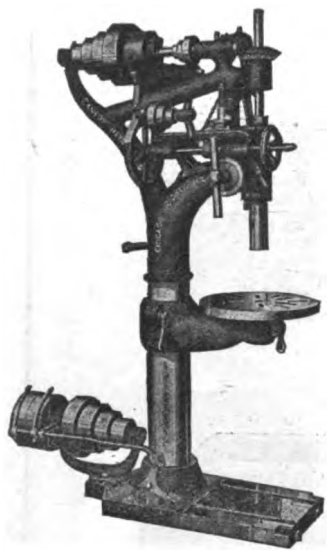
Gives more powerful blast than any hand blower made. Crank turns forward or back ward.
Fire pot is 8x9 in. inside.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS



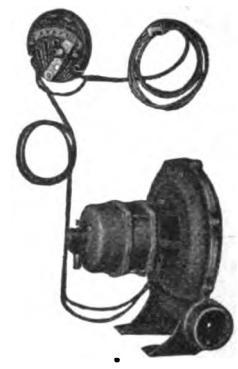
No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.
All machines are tested before leaving the factory, and guaranteed in every respect.
Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.



No. 1 1/2 SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



No. 8 ELECTRIC BLOWER

The best outfit money can buy.



The 3,000 Mile Bridge

Our Soldiers are speeding to meet the common foe. Our Sailors are keeping the sea-way open and safe. Our Mechanics are fashioning the ships on hundreds of ways, day by day building a mightier bridge — and speeding their work with

NICHOLSON FILES

the World's fastest cutting file. There are over fifty years of file making experience built into every keen edged tooth of a NICHOLSON FILE. That's why great ship builders use them. A file for every purpose.

NICHOLSON FILE COMPANY
Providence, R. I., U. S. A.

Service

CAR owners will generally estimate the quality of your service by the quality of the product you sell.

Satisfaction to car owners — satisfaction and profit to dealers—that is the ultimate aim of Harvey Service.

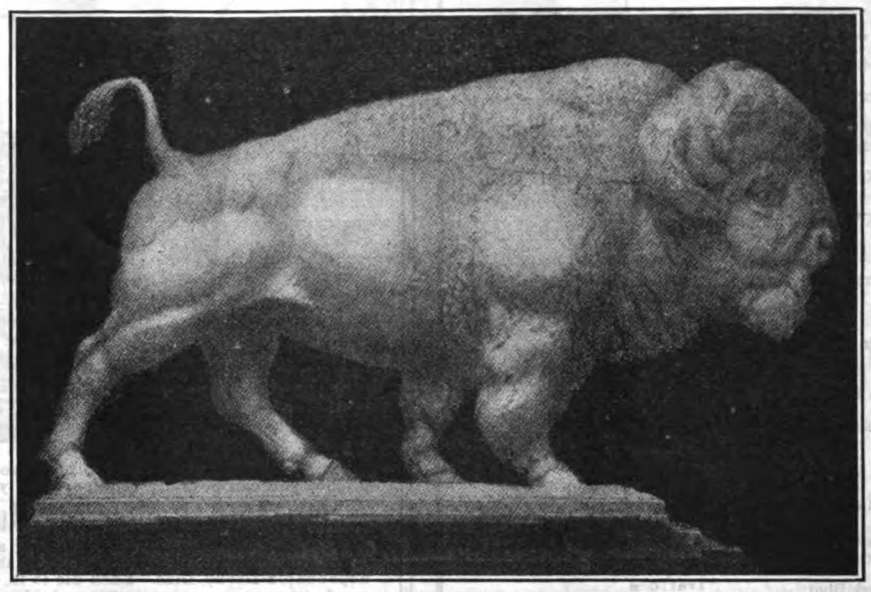


PRACTICALLY UNBREAKABLE

THERE'S A HARVEY JOBBER NEAR YOU
Our new catalogue giving complete measurements of over 900 styles of Springs is yours on request

HARVEY SPRING & FORGING CO.
919 - 17th Street, RACINE, WIS.

Digitized by Google



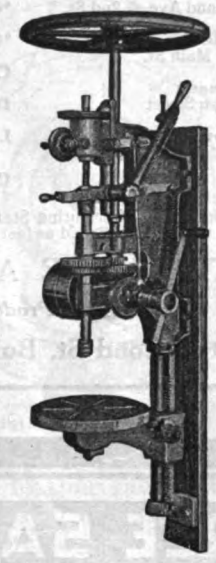
Modern Shop Efficiency



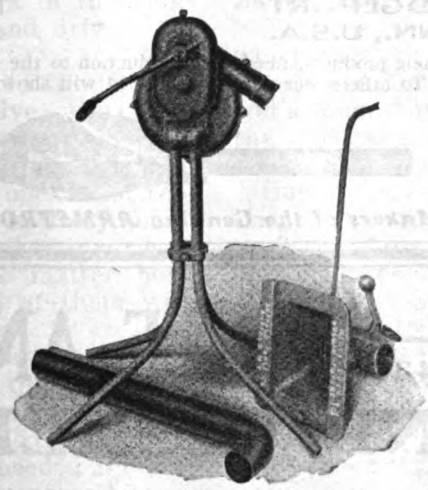
BLACKSMITHS AND GARAGEMEN are determined to have the best that may be had in Blacksmith Shop Equipment.

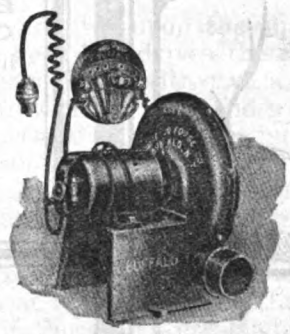
The work of the modern shop demands modern efficient tools—tools that will stand up under severe service.

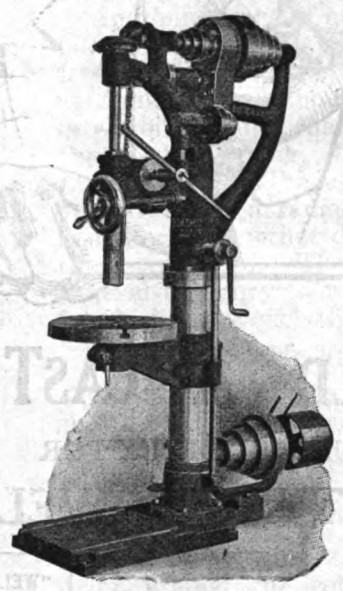
Forges; electric blowers; drills—floor and post type; shears—for cutting angles, bars and sheets—and of every size from the little bench type hand power shear to the heaviest power shear made—these are the tools you should know about.



Buffalo Forge Company - - Buffalo, N. Y.







WRITE DEPT. 6
FOR CATALOG

"Buffalo"





Digitized by Google

LINDE OXYGEN

From Coast to Coast 65 Producing Plants and Distributing Stations provide an unlimited supply of Linde Oxygen for users everywhere.

LINDE SERVICE means no investment except for oxygen actually received—no expensive overhead or upkeep charges.

Linde Oxygen may be obtained from any of the following Linde Plants and Distributing Stations where a large suppply of charged 100 to 200 cu. ft. cylinders is kept on hand constantly to insure immediate shipments.

Mail or telephone your order to THE LINDE AIR PRODUCTS CO., at the nearest point. **Shipments will be made on day order is received.**

PRODUCING PLANTS AND WAREHOUSES

Alabama
*Birmingham
10th Ave. & 28th St.
California
*Emeryville, Oakland
*Los Angeles
1405 Mission Road
Colorado
*Denver
S. B'way & Exposition Ave.
Connecticut
Hartford
1095 Main Street
District of Columbia
Washington
9th & Maryland Ave., S. W.
Georgia
*Alanta
Plyant St. & Southern R. R.
Savannah
OgeecheeCanal,So.of BaySt.
Illinois
*Chicago
3633 Wall Street
East St. Louis
6th & Walnut Ave.
Peoria
721-731 So. Washington St.
Indiana
*East Chicago
S.E.Cor. Kennedy& 145th St.
Fort Wayne
414 E. Columbia Street
*Indianapolis
2819 Roosevelt Ave.
Iowa
Davenport
118 Harrison Street
Des Moines
117 W. 5th Street
Kansas
Wichita
Rock Island Ave. & 2nd St.
Kentucky
Louisville
126 East Main St.
Louisiana
New Orleans
861 Fulton Street
Maryland
*Baltimore
25th & Montebello Ave.
Massachusetts
Cambridge
25 Waverly Street
Springfield
Napier Street
*Worcester
961 Southbridge St.
Michigan
*Detroit
St. Aubin Ave. & Newton St.
Grand Rapids
Pearl Street by the Bridge
Minnesota
Duluth
Seventh Ave., West
*Minneapolis
1809 Hennepin Ave.
Missouri
*North Kansas City
14th & Charlotte St.
*St. Louis
4218 Forest Park Blvd.
Nebraska
Omaha
1007 Jones Street
New Jersey
*Elizabeth
Linden Ave.
Newark
354 Plane Street
New York
Albany
Montgomery & Colonie Sts.
*Brooklyn
475 Driggs Ave.
*Buffalo
155-183 Chandler St.
*Utica
Walnut & Schuyler Sts.
Ohio
*Cleveland
802 East 72nd Street
*Cincinnati
Stanton & Mellish Aves.
Columbus
310 Dublin Ave.
Dayton
521 E. First Street
Lima
338 East High Street
Ohio
Toledo
441 South Erie Street
*Youngstown
601-621 Jones Street
Oklahoma
Oklahoma City
27 E. Grand Ave.
Tulsa
1 North Boulder St
Oregon
Portland
15th & Hoyt Streets
Pennsylvania
Erie
1502 Sassafras Street
*Norristown
*No. Philadelphia
18th & Cambria Streets
Pittsburgh
16th &Pike Streets
*Trafford
Tennessee
Chattanooga
212-238 King Street
Memphis
203 Washington St.
Texas
*Dallas
Harwood and Coombs St.
Houston
Cedar & Baker Sts.
San Antonio
512 Dolorosa St.
Utah
Salt Lake City
112 West Second St., South
Virginia
Richmond
1709 E. Carey Street
Washington
*Seattle
Henrietta St. & 8th Ave., So.
Spokane
121-123 S. Madison St.
Wisconsin
Manitowoc
810 Quay Street
*Milwaukee
36th St. & National Ave.

(Star) * Designates Plants.

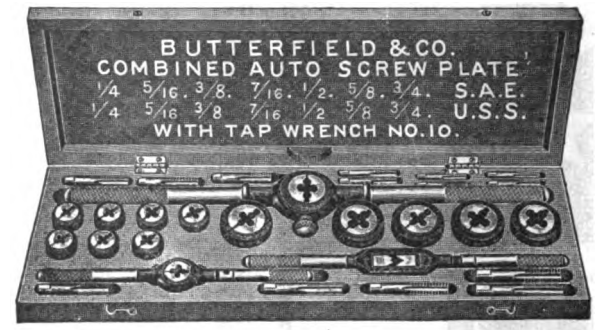
Other Plants and Distributing Stations are planned for other industrial centers throughout the country and will be established as fast as and wherever the local demand for oxygen warrants.

THE LINDE AIR PRODUCTS COMPANY

Largest Producers of Pure Oxygen in America

Forty-Second St. Building **NEW YORK**

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.
New York Store: 126 Chambers Street

The Horse Rasp of Quality



Ask your Dealer for the

IMPROVED HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, **"Slim," "Light," "Slim Light"** and **"Fine Cut."** Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial. New catalogue mailed free on application.

HELLER BROTHERS CO. *Established in 1836* **Newark, N. J.**

FREE SAMPLE OF FLUX



WELD TRADE A MARK CAST

A SUPERIOR FLUX FOR

OXY-ACETYLENE WELDING

"WELD-A-CAST" Flux No. 1 for Welding Cast Iron.

Eliminates pin holes and blow holes, leaving the metal soft.

"WELD-A-CAST" Flux No. 3 for Welding Brass, Bronze, High Speed Steel, and all High Carbon Steel.

Prove it! Write for Sample.

CORTLAND WELDING COMPOUND CO.

CORTLAND, N. Y.

THE ARMSTRONG MFG. COMPANY

BRIDGEPORT CONN., U.S.A. **NEW YORK OFFICE 248 CANAL STREET**

like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



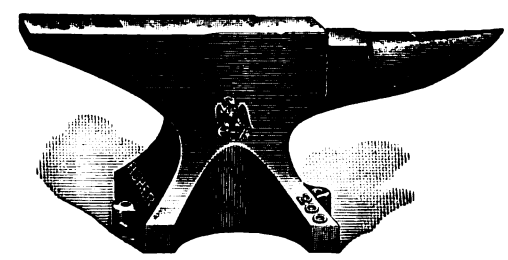
"Makers of the Genuine ARMSTRONG Stocks and Dies."

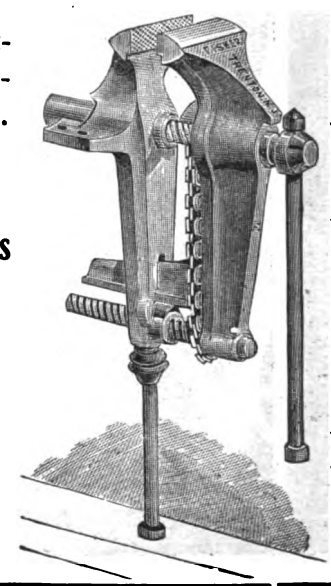
1843 EAGLE ANVILS 1918
AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE
BLACKSMITH AND WHEELWRIGHT

Vol. LXXVIII. No 4. NEW YORK, OCTOBER, 1918. TERMS ONE DOLLAR A YEAR

Design Construction, Operation and Repair of Automobiles and Motor Vehicles

Part IX—Construction of the Cone and Disc Clutches and the Various Types of Gear-Sets in Use on Modern Automobiles

In our last article we took up the starting system and the storage battery, and with the article we completed the description of the engine and all of the units necessary for its operation.

An engine is a complete power plant in itself. Its gasoline tank may be considered as its boiler if one were to compare it with a steam installation. Fuel is vaporized and mixed with the proper amount of air in the carburetor and drawn into the engine. It is not forced in, but passes in when the piston goes downward on its intake stroke. It is therefore necessary to crank the engine either by hand or with a starting motor. When the piston comes up in the cylinder it compresses this gas mixture and when the piston reaches the top of its stroke the ignition unit furnishes a spark in the plug which explodes the mixture and drives the piston downward.

Just before the piston gets to the bottom of its stroke the exhaust valve opens and the piston traveling on its upward stroke forces out all of the dead gas. At the top of its stroke the intake valve opens and the operation again repeats itself. In every four-cycle engine the crankshaft makes two revolutions to one explosion. No matter how many cylinders there are, all of them will fire once every two revolutions.

The firing of each cylinder in turn rotates the crankshaft which carries the other pistons over their dead strokes and so a constant stream of power is carried to the flywheel. Electrical current is needed for the ignition system and since an automobile is operated at night frequently, electrical current may be used conveniently for the lights.

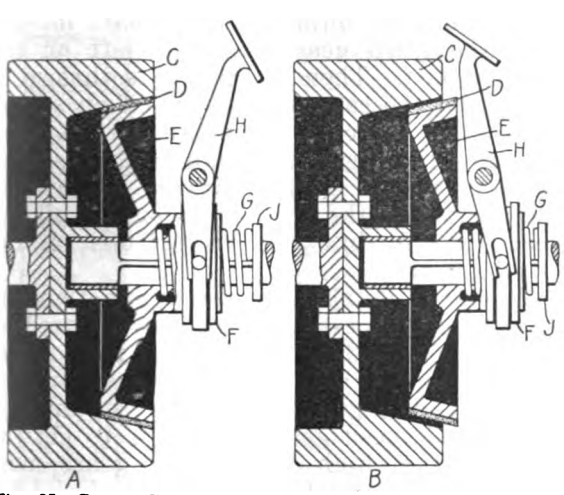


Fig. 35—Cross Sectional View of Cone Clutch Engaged and Disengaged.

Units in Power Plant.

Since the engine must be started and since there is an electrical installation on the car, a motor can be used to start it. Let us then see how many units are necessary for a complete power plant. First, the engine, the carburetor, the fuel tank, the induction or secondary coil or coils, a source of current such as a magneto or a battery, a cooling system consisting of a fan for an air-cooled engine, or a fan and a radiator for a water-cooled system, frequently a pump for circulating the water, an oiling system usually provided with an oil pump. Second, if a starting and lighting system is provided, a generator for charging the storage battery, a motor for starting the engine, the generator requires a check valve which we call a cut-out and some sort of a voltage regulating device.

A complete power system could be removed from the automobile placed upon a stand and operated in itself. This brings us to the application of the power system to an automobile. Just as you utilize the steam engine in your shop so must the power system be utilized in an automobile through some sort of a transmission which will carry the power to the rear wheels.

Just as you need a clutch upon your steam engine or an idler pulley with a slip belt on your countershaft, so you must need a clutch between the engine and the transmission system. This clutch must be so arranged that the engine may be disconnected from the rear wheels, else there would be no way to start the engine without moving the car forward and its connection with the engine be so arranged that it can run idle with the car standing.

The Cone Clutch.

Clutches are divided into two classes: the cone and the multiple disc. The cone clutch illustrated in our 35th figure is undoubtedly the simplest form of clutch made. The flywheel itself is used for the outer member of the clutch and the inside surface is cut slightly beveled or cone shaped. Fitted into this is the main clutch member called the cone. When the cone is pressed into the flywheel it rotates with the flywheel and the power is transmitted from the flywheel to the cone itself.

Now the cone is mounted upon the shaft, which through the gear box drives the rear wheels. A foot pedal fitted with two arms and a collar connects with the cone and when the foot pedal is pressed the cone is pulled away from the flywheel.

Our cut shows very clearly the construction of the cone clutch and if you will refer to it carefully you will see just how this unit operates. In Figure 35 at A is shown the clutch engaged, at B is shown the clutch disengaged. Now if the cone were made of metal there would be a great chance that it would not hold against the flywheel properly and so it is usually faced with either leather or a special fabric.

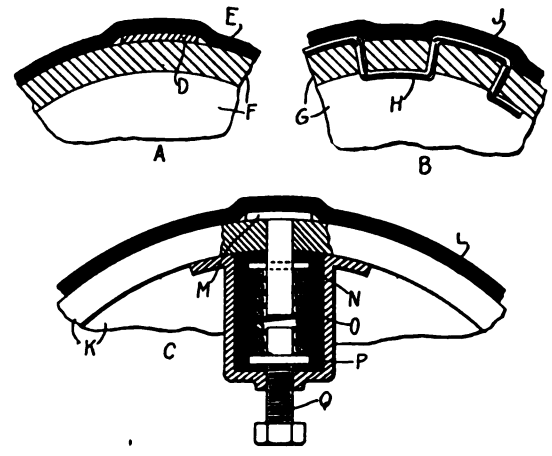


Fig. 36.—Illustrating Methods Used To Prevent Grabbing.

This fabric is shown at D and is usually riveted to the cone by flat head rivets. Under no conditions should these rivets stick up above the surface of the fabric for if they do there will be great danger that the clutch will slip. One can see that if the leather were to get its whole circumference the car would jump forward rather than start slowly. There are a number of ways by which this difficulty is overcome.

If you will refer to Figure 36, you will notice the illustration of three different methods used. At A is shown the surface of the cone F, E is the leather facing and D a small leather insert which is slipped between the facing and the cone itself. This insert has a tendency to make the surface stick outward and this small surface will engage with the flywheel before the larger surface. The car will move slowly and the clutch slip until it is forced away in and all of the fabric grips against the flywheel.

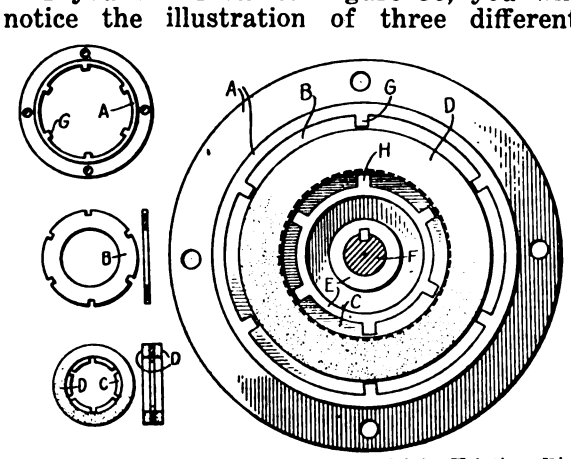


Fig. 37.—Parts and End View of Multiple Friction Disc Clutch.

Another means of accomplishing this same end is shown at B. The cone itself which is faced is shown at G. The leather facing at J and at H is shown a spring wire which is woven through the cone face and beneath the leather facing. The wire answers the same purpose as the leather did at D. Neither one of these arrangements are adjustable and there is another disadvantage had when these are used. That is, that there is a general tendency to wear the surface of the fabric directly over the insert or spring.

Adjustable Facing Plunger.

To obviate this, an adjustable device is shown at C. K is the clutch and fastened to its face is a cap which carries an adjustment screw Q. The end of this adjustment screw is drilled for a cotter pin P and this cotter pin or in some cases a washer presses against one end of a spring, the other end of which rests against the cotter pin or a washer mounted on a small plunger N. The head of the plunger M presses against the leather facing.

One can see that by tightening the adjustment screw Q, the plunger head M is forced outward and the leather fabric pressed away from the cone. In adjusting this type of clutch it is essential that an equal amount of pressure be placed upon all of the plungers or there will be a chance that the fabric will wear unevenly or the clutch "grab."

Multiple Disc Clutch.

One of the most popular types of clutch used on automobiles at the present time is

Digitized by Google

termed the "multiple disc clutch" or the "disc clutch." Whether this device is of the dry disc type or runs in oil, the principle is the same. Above the flywheel is bolted what is termed a clutch driving spider. This device is illustrated in Figure 37 at A. It is fitted on its inner circumference with a number of

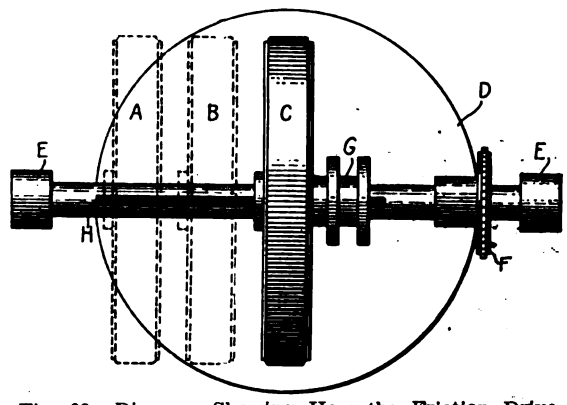


Fig. 38.—Diagram Showing How the Friction Drive Operates.

keys or lips shown at G and into this spider fit a number of plates of a shape as shown at B.

When the flywheel revolves, therefore, these driving plates, as they are called, revolve with the flywheel. Attached to the transmission shaft F is a driven spider E, which is fitted with keys H, and these keys fit into grooves cut in the driven discs C. These driven discs are placed upon the driven shaft in such a way that they come between every two driving discs.

In an assembly, then, we will have a driving disc, then a driven disc. When the discs are all pressed together, the driving discs drive the transmission shaft through the driven discs. When the spring pressure is removed by pressure on the foot pedal, the discs drop apart and slide past each other.

In most cases the discs are faced with a special fabric similar to that used on the cone clutch as mentioned in the description of the cone clutch. In applying this fabric, one should be careful to sink these rivet heads below the face of the fabric. The pressure on the discs is secured in much the same manner as was secured on the cone clutch, either through a large spring at the center or by a number of smaller springs on the outside.

Dry Disc Clutch.

Practically the only difference between the multiple disc clutch and the dry disc clutch is that the latter has only a few discs and these discs are faced with asbestos instead of friction fabric. The latter type of clutch does not run in oil like the multiple disc clutch.

There are practically only two clutch troubles that one is apt to encounter and these troubles are caused either by worn bearings or filled or worn fabric. If the bearings are damaged or badly worn, the clutch has a tendency to stick and the car will creep

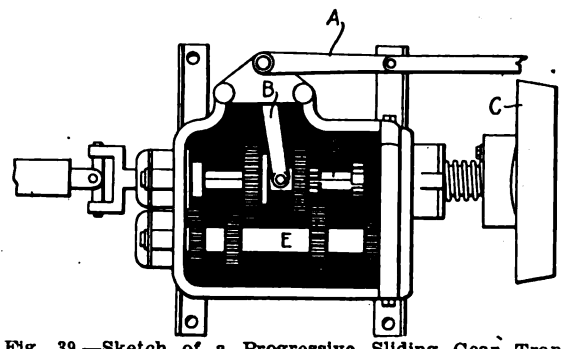


Fig. 39.—Sketch of a Progressive Sliding Gear Transmission Gear-Set.

forward with the engine running. A replacement of bearings is usually necessary in this case.

If the fabric becomes filled with dirt and heavy grease, it can be cleaned with kerosene oil and in a case of the cone clutch, with a stiff scrubbing brush. If the fabric is badly worn and sticks, then a new fabric is usually necessary.

Friction Disc Transmission System.

There is one other type of clutch which is more of a combination clutch and transmission. This type of clutch is used particularly on Metz cars and known as the friction drive. It is undoubtedly the simplest form of transmission on the market. A sketch of it is shown in Figure 38.

Revolving with the flywheel is a large friction disc or driving disc shown at D. This driving disc rotates with the flywheel at all times and is so arranged that it may be moved either backward or forward a distance of about one inch. When it is moved backwards, it presses against a driven wheel C.

This driven wheel is mounted at right angles to the driving disc, upon a countershaft E, which is fitted with a long feather key H and upon it the driven wheel slides. The driven wheel is fitted with a collar G. Two arms fit into this collar so that the wheel can be moved at various positions along the shaft.

The operation is as follows: The engine is started while the drive disc is away from the driven wheel. The driven wheel is pushed along the shaft to a certain position at B, shown by the dotted lines for instance. Then the clutch pedal is pressed downward bringing the driving disc against the driven disc. The friction causes the driven disc to revolve. This action drives the shaft E which is connected to the rear wheels through a sprocket F by chains. A certain car speed is obtained depending upon the size of the driven wheel and its position against a driven disc D.

As soon as sufficient car speed is attained, the clutch pedal is released, the disc D drops away from C, and C is moved to the position

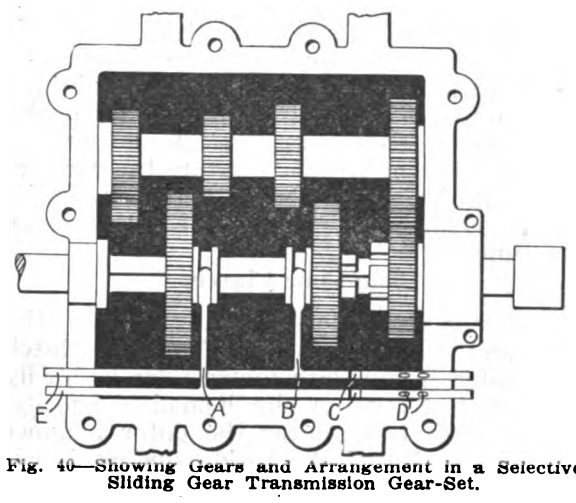


Fig. 40—Showing Gears and Arrangement in a Selective Sliding Gear Transmission Gear-Set.

A. Then the clutch lever is pressed again and the driven wheel rotates at a still higher speed.

Reversing the Drive.

If it is desired to throw in the reverse, the clutch is released and the driven wheel is moved to a position on the other side of the center as shown in the sketch by C.

Aside from the friction disc drive and the Ford type of gear-set which will be described in our next article, there are two forms of gear sets both included under the head of "sliding gear transmissions." These two types are known as the selective and progressive.

The progressive type of transmission is the oldest and is illustrated in Figure 39. The sketch shows the gears at neutral. The shift lever arm A is connected with the change gear lever. It operates the gear fork B and this latter member is so arranged that it carries with it the two sliding gears. These sliding gears are keyed or so arranged that they drive the shaft D when they revolve.

Frequently the shaft D is square and the hole through the gears is square as well. The shaft D is connected through a universal joint with the rear axle. It does not, however, rotate with the driving shaft from the engine. The driving gear is connected directly with the driving shaft which is driven by the clutch; in this case a cone clutch is used to illustrate. It is shown at C.

The last gear to the right, at the end of the shaft D, is the driving gear. It will be noted that this driving gear is fitted with a number of projections into which fit the projections on the sliding gear. More about these will be said later.

The driving gear is meshed at all times with the last gear on the countershaft E. The four gears shown on the countershaft E are keyed directly to that shaft and always revolve with it and they do not slide.

One will notice that the last gear on the countershaft at the left is meshed with another gear which is shown below. This last gear is termed the reverse idler gear. Now let us see what happens as we mesh the various gears.

Action of the Progressive Type.

We will assume that the car is standing still and the engine running. In this case all the gears on the countershaft E are rotating. We must throw out the clutch, then, so that these gears will stop revolving, or they will be stripped. After throwing out the clutch, the arm A is pulled forward and the sliding gears moved backward until they mesh with the second gear from the left in the drawing. Then the clutch is thrown in again and power is carried from the driving gear through the countershaft back to the sliding gear and then through to the rear axle. The car moves forward on low speed.

As soon as sufficient car speed is attained the clutch is thrown out and the sliding gear moved forward until the front part meshes with the third gear from the left on the countershaft. Then the clutch is thrown in again and the car moves forward on second speed. The clutch is again thrown out when the car is moving fast enough and the sliding gears move still further forward or towards the right until the projections on the sliding gear then fit into the projections on the driving gear.

When the clutch is thrown into action, the driven shaft rotates at the same speed as the engine and the car moves on high speed. In order to get back into low speed or neutral, the sliding gears must be passed through the second speed gear. In order to get the reverse from high the sliding gears must pass through both the second speed and the low speed gears and mesh with the reverse idler gear shown at the extreme left.

This is called the progressive type of transmission simply because the sliding gears progress through the various speeds. Such a combination is rather awkward and at the present time little used.

Selective Type of Gear-Set.

The gear set used on the majority of modern cars is that of the selective type and a sketch of this is shown in Figure 40. In this case the sliding gears, instead of being fastened together, are operated independently by the forks A and B each mounted on a separate change gear shaft. The change gear lever fits into the slots shown at C. The driving gear as in the type already described

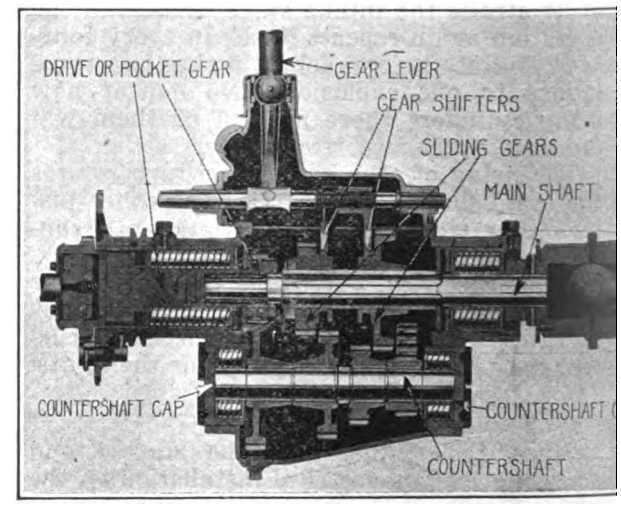


Fig. 41.—Cross Section of Typical Selective Type Gear-Set.

rotates with the driven clutch member and meshes with the countershaft gear.

The countershaft gears are all fitted to the countershaft and rotate with it exactly the same way as described in the progressive type. The last gear to the left meshes with the reverse idler gear. In operating this transmission, the change gear lever is tipped to the left. This brings the arm so that it

Digitized by Google

fits into the slot C on the shaft A. It is then pulled backwards, moving the shaft A forward and meshing the low speed gears. The clutch is engaged and the car moves forward at a slow speed.

For second speed, the change gear lever is brought forward bringing the sliding gears to neutral in the position shown. The change gear lever is tipped to the right which brings it into the slot C upon the shaft B. It is then moved forward and the sliding gear moves towards the left into intermediate speed.

High speed is attained when the sliding gar fits into the projections on the driving gear. A cross-sectional view of this transmission gear-set is shown in Figure 41 and clearly shows the essential parts of a selective sliding gear transmission.

CARRIAGE BUILDERS' ANNUAL EXHIBITION.

Through a typographical error in the September number of this magazine, we announced the exhibition of Carriage Dealers rather than Carriage Builders at Cincinnati, Ohio. Since this organization is one of the oldest in the country, doubtless all of our readers noticed the error and were not misled by it.

The Carriage Builders' National Association has held its annual conventions for many years, this being the 46th, and to keep pace with the trend of the times, this year will find many automobile accessories upon exhibition.

The Rock Drill Blacksmith

Part II—Two Methods of Drilling and the Various Shapes and Styles of Rock Drills Commonly Used

Copyright, J. F. SPRINGER

The rock, which the rock drill has to penetrate, differs wonderfully. Sometimes it is quite soft and friable; sometimes it is exceedingly hard and stubborn. Between the two extremes are many varieties. In addition to the character of the rock itself, we have to deal with it in various arrangements. At times the rock is very solid and free from crevices. It may be essentially the same material for foot after foot of the hole. At other times the rock will change suddenly from one variety to another, cracks and crevices will be abundant, and, in fact, big cavities are sometimes encountered. The drill enters through hard rock, it may be; and then there is practically nothing at all for a while. Here a drill bit may be lost.

The reader may have gathered already that the duty of a rock drill bit is liable to excessive variations. Now, some of the differences in the rock and the circumstances will have to be provided for in the form and the heat treatment of the drill bit. With the form the blacksmith shop will, perhaps, have little to do, except in the way of making up the exact form decided upon by those in control of the blasting operations. But the heat treatment may be left to the shop, at least to a great extent.

Various Points to Consider.

For the purposes of this present chapter it will perhaps be enough to emphasize the points that it will be wise for the blacksmith to familiarize himself with the duties the various forms of bits are expected to perform; and the reasons for preferring one style of bit for one job and another style for another job. It will be well for him to understand why it may be preferred sometimes to start off with one style of bit and then to change to another style later on. It will be well, too, for the smith to learn why it is that the rock wears the face of the bit differently from the sides, and how this difference will be modified as the character of the rock changes. In short, the wide-awake blacksmith should not be content to stay in his shop and judge whether the drills are working effectively simply by examining the dull bits brought in from time to time. He should get out of the shop and watch the action of the drills at the point of use.

If possible, he should learn the mode of operation of the drill bits by personally operating one. When the rock changes, he will be there to note the effect on the drilling. Some of the things a blacksmith should know will be told in this chapter. But he will do well not to rest satisfied with this, but to get all the information he can in connection with the very work his drills have to do.

The reasons why the smith should get an understanding of the way the rock reacts on the bit are two: (1) Because it will enable him to understand why changes in styles are made and thus assist him in making the bits just right; and (2) because it will show him the need for giving different heat treatments to different styles of bit, and even to different parts of the very same bit.

Two Methods of Drilling.

Rock drills do not all operate on the same principle. But pretty much all the rock drilling in the world is done in one of two ways. Either the drill bit is hurled or

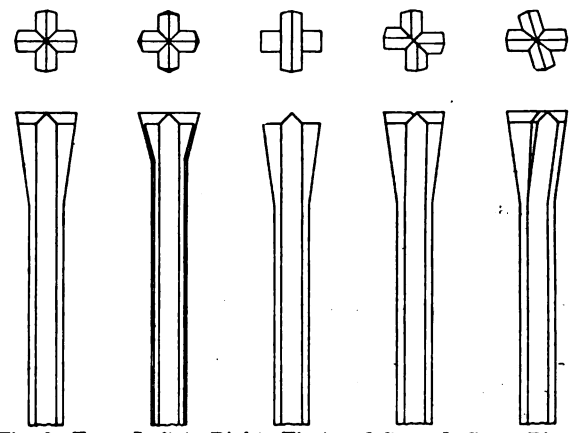


Fig. 3—From Left to Right: First and Second, Cross Bits; Simmons Bit; Brunton Bit; X Bit.

dropped against the rock or else the bit is held against the rock and is forced into it by a hammer blow. The one procedure is percussive drilling; the other hammer drilling.

These two procedures are followed, both in hand drilling and in machine drilling.

Forms of Drill Bits.

There are very many forms of drill bits in use for drilling into rock and rock-like material. Some designs are, no doubt, freaks and serve no special purpose in any better way than more usual forms. But there still remain a number of useful varieties. One and the same style or form cannot be expected to cut hard and soft rock equally well and to start and carry on a hole to the very best advantage.

One style of bit will have a single cutting edge extending from one side to the other of the face of the bit. Another form will have two such cutting edges arranged at right angles to each other. Naturally, these two cutting edges will intersect at the center of the face. In another style, there will be the two edges, each running from side to side, but they will not be at right angles to each other. The cutting edges may have the same form as that found with the cold chisel in machine shops. That is, the cutting edge may be a double bevel.

Again, the cutting face may be flat or it may be curved. This will perhaps need explanation. Consider an ordinary cold chisel. The edge will be straight. If we set it up vertical on a table with the edge down, the edge will touch the table from one side of the chisel to the other.

Now conceive a similar chisel with the edge rounded like the end of a dinner knife so that when set up as before only one or a few points touch the table. Rock drill bits are made in both styles. In one style the edges will all be straight. If the bit is set up vertical as if for use, then all the edges will touch the table from one side of the bit face to the other.

In another style the edges will all curve, so that, when set up as before on the table, only the central part of the face will touch. The face is convex instead of flat.

There are some bits which are made with the cutting face concave. That is, the edges are curved, but they touch the table, when set up as before, only on the outer rim of the face. In the center the edges are further from the table than anywhere else. It may be convenient to speak of bit faces as flat, convex and concave.

Hollow Drill Bits.

Further, drill bits are often made from stock which has in it a central hole. Such bits have faces with no central parts at all.

Generally, the face of a rock drill bit will be larger in diameter than the stock from which it is made. At times the difference will be very considerable. It is really necessary to have some difference in order to prevent the shank from sticking in the hole. Ordinarily the bit will have its largest diameter at the cutting face. From there back the diameter decreases until it diminishes to that of the shank.

The taper from the face of the bit back to the shank properly varies with different styles of bit or with the different services the toll is to perform. Take the case of the standard cross bit. There are two cutting edges if we count an edge as running from side to side, or four cutting edges if we count from the center of the face out to the side. The taper back from a cross bit may be as small as eight degrees for one side of the taper, or 16 degrees for the angle between the two sides. This gentle taper provides a good, solid backing and should give good strength back of the outer ends of the cutting edges.

The cross bit may, however, be made with a 16-degree single taper or—what is the same thing—with a 32-degree double taper. Naturally the extreme ends of the cutting edges are not backed up as solidly.

The Cross Bit.

The cross bit has two diametral cutting edges at right angles with each other, or four radial cutting edges at 90-degree intervals. It may be made from three forms of stock—the round, the octagon and the cruciform bar. The Michigan copper mines appear to have preferred round stock, but the iron mines of Michigan and Minnesota the octagon bar, while the cruciform bar seems to have found favor in the extreme West.

There are three things required of a rock drill bit, which have been expressed as follows:

(1) To chisel out a hole in the rock;
(2) To keep this hole round and free from rifles;
(3) To "mud" freely.

The cross bit meets all three requirements,

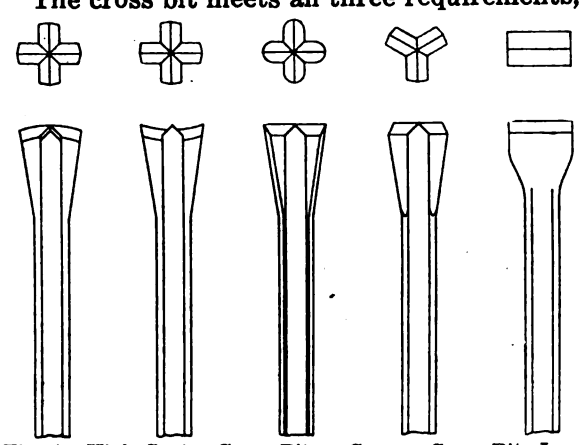


Fig. 4.—High Center Cross Bit or Convex Cross Bit; Low Center Cross Bit or Concave Cross Bit; Round Edge Cross Bit; Y Bit; Bull Bit.

and this is probably the fundamental reason why it has found so much favor in American metal mines. The chisel edges of the cross

Digitized by Google

bit are of such form as to suit the chiseling action required. The double bevel of the chisel edge is properly made equal to 90 degrees. It will then chisel well into the usual rocks. The side edges may be called the reaming edges.

Both the chisel edges and the reaming edges of the cross bit will wear in cutting down into rock, especially if the rock is hard.

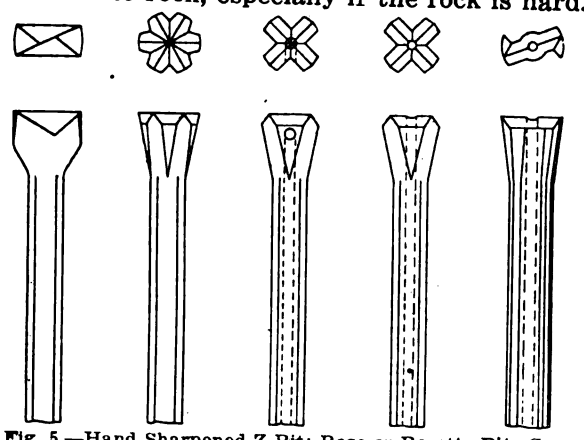


Fig. 5.—Hand Sharpened Z Bit; Rose or Rosette Bit; Cross Bit (Hollow Steel, Side Exit); Cross Bit (Hollow Steel); Z Bit, Here Shown on a Straight Bar.

With soft rock they still wear but may remain fairly sharp. Whether the rock is hard or soft, the bit will naturally lose diameter. But if the taper back of the face of the bit is gentle, a flat-faced bit will last much longer than it would if the taper were rapid.

The roundness of the hole and its freedom from rifles depend largely upon the reaming edges. The gentle taper tends, it seems, to maintain these edges and consequently to keep the hole round and free from rifles. The third requirement of a rock drill bit is that it shall "mud" well. By mudding is meant the action of throwing back the small bits of rock as the chisel edge cuts them loose. Whether a bit will mud well depends in part upon the angle between the companion bevels on a cutting edge.

A right angle is considered good. If the chisel edge is made much sharper or much blunter than this, then the mudding action may be less advantageous. However, the reader is not to look on a 90-degree chisel edge as necessarily the only thing. There are so many variations in the character of the rock, the hardness of the steel, the amount of water fed to the face of the bit, and so on, that an iron-clad rule can hardly be set up.

The X Bit.

The X bit resembles the cross bit in the fact that it has two chisel edges, each a diameter in length, or if we choose to put it so—four chisel edges, each a radius in length. But the angle between diametral edges is, in the X bit, different from a right angle. There is a definite purpose in having all the angles bigger or smaller than 90 degrees. It is customary to turn the drill one-eighth of a turn between blows.

With the cross bit the cutting edges would all be in exactly the same position on the rock every second blow. In fact there would be in effect only two positions of the cutting face on the rock. Changing from the right angle tends to correct this and distribute the cutting action better over the bottom of the hole.

The cross bit with its cutting edges at exactly 90 degrees will be in precisely the same position every two partial turns between strokes. One partial turn is one-eighth of a complete turn, so that two of them make exactly a right angle. With the X bit this sameness of position every two partial turns is broken up.

The Y Bit.

The Y bit has three cutting edges, each of them one radius long. The cutting edges are, in fact, radii set at intervals of 120 degrees. As there are 360 degrees in the whole circuit, one-eighth of a complete turn is 45 degrees. The same position of the cutting edges will recur every now and then, but not nearly so often as with the cross bit. The Y bit is said, however, to be difficult to make and resharpen by hand methods.

The Bull Bit.

This bit has a single cutting edge extending as a diameter clear across the face. The edge is made rather dull. This style of bit has been found very useful in certain lead and zinc districts in Missouri where the limestone and flint set up a stubborn resistance to the cutting action. When the hand-sharpened cross bit was employed the wear was so great as to make resharpening a considerable problem. In fact the rock was not so much cut as broken up by shock. With a machine to do the sharpening the cross bit appears to be satisfactory under the forgoing conditions. But when the sharpening has to be done by hand methods, the bull bit seems to be preferable.

The Z Bit.

This bit has a peculiar form. It has found service in the United States in the lead district in southeast Missouri. The Germans are understood to make large use of it and to supply steel, in normal times, twisted or otherwise formed to facilitate making and resharpening.

The Brunton Bit.

This bit is the invention of D. W. Brunton. Its form resembles that of the X bit. There is a difference, however. The cutting edges are neither diameters nor radii. The edges may be regarded as four short radii somewhat displaced. It is understood that this bit may be resharpened by hand without all the difficulty attendant upon resharpening an X bit. This ease of resharpening is an admirable quality. Otherwise the bit is to be viewed as an equivalent of the X bit. It has the same advantage that the X bit possesses over the standard cross bit. This is the advantage of not striking the rock precisely the same every two turns. With both the X bit and the Brunton bit four or more partial turns are required before the bit strikes just the same as before.

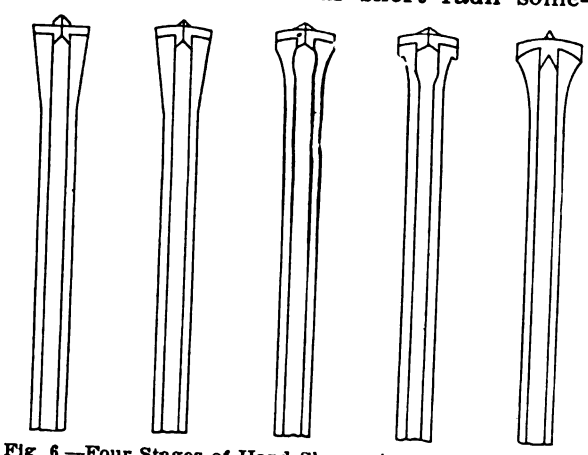


Fig. 6.—Four Stages of Hand Sharpening a Cross Bit with a Set Hammer. At Right; Cross Bit Hand Sharpened with Fuller and Dollie.

The Carr Bit.

This is a comparatively new bit. It is simple in form, having but one cutting edge. This extends along a diameter across the face, but is interrupted by a sunken place located half way between the ends. The cutting edge is a double bevel of the cold chisel form. It may, naturally, be sharp or blunt. A rather blunt form with an angle of, say, 120 degrees seems to be representative. If one has any trouble in imagining just what an angle of this size looks like, he may easily help his imagination in the following way.

A triangle having three equal sides is constructed with the aid of compasses opened to just the length of a side. When the triangle is completed, it is only necessary to prolong one of the sides. The new angle thus formed outside the triangle will be an angle of exactly 120 degrees.

Most forms of rock drill bits have heads which taper from the cutting face back to the shank. This is not the case with the Carr bit when made from ordinary solid stock having no hole in the center. The thickness of the head is just about the thickness of the steel stock; the breadth of the head is considerably larger. When the upsetting is done to get enough metal to form the head, the smith will need to be careful that he does not thicken the metal all around.

It is claimed for the Carr bit in effect that it does not wear on the sides like other bits. This means that the hole in the rock will taper less. If one considers this point, it is not difficult to see that this means a good deal of economy and satisfaction. There will be a less number of changes of drill bits needed to drill a given hole. And the more gentle taper means that the amount of rock to be cut will be less than would otherwise be the case.

The blunt cutting edge has been found to cut faster than if the bit were given a sharper edge. The depression across the cutting edge acts, it is understood, as a kind of pilot. It also reduces the amount of contact between drill face and rock. The result of making the transverse depression is to increase the cutting rate. The bluntness of edge is considered an advantage as it reduces to a minimum the tendency of this type of bit to enlarge the hole considerably beyond the breadth of the bit head. It is also understood that a blunt edge will cut faster than a sharp edge.

Solid and Hollow Drill Steel.

During recent years the hollow bit has come greatly into use. It seems probable that in the end it will pretty well displace the solid steel. Hollow drill steel stock is just about the same as other drill stock except for a hole running through it along the axis. The hole is utilized for the purpose of introducing water or compressed air to assist in getting rid of the small bits of rock produced by the cutting action of the drill.

Difficulty has arisen with the use of hollow steel. There is a tendency to permit the rock at this point to remain uncut. As the drill goes down, a longer or shorter core of uncut rock will form in the hole in the bit. This core is not wanted, as it stops up the hole and hinders the water or compressed air from performing its duty. These cores may become quite long. It is understood that they have at times continued to form until the length had increased as high as eight inches.

A remedy has been found. This remedy consists in plugging the hole near the cutting edge and making an exit in the side of the drill head back of the plug. A simple way of making the hole in the side and at the same time doing the plugging has been discovered. This method will be explained later.

In cases where the hole has its exit in the face of the bit and a core forms in consequence, it may become the blacksmith's duty to remove the core. How to do this will also be explained in a succeeding article.

Hand Drill Bits.

A good many blasting holes are cut in rock by simple drill bars operated by hand. There are, corresponding to machine drilling, two methods of cutting the hole. In the one the drill bar is lifted and dropped, lifted and dropped. A sharp blow is struck by the fall of the heavy bar. This is similar to machine drilling of the type where the drill bit is thrust at the bottom of the hole and then thrust again.

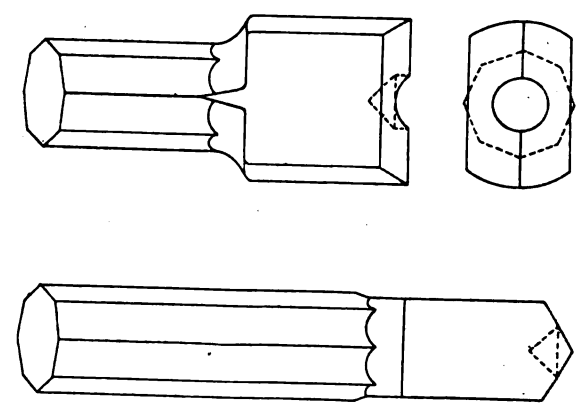


Fig. 7.—Three Views of the Carr Bit.

Wherever the drill bit is actually removed from the bottom of the hole and the cutting done with a rapid forward movement of the bit, the operation is percussive drilling. But hand drilling is done not only by the lift-and-drop method—that is, by percussion—but also by the use of the hammer. The drill

Digitized by Google

rod is held in place and a blow struck on the outer end with a hammer. This is hammer drilling, whether it is carried out by hand or by machine.

Ordinarily, a hand drill rod has a single cutting edge. This edge will usually have a double bevel and in this respect resemble a cold chisel. How sharp the double bevel should be will depend upon the rock. If the rock is hard, the double bevel may often have a total angle of nearly 90 degrees. That is, each single bevel will be of about 45 degrees. When combined the total will give about 90 degrees—that is, about one right angle.

If the rock is soft, the cutting edge may be made sharper. If, however, the rock is a coarse-grained sandstone which breaks up rather easily, then a blunt edge is understood to be better than a sharp one. Where hand drilling is used to penetrate a layer of earth the blunt edge will probably be found better adapted than a sharp one.

Buy a Bond and put a B in the kaiser's bonnet.

GLITTERING CARS.

(By Walt Mason.)

Some poet wrote, in days of old, "All things that glitter are not gold." The poet's head was large and long, his intellect was working strong. There were no flies upon that bard, who sprang the truth, and sprang it hard.

All things that glitter are not gold; we wouldn't be so often told, if haply we'd remember that, and post the maxim in our hat. The junk that fakers want to sell will often look surpassing well, but when it's used it comes to pass that shining gold is only brass.

I bought two diamonds long ago; they cost me eighty bones a throw. I held them proudly in my hand, and there they shone to beat the band. I bought them from a stranger slick, who found in me a trusting hick. I swallowed all his helpful bunk, and handed him my bottom plunk. And in a month the stones were dead; no gorgeous radiance they shed. The man who bilked me was a peach; those gems were worth just eight cents each.

The poet said, "Oh boys, behold! All things that glitter are not gold!"

The man who goes to buy a car, down where the blithesome agents are, should keep the maxim in his mind; it isn't safe to go it blind. Some shining paint and nickel plate will make a tinhorn boat look great. The buyer, take it as a rule, is quite an easy man to fool. He knows no more about a boat than Uncle Ezra's billy-goat. He doesn't know or want to know what makes the dog-gone inside go; but he would like a fool-proof car, in which a man may journey far without it coming all apart and rupturing the owner's heart.

He ought to buy a car that's made by men of standing in the trade. Have they been in the business long, and are their fame and credit strong?

He should remember that the Haynes was first to hit our native plains, and all the time it's kept abreast of everything that's first and best. That is the safest guarantee for easy marks like you and me.

The poet said, "Our feet grow cold, for all that glitters is not gold."

An Ingenious Blacksmith Makes Many of His Own Tools.

Many Smiths Started with No Money in Their Pockets and Ended with a Fortune, Just Because They Happened To Be Ingenious

BY JAMES F. HOBART, M. E.

Some smiths very naturally must do a considerable bit of wheelwright work now and then and find it very convenient to have some means for holding a wheel in a horizontal position, bench high, and firmly enough to permit of driving spokes or felloes or boring for tire bolts, etc.

Recently I saw one smith using the anvil for this purpose. He had fitted up a bolt which he placed through the hardy hole of the anvil and the lower end of the bolt, near the head thereof, had been squared and upset to fit loosely inside the hardy hole but too large to turn around therein.

The smith had welded a small eye, A, to the head of this bolt, B. The eye was made from ½-inch stock and projected downward when the bolt was in place in the anvil. A piece of round ½-inch steel, C, had been bent up with a similar eye at one end and this eye was hooked into the eye on the end of the hardy hole bolt. Then the plain end of the second eye was cut off just long enough that it reached the floor beside the anvil.

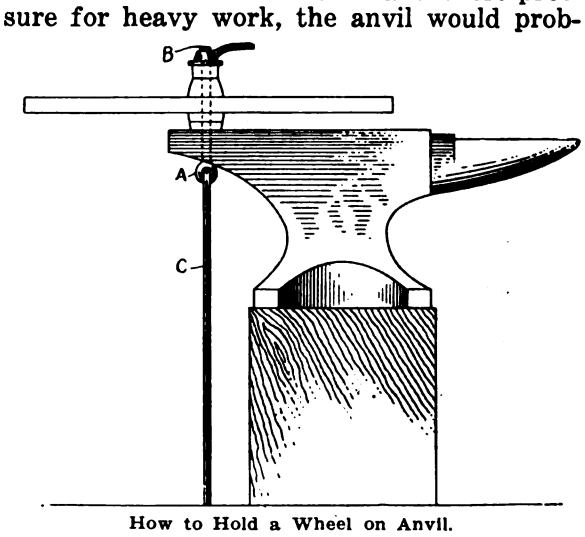
A "pollywog" nut was fitted to that portion of the bolt which stood above the top of the anvil and this nut, together with a big washer about 5 inches in diameter, completed the outfit. The piece of rod attached to the eye in the end of the bolt head prevented the bolt from falling out of the hardy hole when the "pollywog" nut was removed. The squared portion of the bolt prevented it from turning around in the hardy hole whenever the nut was applied or removed.

Using the Device.

When a wheel was to be worked upon, the bolt would be pushed from below up through the hardy hole and the supporting rod arranged below. Then the wheel would be slipped over the bolt, the wide washer put in place, and the "pollywog" nut screwed down upon the washer, holding the wheel firmly in place and enabling the smith to work on the wheel with considerable force, the limit, of course, being that required to tip the wheel, anvil and block over upon the shop floor.

An anvil arrangement of this kind will not, of course, stand as much side pressure as will a regular wheel stand, well fastened to the floor. But, while using one of the "anvil stands" if the smith will take care to stand at the end of the anvil opposite the horn, and to exert the working pressure in the direction of the horn, pretty heavy work can be done upon a wheel thus supported upon the anvil, with no danger of overturning it.

Spoke driving and boring with the hollow auger, wedging and rim boring may be thus done with little danger of upsetting the anvil. But, should the smith stand either behind or in front of the anvil and exert pressure for heavy work, the anvil would probably be overturned, wheel, block and all. Therefore, look out and stand at the anvil end when using the arrangement described above.



How to Hold a Wheel on Anvil.

Forging Pentagons.

I recently heard one smith ask another how he forged "pentagons," whereupon the other smith came back with the query, "What in blazes are they?" When it was explained that a "pentagon" was a figure with five equal sides and angles, the smith stated that he had never forged any and had no idea of what a five-sided piece of metal could be used for.

Such shapes are used, however, and five-sided wrenches to fit five-sided bolt heads are by no means rare, nearly every fire hydrant where there is a city water service having a five-sided head to the screw which opens the hydrant. The principal value of the five-sided bolt or nut lies in the fact that an ordinary wrench will not turn the five-sided shapes unless they move very easy indeed, therefore fire hydrants are not apt to be meddled with except by the proper men with proper wrenches.

To forge a five-sided shape, it is well to make up a sort of flatter with an angle right across the middle of its face. The angle should be made so the sides are at 72 degrees with each other. To use the tool, place the round heated stock upon the anvil, placing the 72-degree tool on top, and strike the tool lightly until three sides have been started.

Next, turn the piece upon one of the flatted sides and apply the 72-degree tool as before, taking care that one of its flat sides comes fair with one of the three sides of the pentagon already formed. In a short time, by turning the work frequently, it may be forged out into a perfectly formed five-sided figure or "pentagon".

A Smith-Shop Brass Foundry.

It is possible for the smith to do quite a bit of business, during his spare time or otherwise, at making small brass castings, provided he can create a demand for them as was the case with a certain smith who had worked up quite a business making models of machines for inventors and others who wished to develop new mechanisms.

This smith procured one of the clay crucibles used for melting brass and other soft metals. He also procured a sleeve of boiler iron, or, more strictly speaking, of tank steel. This stuff is steel which is not good enough for boilers but is strong enough for tanks, smoke stacks, etc.

Making the Foundry.

The piece of steel A was about ⅛-inch thick and when rolled up made a cylinder about 14 inches high and 16 inches in diameter. This cylinder was placed on the forge B around the tuyere iron C and a fire built with soft coal. After it was well a-going, some crushed coke was sprinkled on top of the ignited soft coal and the clay crucible, charged with brass, was placed on the coke and more of the coke packed around the crucible until it was filled to a level a little above the level of the brass inside of the crucible or melting pot.

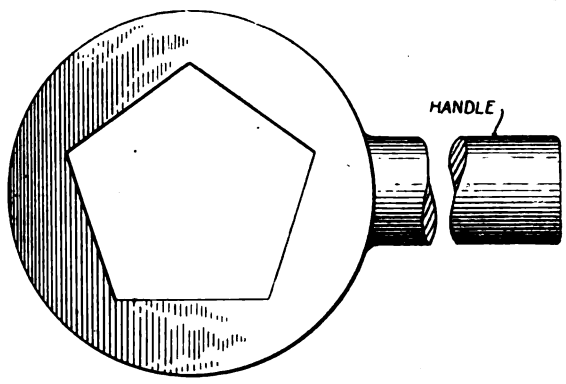
The crucible which was about 12 inches high, would easily contain 50 pounds of brass after melting. Of course, that amount could not be placed inside in pieces of scrap, but by feeding in a few pieces at a time, 50 pounds could easily be put inside the melting pot which this smith was using.

Need of Cover.

An iron cover, D, with a ring in it, was placed on top of the crucible while in the fire.

Digitized by Google

The cover, which fitted as tightly as possible on top of the pot, was for the purpose of keeping the air from the brass. When brass and similar metals are heated, they unite with air very promptly and form oxide or "dross" on top of the molten metal. And it is only a question of time when metals, kept melted and exposed to the atmosphere, would be entirely oxided and nothing but dross would remain in the ladle or the melting pot.



Forging a Pentagon.

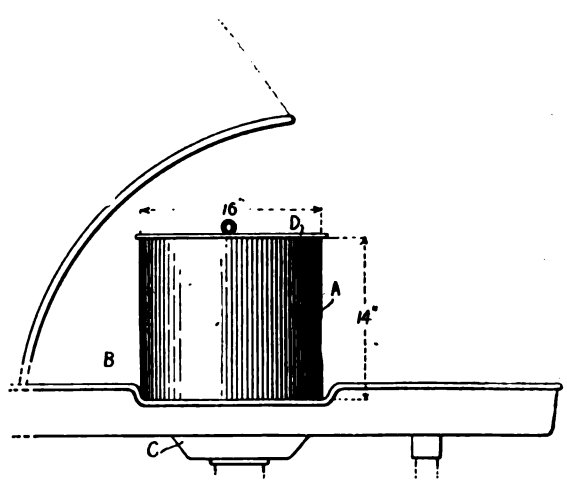
Covering the pot with the bit of iron prevents a whole lot of metal loss through oxidization. The ring in the top of the cover is for the purpose of removing the cover with a hook when more metal is to be added or the contents of the crucible are to be stirred before being poured into the molds.

Before placing the crucible on the fire, some arrangement must be made for handling the pot when the contents are melted. A pair of tongs will be found the best means of handling the pot. It will not do to catch one edge of the clay crucible with a pair of ordinary tongs, for so doing will surely break the side out of the brittle crucible. Make a big pair of tongs which will grasp the pot from above, extending well down past the middle of the pot and close upon the lower or taper portion. This is the regular way of handling brass melting pots and it is a safe method. The end of each jaw of the tongs may have a piece of flat steel welded on crosswise and bent to fit the crucible, thus giving more bearing surface between the tongs and the crucible.

How to Use Fire.

Do not force the fire too much at first. Put on a very light blast and get the coke well ignited from top to bottom—from bottom to top would be more appropriate—and do not let the fire get above a bright red or a low white heat for that is sufficient to melt brass and most of the other soft metals.

Keep putting in coke and occasionally stir it down with a small rod in such a manner that the lower portion of the fire will not burn out and leave the melting pot exposed at the bottom to a blast of cold air from the



A Smith-Shop Brass Foundry.

tuyere instead of being seated on a bed of glowing coke.

The above is the vital point in melting brass on the forge. Keep coal under the crucible at all times, even if you have to raise it once or twice by the tongs in order to mend the fire between the melting pot and the blast pipe.

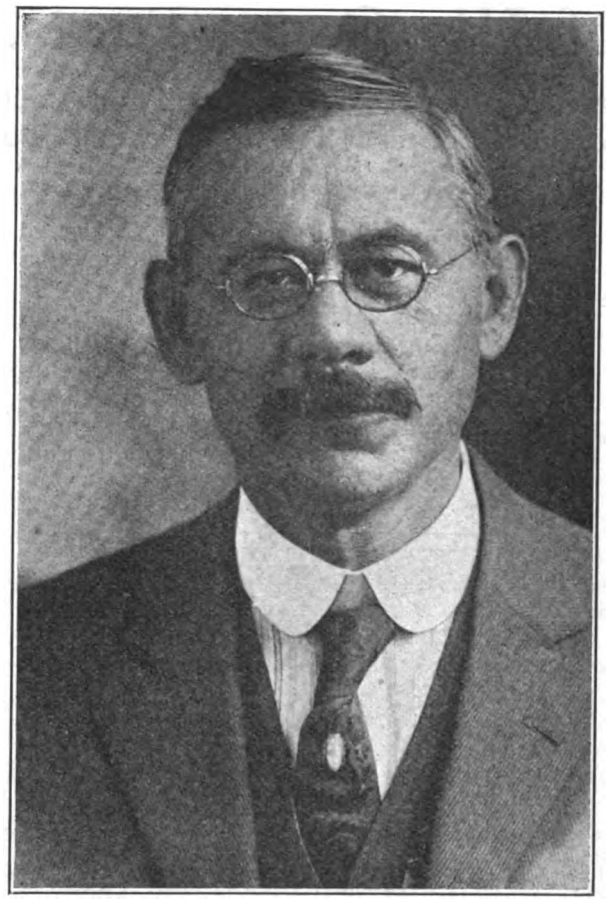
Report of the Meeting of the C. B. N. A.

A General Spirit of Optimism Regarding the Future of the Horse-Drawn Vehicle Prevailed at the Convention

Visitors to Cincinnati during the last week in September might have noticed a particular stir of excitement, and if they had kept up with the times they would have attributed, and rightfully, this busy-ness to the Carriage Builders' National Association, who were holding their forty-sixth annual meeting at the Hotel Gibson.

Despite the fact that pessimists are bewailing the passing of the horses, the forty-sixth annual meeting proved just as interesting and the exhibition just as attractive as those meetings and exhibitions of former years.

At the annual meeting in 1917, former President Theodore Luth of Cincinnati made an earnest plea for standardization, and acting upon his suggestion considerable interest was shown at this meeting relative to this important topic. The South always has had much interest in the carriage industry and



A. H. Ahlbrand, the New President of the Carriage Builders' National Association.

this year proved no exception. Members from that part of the country were present in large numbers.

Mr. McLear Present.

Notwithstanding his advanced age, the honored secretary of the C. B. N. A., Mr. Henry C. McLear, was present and was just as active as usual in his many duties during the convention.

Mr. McLear was one of the original organizers of the Carriage Builders' National Association. Since way back in 1872 he has been identified with the organization. He was president of the organization for three terms and has been secretary and treasurer since 1887. Out of the forty-six annual conventions which have been held by the association, he has been present at forty-three and this convention makes forty-four. The Blacksmith and Wheelwright wishes to congratulate Mr. McLear on his long and useful career, and also to congratulate the Carriage Builders' National Association for having such an upright, faithful, industrious and efficient secretary.

First Day's Proceedings.

According to the schedule planned, the meeting was called to order promptly at ten o'clock by the president, Thomas M. Sechler. After a few opening words, the president called upon the former president, Theodore Luth, to introduce the Hon. John Galvin, Mayor of Cincinnati, as the first speaker.

The Mayor reflected the spirit of Cincinnati in giving the delegates a cordial welcome. The Mayor, as did all of the speakers, dwelt upon the present war situation to some length and made "Patriotism" the keynote of his address. He drove home the fact to every member that while they were in Cincinnati they were among real Americans, that Cincinnati was "in to win," that he was glad because a body of true Americans had chosen a red-blooded American city for their meeting.

In closing he said that every member was heartily welcome, and that he hoped they were as pleased to be in Cincinnati as Cincinnati was to have them.

The Mayor's address was responded to on behalf of the association by Mr. James B. Kaler of Columbus City, Indiana. Mr. Kaler thanked the Mayor for his hospitality and said that the C. B. N. A. appreciated the cordiality expressed by the city. He said that the convention was pleased to be in a city of loyal Americans.

Following Mr. Kaler's response, the president, Thomas M. Sechler, gave his opening address. He reviewed, in part, the progress of the carriage industry and recalled the first convention meeting in New York City. His knowledge of the industry he said was drawn from the publication of Messrs. Ware Bros. Co., The Vehicle Monthly, in the 1913 convention number of which appeared a full history of the association for the forty years of its existence.

Mr. Sechler stated that at the present time the Southern States seemed to have a majority of the remaining carriage building factories and that the membership could be increased by these Southern manufacturers.

Hold Future Meetings in the Summer.

He advocated the holding of the convention during the summer months at points well to the north, and suggested that if this were done many of the Southerners might be able to attend the meetings.

He called attention to the fact that the vehicle output for the past year has been up to, or a little ahead, of the output for the preceding year and he stated that he thought the coming season would be a golden one for horse-drawn vehicle manufacturers. His views concerning the small factory were very optimistic, while he said that the larger industries in the carriage line would shortly be working at a disadvantage.

He next considered the report of the Executive Committee. This report showed that the high water mark of prosperity was reached in 1914, since when receipts have fallen off rapidly. The report showed that the technical school in New York which for many years received financial aid from the association was removed from their payroll in 1916.

Following his address, the president announced his appointments for the committees as follows:

Committee on Resolutions.

E. V. Overman, Chairman, Cleveland, Ohio.
S. P. Nichols, Jackson, Ga.
Richard Hirst, Philadelphia, Pa.
Ohio.
A. L. Black, Norfolk, Va.

Committee to Recommend Officers for the Ensuing Year.

Theodore Luth, Chairman, Cincinnati,
A. H. Ahlbrand, Seymour, Indiana.
H. A. Crawford, Kalamazoo, Indiana.
James B. Kaler, Columbus City, Ind.

Digitized by Google

Committee on Exhibition.

C. J. Rennekamp, Chairman, Cincinnati, Ohio.
W. C. Martin, Carpentersville, Ill.
H. M. Kunkle, Ashtabula, Ohio.
Geo. B. Ogan, Chicago, Ill.
R. C. Schemmel, Union City, Indiana.

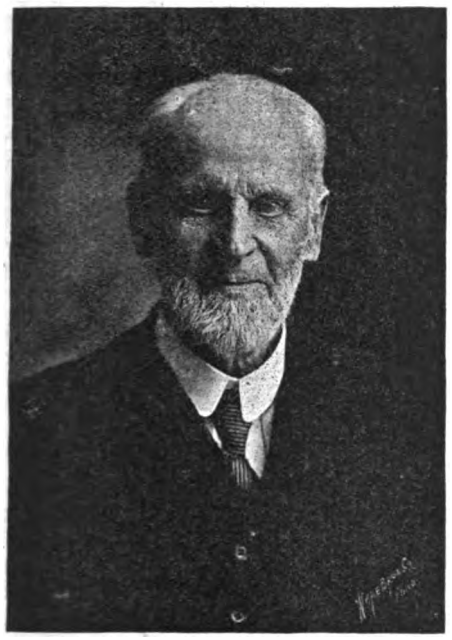
Obituary Committee.

J. Frank Hutcheson, Chairman, Cincinnati, Ohio.
R. C. Ware, Philadelphia, Pa.
J. W. Gresham, Griffin, Ga.

Having announced these appointments, President Sechler called for nominations of the president for the ensuing year. Mr. Theodore Luth of Cincinnati, Ohio, nominated Mr. A. H. Ahlbrand of Seymour, Ind., and his nomination was immediately seconded by Mr. P. E. Ebrentz of St. Louis, who stated that he was glad to second the nomination of a gentleman who has shown himself to be a man of resources and ideas, together with the ability to carry them through.

A motion was then carried that the nominations be closed and according to the constitution the nomination was left until a following day, to be voted upon.

Following a short speech of Mr. Ahlbrand, in which he thanked the association for his nomination, portions of the report of the Committee on Statistics was read by Chairman O. B. Banister and copies of this report were distributed among the members. The report of the standardization committee was



Henry C. McLear, Secretary and Treasurer of the C. B. N. A.

postponed until Thursday so that the report of the Executive Committee, including that of the War Service Committee, followed.

This report was read by the Chairman, Mr. P. E. Ebrenz. After these reports had been accepted, Mr. H. C. McLear, the treasurer, gave his annual report. During the convention year the following members were reported as having died:

Active.

W. A. Sayers, Cincinnati, Ohio, Nov. 12, 1917, aged 67 years.
W. E. Maxwell, Indianapolis, Ind., Dec. 12, 1917, aged 57 years.
E. M. Galle, Utica, N. Y., Jan. 10, 1918, aged 52 years.
Edward W. Kearney, New York, January 27, 1918, aged 65 years.

Associate.

C. T. Newbury, Taunton, Mass., March 1, 1918, aged 60 years.

The meeting was then adjourned until ten o'clock on Wednesday.

Second Day's Meeting.

Upon Wednesday, September 25th, the second day's meeting, the session was short and given over to the report of the Nominating Committee. The nominations submitted were as follows:

Report of Nominating Committee.

For Vice-Presidents:

A. T. Jackson, Rockford, Ill.; J. W. Gresham, Griffin, Ga.; I. M. Baum, Ligonier, Ind.; Hanley Bohon, Harrodsburg, Ky.; H. A. Crawford, Kalamazoo, Mich.; C. R. Crawford, St. Louis, Mo.; James H. Birch, Burlington, N. J.; Daniel T. Wilson, Brooklyn, N. Y.; Thomas B. Tyson, Carthage, N. C.; Clen Perrine, Cincinnati, Ohio; August Geissel, Philadelphia, Pa.; T. M. Robinson, Nashville, Tenn.; A. L. Black, Norfolk, Va.

For Executive Committee.

(For three-year term): W. H. McCurdy, Evansville, Ind.; E. J. Schlamp, Henderson, Ky.; W. G. Norman, Griffin, Ga.; H. A. White, High Point, N. C.; (for two-year term): T. M. Sechler, Moline, Ill.

For Secretary and Treasurer:

Henry C. McLear, Mt. Vernon, N. Y.

Following the report of the Nominating Committee, which was approved, the meeting was adjourned until 10 A. M. the following day.

Thursday's Meeting.

Since the report of the Committee on Standardization had been deferred until Thursday's meeting this report was submitted by F. H. Delker, Chairman. He said that the matter of standardization had been considered very thoroughly at the conference of the carriage manufacturers the day before and that it had been satisfactorily received.

Following this report President Sechler brought up the business for the day, the election of President for the ensuing year. A motion was carried that the secretary be directed to cast a ballot for the election of Mr. A. H. Ahlbrand who had been nominated the first day of the convention.

The motion was seconded and Secretary McLear cast the ballot which unanimously elected Mr. Ahlbrand president, whereupon the president-elect gave a short speech. Mr. Ahlbrand paid tribute to the former executives of the organization and asked for full co-operation from all of the members. Mr. Ahlbrand requested that the one thought to be kept uppermost in all minds was, to put the interest of the Government ahead of their own, that even if the industry must be sacrificed everything must be done to aid the Government in winning the war. He closed by saying:

"Let us never forget this; and if it takes every dollar of our profits and every dollar of money that we have in our possession, let us remember that we cannot hope to equal the sacrifices that those men 'over there' are making for us; and when their appeal comes to us, let us tell them we will back them to the limit."

Following the election of the new president, Mr. Richard Crane of Cincinnati, Ohio, spoke upon "Business of To-Day." "The Business of To-day," said Mr. Crane, "is the business of winning this war. We did not get into this war. This war got into us." This theme followed throughout his address and he closed by saying:

"To the boys who have already made the supreme sacrifice; to the boys 'over there' I kiss the tips of my fingers and join in the Te Deum of a grateful world. I envy from my inmost soul your prerogative to have died and exchanged a citizenship of the greatest republic of the world for citizenship in the Kingdom of God forever!"

Mr. E. E. Parsonage, Chief of the Agricultural Implement and Vehicle and Wood Product Section of the War Industries Board, Washington, D. C., next gave an address and answered many questions relative to the method in which the Priorities Committee intended to handle stock and raw products for the forthcoming year. Following this W. H. Roninger, chairman of the Committee on Classification, rendered his report and said that his report would be printed in the trade journals.

Membership Report Satisfactory.

The report of the Membership Committee, read by Mr. Clen Perrine, proved very satisfactory and showed that twenty-two active and eight associate members had been added to the membership during the year. Mr. Perrine suggested that all of the manufacturers present who were not members had better put in their applications.

Following in order came the report of the Resolutions Committee, the report of the Publicity Committee, and letters from the Cincinnati Chamber of Commerce and the War Industries Board.

The Committee on Exhibition then rendered its report which was put upon record and the secretary, Mr. McLear, stated that invitations had been received from Chicago, Columbus, Buffalo, Cincinnati and St. Louis to hold the next convention in their cities. The rules were suspended and the selection of place of meeting for 1919 was left to the Executive Committee to be acted upon at one of their future meetings.

Upon motion of Mr. Ahlbrand a ballot was cast by Secretary McLear for the election of the several nominees for their respective offices for the year to come.

The president said a few words, and since there was no further business to be transacted, upon motion by Mr. Ahlbrand the convention was adjourned.

Other Matters.

Aside from the business meetings of the convention, the C. B. N. A. members enjoyed a pleasant banquet on the evening of the 26th at the Hotel Gibson. Thomas M. Sechler was the toastmaster. The invocation was given by the Rev. John H. Race and speeches were given by R. A. Tingle and the Hon. John Galvin. In addition to the regular speakers several soldiers were invited, who have seen service at the front, and gave their experiences. At the conclusion of the banquet a dance was given and a general "get-together" was enjoyed by those present.

The exhibit of parts and materials which were upon exhibition during the convention attracted a due amount of attention. They were well arranged and a general feeling of optimism permeated the hall. All evidences point to a radiant future for the carriage industry and the exhibitors all expressed themselves as being entirely satisfied with the attendance and the interest in the goods on display.

PRESIDENT'S LIBERTY BOND ADVERTISEMENT.

President Wilson is the author of the following Liberty Bond advertisement, which was made public through the Liberty Loan Committee:

The White House, Washington.

Again the Government comes to the people of the country with the request that they lend their money, and lend it upon a more liberal scale than ever before, in order that the great war for the rights of America and the liberation of the world may be prosecuted with ever-increasing vigor to a victorious conclusion.

And it makes the appeal with the greatest confidence, because it knows that every day it is becoming clearer and clearer to thinking men throughout the nation that the winning of the war is an essential investment. The money that is held back now will be of little use or value if the war is not won and the selfish masters of Germany are permitted to dictate what America may and may not do.

Men in America, besides, have from the first until now dedicated both their lives and their fortunes to the vindication and maintenance of the great principles and objects for which our Government was set up. They will not fail now to show the world for what their wealth was intended.

WOODROW WILSON.

BACK the BOYS with BONDS and BEAT the BAD boche.

Digitized by Google

THE BLACKSMITH & WHEELWRIGHT

The Pioneer Journal of Its Class in the World.

Member of the Audit Bureau of Circulations.

PUBLISHED MONTHLY BY

M. T. RICHARDSON COMPANY,

71-73 MURRAY STREET, NEW YORK.

POST OFFICE BOX, 654. TELEPHONE—7377-7378 Barclay.

CHICAGO OFFICE, 608 SOUTH DEARBORN STREET.

Entered as second-class matter at the Post Office in New York City.

M. T. RICHARDSON, President and Treasurer — F. R. WHITTEN, Secretary

M. T. RICHARDSON, Editor

FRANK L. AVERY, Managing Editor

F. R. WHITTEN, Advertising Manager — H. F. LUDINGTON, Western Representative

GEO. A. SMITH, Eastern Representative

FRANKLIN MYERS, Art and Copy Dept.

FOREIGN AGENTS:

NEW ZEALAND

MR. R. HILL, Matlock House, Davenport, Auckland, New Zealand.

GREAT BRITAIN

ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance.....$1.00
One Copy, six months, in advance.....60 cents
Single Number.....10 cents
Canadian subscriptions.....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 2d., English Money.

Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

ADVERTISING RATES SUPPLIED ON APPLICATION.

SPECIAL NOTICE

Subscribers failing to receive their magazine regularly will favor us by giving us notification to that effect.

CHANGE OF ADDRESS

Subscribers who desire the address of their paper changed should send us the old as well as the new address.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

OUR EDITOR'S LETTER.

IN my last letter to you, I told you how nice it was to receive a cordial letter from a friend and what a fine disposition one of our subscribers has in being willing to help his other friends. Not long ago one of our letters, in the workshop experience department, mentioned the fact that two competing blacksmiths in the same town were very staunch friends. This is just the sort of a spirit to have, brother blacksmiths. It makes you feel good yourself and it is sure to work out well in the end.

Suppose you live in a town where there is room for two blacksmiths. You easily can afford to be friends with your competitor. There is work enough for both of you. You may be able to do some particular kind of work better than he can, and if you are friends he will probably do his part and send this class of work to you.

In a like manner you will probably be able to turn a certain class of work his way occasionally. Co-operation is the one keynote to success. There is no man in the world today who can live by himself. Every man depends upon his neighbors or upon other men. Take yourself, for instance.

You may say that you could succeed without anyone's help if you owned a farm and were able to put your whole time on it; but could you succeed? Could you construct your house and the buildings all by yourself? Could you make your own hammers and your tools? Could you make your own farm machinery? Could you live on just those things that you grew on your own farm? No, you could not. You would soon find that you needed a few things that somebody else produced. It might be a simple thing like salt or sugar.

At any rate it proves how dependent we all are upon one another. In other words, people must co-operate if they care to live, and it is this co-operation that has led to civilization. Even the savages of olden times lived in tribes or clans.

The person who tries to do his part and does just a little more than his neighbor, for the good of the community, is soon recognized. He leads as a "co-operator." When he departs forever he is greatly mourned because his deeds will be missed. He may not be missed until he dies, but at the same time he has that self-consciousness of being necessary to someone else's happiness.

Just as co-operation can be applied to a small town, so it can be applied to our nation. We must all stand together. We must all help each other as much as we can. We may not be able to give money, but we can be devotedly patriotic. We can exchange our ideas through the papers and magazines. You can help us as much as we can help you. In helping us you also help your brother blacksmiths.

Suppose you live in a town where there is not room for two blacksmiths and another smith tries to steal your trade from you. If you are enemies one of you is bound to suffer sooner or later. Prices will be cut until both of you do not take in money enough to keep either one of you alive.

Is it not much better to combine and put the prices high enough so that both of you can live; to work together and try and get more business? Branch out into neighboring towns. Decide which of you can do the best work in a particular line, then make an agreement whereby each one does the work he is best fitted for. Perhaps one of you can repair automobiles. If so, let the other fellow do the blacksmith work. At any rate, pull together even if you may fail, but under any condition, if you don't pull together, both of you will fail. Think this over and try to practice it and I am sure you will admit I am right.

Are You Willing to Make Peace With a Nation of Murderers?

ABOUT the middle of this month the country was "electrified," if we may use the expression, by a peace note from Austria and doubtless everyone has their own ideas regarding the method of treatment of such a note. The proposal was couched in terms similar to the old joke of "heads I win, tails you lose." Austria seemed to be entirely unwilling to incriminate herself in any way. She didn't want any open discussion, nor did she want to make any suggestions that might be considered as binding.

In other words, she wanted America to show her hand in the big game without laying her own cards on the table. The Allies have just taken a number of tricks, so to speak, and it looks as though the game was fairly well in hand, controlled by the exponents of Liberty. Therefore it behooves Austria to find out just what our next move will be, and this is her method of trying to look over our shoulders.

Austria always has been, ever since the beginning of the war, the catspaw of Germany. Austria pulled the chestnuts out of the fire when she first declared war, and now that Germany has some more chestnuts to withdraw, Austria is again playing the part of the monkey.

We are proud that America's leader has refused to consider any proposal that was not above-board and open. We cannot make peace with the thieves that have broken into a house. Now that the burglars are cornered they are willing to give back a portion of the plunder if we will let them crawl out of the window again so that they can plunder someone else's house.

Yes, WE WANT PEACE! Everyone wants peace, but we realize the only way to have peace is to imprison the burglars, punish the thieves and wipe out the murderers. Only until this is done can we be sure of a real peace, a lasting peace. We do not want the dove of peace to land in a pool of blood. Therefore we must fight until we have won that which we are fighting for, "Liberty."

Motor Trucks and Tractors Are Absolutely Essential.

ALTHOUGH the Government has threatened to curtail the production of passenger cars, as yet nothing has been done to prevent the manufacture of trucks and tractors. The Government realizes, as does everyone else, that both trucks and tractors are absolutely essential for the continuance of the war. If the production of trucks or tractors is curtailed, industries of all sorts will be crippled.

There are no figures available as to how many trucks are being used by the Government in this country for carrying food, supplies, ammunition and men, but undoubtedly the wonderful record we have made is entirely due to these valuable machines.

New York, the center of all industry, would soon breathe her last, if motor trucks could not be used. Practically all of the foodstuffs and practically all of the material used for manufacturing purposes is carried by motor trucks to various distributing points or factories. In many cases food is brought in directly from the farms to the markets, they are then redistributed and trucked to various retailers.

Since the establishment of the return roads bureau, trucks have played an important part in inter-city and even in interstate commerce. Considering all of these facts, is it not obvious that much money can be made by enterprising blacksmiths in repairing trucks and tractors?

The machines must be kept up to standard and efficiency. Many of them are operated both day and night, consequently they require much repair work and adjustment. Repair men are coining money in this branch of the trade. Why can't you do the same?

Another Source of Income for the Enterprising Smith.

ALTHOUGH the automobile industry as a whole, particularly the manufacture of new cars, is to be greatly affected during this winter and next year, those of our readers who are repairing machines will find that their business is growing better, rather than worse.

As soon as the car owners find out that they cannot purchase new cars, they immediately will do all they can to keep the old machines in repair. Consequently the automobile repair man will be figuratively coining money until the war is over. It is for this reason that we have been trying to persuade our readers to repair automobiles.

This is why we have tried to educate them by our automobile articles, and though we feel that we have not in any way detracted from the magazine as a blacksmith paper, occasionally we receive letters requesting us not to publish an automobile paper.

The Blacksmith and Wheelwright always has been devoted to the interests of those who work in metal, shoe horses, or repair carriages and wagons, and it is not our intention to change this policy. At the same time everyone must keep up with the times. The country blacksmith who relies upon our magazine for his education must be provided with the proper knowledge through our magazine. Throughout the country horses are being replaced by gasoline machinery, trucks take the places of wagons and carriages of passenger cars. Consequently, the blacksmith cannot always find enough work to keep him busy if he limits himself to this line of work only.

The blacksmith of today must branch out. Without question, he is the pioneer worker

Digitized by Google

of iron. The blacksmith was the first machinist, as our articles upon the history of blacksmithing show. This being the case, the blacksmith is the best man to repair gasoline machinery. But before he can do this a certain amount of study must be supplemented to his common sense and ingenuity.

That is just why we are publishing the automobile stories, and we should advise all of our readers to read them whether they are interested or not. There is no telling when your own business may suffer and you may be obliged to take up the repair of automobiles. If we can help you in any way, we shall be pleased. Send us your questions and we will give you the benefit of our knowledge as well as the experience of others.

Help to Enforce the Sunday Fuel Conservation Law.

I SUPPOSE that every blacksmith is smiling inside and out because of the Sunday anti-automobile request. Throughout the country those people that could afford it, hired horses or drove their own horses on Sunday rather than automobiles. This means more horseshoe and more wagon work for all of our subscribers.

There was a small percentage, however, that did not heed the request. This small percentage of yellow dogs are the fellows who are taking the bread from your mouths and stealing the fuel from your sons whom you have sent to France.

Don't let them do it.

Make them act patriotic even if they are not. Tell them that you don't intend to have them waste the materials which you are trying so hard to save. You are depriving yourself of something to help win the war, but there is no reason why you should deprive yourself of it so that they can use it.

When a car owner brings his automobile to you Saturday morning and tells you that he wants to use it on Sunday, promise him his machine for sometime Monday, but do not let him get out of your shop with his automobile if you can help it, and if he does get away tell him your opinion of unpatriotic Sunday automobilists.

The Fuel Conservation request certainly met with a fine response. We are glad to show germany that we are not a nation of pleasure and dollar chasers. We are glad to show germany that we ARE IN TO WIN and that no sacrifice is too great for citizens of a free and democratic government. Add your protest to the general one against Sunday driving and help to get our boys back from France. Don't let your neighbor be a yellow dog.

As a Citizen of the Country Insist Upon Conservation.

WE venture to say that every loyal-hearted American is trying his best to conserve food and other necessities of life. As individuals the American people have certainly shown a fine spirit, but true patriotism goes even further than this. A town or a city can be unpatriotic just as much as a person can be unpatriotic. A town or a city can waste products upon a much larger scale than can the individual.

As an instance of this, we recall a New England city where the street lights are turned on about one hour before they are actually needed. This is a waste of coal and raw materials! It may be true that the city has contracted for a certain number of hours of light. Notwithstanding this, however, it is every patriotic citizen's duty to protest against the waste of power that is now going on.

Possibly in your own town a like condition exists. If it does, call the attention of your fellow citizens to it and send a protest to the proper authorities. There would be plenty of coal for everybody if every business and every person were economical. Discourage the useless burning of lights in store windows, upon sign doors, in the streets.

If the authorities in your town do not care to remedy matters, put somebody in office who can. Don't go hungry this winter and freeze to death just because the storekeeper of your main street chooses to burn his lights after he has closed his store.

An Error in History.

Author's correction: On page 64 of the german history will be found the statement "Gott mit uns." This is an error and should be corrected to read "Beelzebub mit uns."

THE SMITH.

We acknowledge receipt of a house organ published by Blacker, Ltd., of Stalybridge, England, called "The Smith." This fine little book contains many interesting articles and may be had free by sending a postcard or letter to the publishers. Blacker, Ltd., as many of our readers know, manufacture mechanical strikers in many sizes and types, and their booklet brings forth many arguments in favor of machines as against manual labor.

The Best, the Worst, and the Oldest Blacksmith Shops

At Last the Prize Contest is Ended and Herewith Is Announced the Fortunate Prize Winners

At last! The suspense is over and we announce the winners of the Prize photo contest. "Easy enough," you may say, but is it? The contest started in the September, 1917, number and in all we received 41 pictures of different shops. Some of the proud owners sent in five or six pictures, and we were at our wit's end, sometimes, to pick the best ones for the magazine.

As the day of the announcement grew near, our poor editor began to see visions and be troubled with insomnia. Irate blacksmiths, who did not win a prize, haunted his sleep, daily he was haunted by the vision of a blood-thirsty smith who had won the prize for the worst looking shop.

"The best, the worst and the oldest," so are the terms of the contest and if you still have all of the papers since September, 1917, look over the entries and see if you don't agree with us, when we say that its like choosing between an apple, a peach and a watermelon, all in the pink of condition.

For the next six months our office boy has instructions to say "out" when anyone asks for the editor, especially if they can be identified as having entered a photograph for the contest and have not received a prize, or have received a prize for the worst looking shop.

We are between two fires, we must choose between honesty and safety, and as always, honesty has conquered. Had we consulted our own feelings we would have awarded the prize for the worst looking shop to a subscriber in California or Washington state, but we take our lives in our hands and hand it to a New Yorker—our own office might have won this prize if we had entered it.

Let's get the bad news off our mind. The prize of $5 for the worst looking shop goes to Partlan Brothers of New York, three husky boys, any one of whom towers a head above our humble editor. Possibly they have been taken in the draft, and if so we will be given respite until the sting of the prize wears away. If they return victorious with the scalp of the kaiser hanging from their belts, they will scorn such small fry as we.

The award of the $5 prize for the best looking shop is almost as embarrassing as the other. The photographs were all so good that the choice might well have been left to luck or the pitching of a penny. We trust that all our readers will agree that Mr. Atherton of Idaho has as attractive a place of business as any.

Like all things mathematical, the choice of the oldest shop is easy. Figures don't lie, unless one is telling of the trout he caught. Our records and letters show that Mr. Scheerer of Illinois occupies the oldest shop shown in the contest.

Now that the prizes are announced, we feel just like the man who pushed the pile of bricks from the third story of the house to the street below—they can't hit everyone, and those that they do hit, won't bear any grudges for anyone.

Note.—Partlan Brothers appeared in October, 1917; Scheerer appeared in January, 1918; Atherton appeared in August, 1918.

The National Truck and Tractor Exposition

The Big Show Upon the Municipal Pier at Chicago Proved Very Satisfactory To Those Represented

The National Truck and Tractor Exposition.

Despite the pressure of war upon the automobile trade, the National Exposition of Trucks, Tractors and Accessories on the whole might well be said to have been a gratifying success.

Without doubt the Municipal Pier at Chicago is an ideal building for the holding of such an enormous show as was staged by the Automotive and Accessories Exposition, Inc. The visitors might well be said to have been 100% interested. Those people who were really interested had plenty of opportunity for seeing the exhibits and the exhibitors themselves were able to give full attention to the persons present.

Ordinarily at the large shows there have been a noticeable number of curiosity seekers, people who did not care to purchase anything and in many cases people who did not own or even intend to own machines of any description. Such people have always been the bane of the exhibitors' existence and though there were a few of such visitors at the Municipal Pier the exhibitors were more than satisfied with the show. The hall was tastefully decorated with bunting and American flags.

The La Crosse exhibited a tractor specially made for the show and run by an electric motor. The operating parts were open to inspection and this machine attracted much attention.

Perhaps the largest and most complete line of accessories was exhibited at the booth of Gray-Heath Company. A number of manufacturers were represented in this exhibit.

The show radiated a spirit of optimism and all of the exhibitors seemed to feel that the future of the accessory field was closely linked with that of the truck and tractor. Many of the purchasing agents present at the show seemed to feel that there would be a greater demand for accessories for the coming year than ever before, for the very reason that if the production of new cars was to cease, then the owners of old cars would be more inclined to invest in accessories and so bring their machines up-to-date. Working upon this supposition, the visitors seem to be on the lookout for truck accessories and many of them left good sized orders.

Digitized by Google



Twelfth Annual Meeting.

From G. E. Johnson of Kansas.—I wish that you would publish a notation in your paper about our coming convention.

The Blacksmiths', Horseshoers' and Wagonmakers' Association of Kansas will hold their twelfth annual meeting at Hutchinson, Kansas, on November 13th and 14th. Every mechanic and blacksmith should attend this meeting as we have prepared a big program of interesting things of value to all.

As I have been a reader of your paper for several years past, I will mention that your paper is very valuable to me. In it I find ideas which enables me to keep pace with time. Also many hints and suggestions, which are good indeed.

The tractor, or "Iron Horse," which plays such an important part, at this time, is brought out in your paper so that every one will understand that it has come to stay, and that it is up to the blacksmith or mechanic to keep it alive. It was demonstrated to me as I was attending the National Tractor Show which was held in Salina, Kansas, about a month ago, that the tractor was here a hundred strong.

The sales of tractors was large which will mean a big repair business in the future. Our locality has already a large number of tractors and the blacksmith is always called upon, when in need of repairs. There are many smiths still mourning over the lost horseshoeing and buggy repairing, while the auto has replaced that long ago, and now the tractor is here, why not brush up the shop, bid him welcome, and get acquainted, the sooner the better.

Some smiths would say that they have no shop room; why not clean up the old shop a little and there would be more room than needed. Get busy, the opportunity is here; why not grab it? Our conventions, which are held every year, is a teacher along the same line as your journal, I have attended nearly every year, and always found it a good investment, especially since the competitors in the same cities will there meet and get a square look at each other and perhaps gain each others confidence, have a talk on prices, and prices generally advance a little; it's a rather slow process but it pays well.

The only price system to follow is the "over head" system, and with the present times prevailing, we must figure right if we are not going to pay for the privilege of working. Everything is double. Why not double the blacksmiths' pay. If any one is earning his pay, the blacksmith surely is. The conventions therefore should be well attended, as it is to their own interest to get these things to exist.

As I am new at the typewriter, you will find many blunders for which you may excuse me, and if you find anything of value for publication you may do so, and maybe in the future when the days get short and nights are long I may come again.

Two Excellent Suggestions.

From H. L. Lynn, Kentucky.—I like your automobile articles which appear in The Blacksmith and Wheelwright, but please do not turn the magazine into an automobile paper, as it seems is being done in many cases. Give us some of those articles, but remember that it is a blacksmith paper first.

I am giving you two suggestions which you can use if you care to. I am sending by mail a model of a sectional bolt rack, the original of which I have used for several years, and find it to be excellent. I would have given it to your readers sooner if I could have made a drawing of it. My drawing is like those of Mark Twain's. You remember when he said, "This is a house; this is a fence; this is a cow; and this is either a woman or a hay stack, I have forgotten which." And so I am sending a real model which will give you the idea better than my sketch.

Every shop needs a pigeon-holed case for bolts and small articles. Very often it is necessary to move such a case, and if it is built in one large piece, it is very heavy to move and lift unless one cares to take the time and remove all of the bolts or contents.

I concluded that the sectional bookcase idea could be applied to the bolt-rack, and so I devised the rack which I am sending you. The size can be varied to suit the needs of the builder. Mine is made out of boards and rough stock which I could find about my shop. The sides of the frame are made from two-inch stock, eight inches wide by 7½ feet long. The top is simply a one-inch board to hold the frame together. It is into this frame that the sectional bins fit. One of these bins is shown at B.

These sectional bins vary in height, but are about six inches in height, seven in depth and 58 inches long. For ¼, 5/16 and ⅜ inch bolts I make the sections about 4½ inches in width. For ½-inch bolts I use fewer divisions and thus have larger bins to hold them.

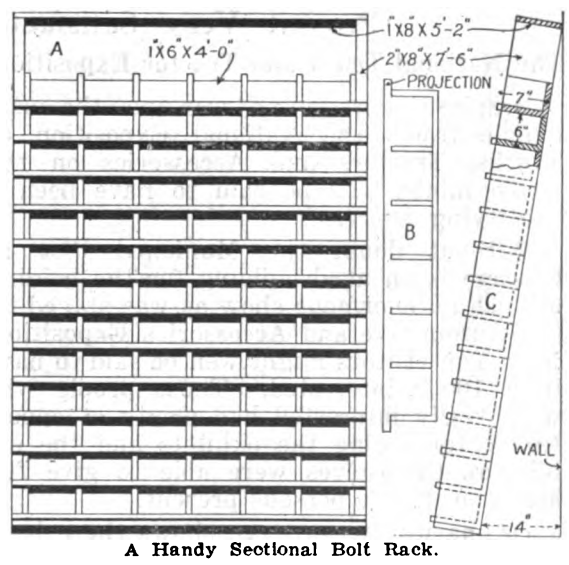
I place the one-inch long by ¼-inch diameter bolts in one or two rows, beginning with the first at the top, left end of the row; next I put the 1½-inch in length bolts, same diameter, always increasing the length as placed in the boxes to the right.

After all of these bolts have been placed, I begin on the next row with the 5/16-inch sizes, one inch in length to the left, and so on; the half-inch bolts should be at the bottom as they are not used as often as the others.

It is always best to make one or two large sections for the very top, in which you can place mower repair parts, singletree clips, etc., according to the demand.

Set the frame about 14 inches away from the wall at the bottom and lean it against the wall as shown at C, that is all it needs to make it stand firmly.

If you want to have the bottom of the



A Handy Sectional Bolt Rack.

trays so that they will have more slope, make the back of the tray at the bottom one inch narrower than the front, then when you pack on the rest of the trays all the bottoms will slope backward.

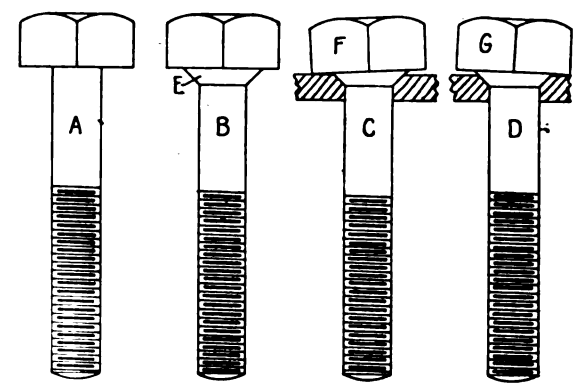
Be sure to make the projections on the trays wide enough so that they will extend upon the frame. A tray with the projections is shown at B. A set of 13 trays are shown packed into the frame at A. You will notice that the bottom of one tray forms the top of the one below it.

I have another idea that may be of help to my brother craftsmen that I gladly give. If every one of us would only publish one of the ideas that we have worked out, it would be a great help to all smiths. No man knows everything about the trade; often an humble workman can tell an expert some little thing about the work that the experienced man doesn't know. I wish every smith would send an idea to you so that you could publish it.

In some places where large bolts are used, such as on chilled plows, beams, etc., the heads break off very quickly. These bolts, like that in the second sketch at A, have a sharp angle where the head joins the body of the bolt. This is the point of greatest weakness. When I make bolts for this kind of work I always leave a large fillet, as shown on the bolt B at E.

I use a light countersink in the heading tool in which I make the bolt, and when bolts are made in this way more metal is added to the weak point. A small countersink in the heading tool does not disfigure the bolt, and if appearance makes no difference a deeper countersink should be used, then the fillet will be much larger.

In this way a ⅝-inch bolt becomes ¾-inch at the head. As a rule the hole in the iron



How Bolts Should Be Forged.

has a little extra space around the bolt next to the head, and if such a filleted bolt is used it will grip tighter and fill up the metal.

With the rounded shoulder, the side strain is taken off the head of the bolt as shown at C. and D. If the fillet is too large, the head will not touch the surface, the whole strain being taken by the shoulder. This prevents any head breakage. I do not think this kink has failed with me for 25 or 30 years.

Editor's Note.—Mr. Lynn does himself an injustice when he says that his drawing is unrecognizable, it was very good indeed. We knew just what he was describing before we received the model. By the way, Mr. Lynn is a carpenter as well as a blacksmith—that is, if we can judge by his work on the model bolt rack which he sent us; let's all hope that he sends another bunch of suggestions. Personally I think that his last one, about the bolts, is mighty good. A machine turned bolt invariably breaks off beneath the head, if it breaks at all, just because of the sharp corner.

You may all rest assured that your Blacksmith and Wheelwright magazine will never turn into an automobile paper; we will publish a few automobile and truck articles, just to keep you abreast of the times; but it will always be the "ironworker's right-hand man."

Shoeing Kneesprung Horses.

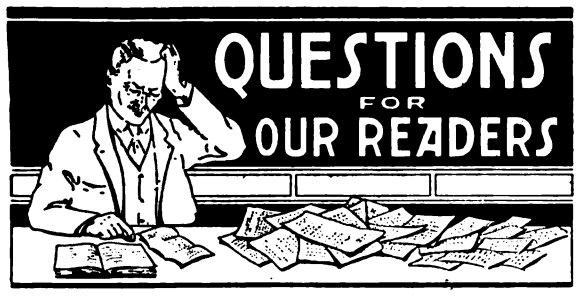
From E. W. Lane, New York.—In regard to Mr. Winter's question about shoeing a kneesprung horse. My experience has been to level the horse's foot to a natural slope, or if anything, to slightly lower the toe and raise the heel of the shoe about the usual height.

Be sure the heels are protected, and if there is any soreness or bruises use a bar shoe and put the pressure on the frog so that it will favor the heel as much as possible. Pack the foot to keep it soft and free from fever. It is a good idea to feed the horse from the floor.

Digitized by Google

Answer for Brother Shaw.

From Joseph Hughes, Pennsylvania.—In answer to Brother Shaw, who wants to know how to weld malleable iron, I will let you know how I do it. I use old files, draw them down to size wanted and I use cast iron welding compound. The main thing is to be careful and not burn it. To weld, first prepare the pieces, and bring parts and welding rod up to a melting heat, also dip rod into flux and then keep rods and parts in contact and allow them to melt together. Where pieces have been lost I have used iron or soft steel in their places. I tried iron for a filler rod, but I did not get as good results as when I used steel.



Why Are Double Tires Used?

From Max Maser, Texas.—I would like to hear from some of the blacksmiths as to how they weld points on plows. I take an old rasp, apply welding compound on the rasp and plow point, take both from the fire and clamp them together. I need no instruction as to welding, only I want to know the shape of the rasp or steel that is to be welded on.

The next question I want to ask is: Why are double tires used on some heavy wagons that I have seen in California? I noticed these about fifteen years ago around Fresno. One blacksmith told me that they were used so that a heavier load could be carried on lighter felloes. I would also like to know if the heavy tire goes on the rim or on top of the other tire, or if the newest tire is put on first and the worn one afterwards. I would also like to know the shrinkage of each, in fact I want to know about this double tire business, all that I can learn or hear from some of those old blacksmiths who have practiced putting them on and know what they are talking about.

Who Can Help?

From a Georgia Reader.—I have been a reader of your Blacksmith and Wheelwright paper for a long time and like it very much. I have been a blacksmith all my life. I should like to ask you for help as I believe you are a friend to all shop men that are trying to be something and trying to be men.

I came South twelve years ago with some money and thought I had the place to make lots of it so I started a shop. I got lots of work and the people seemed to be kind to me. I had their work done on time but they would not pay until fall and lots of them would die still owing me for work, but I kept working on until a number of my family were taken sick. Death took some away, then I became sick myself and my accounts got larger. Still I could not get my money, so I lost all I had and had to stay here because I could not pay a moving bill. So if you can find a good man that will pay a moving bill for me, I will work for him to pay it.

I want to get away from this part of the country. There is nothing here for a blacksmith.

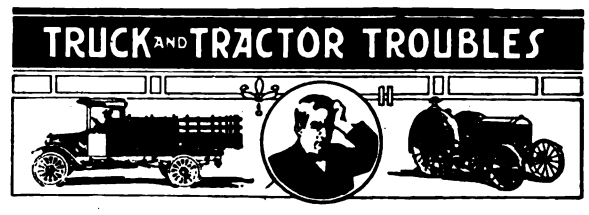
I have a wife and two small children. I don't care where I go just so that I am near a church and get work. I want to leave here. If you can get a place for me I will give reference of my work, of my behavior and manhood.

Welding Heavy Iron.

From E. Alexis, Louisiana.—I trust that some of my brother smiths will help me by writing how they would go to work on a job such as I have to do every day. I am doing heavy welding for ships and using flat iron ¾ by 8 inches. This flat iron runs from the front of the ship to the back and has to be welded to each of 24 bars called stem irons measuring 4 by 9 inches.

In heating this iron, should I give it slow heat or make it rapid? Sometimes it takes two or three heats and this takes too much time. What is the best way to build up around the iron for quick heat? At present I am using fire clay, but it don't last long. Will one of my brothers tell me how to do this work and of something that will last longer than fire clay?

As I am working on this all of the time, I wish that you would send me advice as soon as you can and if any of my brother readers have had experience on this kind of work I wish he would help me.



Some Automobile Questions.

From R. W. H., Canada.—Here are a number of questions which I would like my brother blacksmiths in the States to answer, if they can.

How are automobile wheels built and rims put on?

Suggest methods for tightening automobile wheels that are slack.

What kind of steel is the Ford rear springs made of? These springs will not weld satisfactorily. Why?

Growling Noise in Ford.

From J. D. A., Texas.—When I push the reverse gear pedal, there is a growling or roaring noise in the gearset of my Ford car. What is the trouble?

"OL' HOSS" UP!

The Increasing Consumption of Horse Meat on Eastern Markets as a Food-Conservation Measure.

L. LODIAN.

The expression, "gone to the dogs"—in allusion (usually to a person who has gone on the down-grade beyond redemption)—is said to have originated among British horseshoers, in reference to horses which are no longer brought in to be shod. The common practice "over there" is to "pole-ax" the undesirable, and sell the flesh to dog- and cat-meat dealers. Hence the saying, "gone to the dogs".

Horse meat is a safe, healthy food for humans, and from time to time for the past half-century, diverse medical journals have extolled it. It is of more protein value than bovine flesh: the meat protein (lean) is the muscle- and fibre-builder, while the fat is a heat-giver, but fat—or any fat—is of feeble sustaining power if eaten alone.

Horse meat is deficient in fats, but in protein-content is 21.7 per cent compared to bovine meat at 20.5 per cent. It is that protein superiority which tells its own story in the hackneyed saying, "strong as a horse". Horse meat is now "legal tender" in the butcher trades of a number of States—the Hudson State in particular.

As to flavor and appearance, one can scarce tell it from lean beef. However, the expert recognizes it by its combination flavor of deer meat (venison) and ox meat. The writer has used "ol' hoss"—both the fresh-daily choice "cuts", and the bologna-frankfurter, salami, et al. forms—for (on and off) the past thirty years, both in this country and in France.

Our Kaki-ites in France Use "Ol' Hoss".

In this connection it is interesting to note, according to published press dispatches anent our Sammies fighting the hun-thug hordes, that "the boys" are already familiar with the viand-de-cheval (horse meat), having aptly "borrowed the idea" from their galik co-fighters' kanteen or army-kuisine.

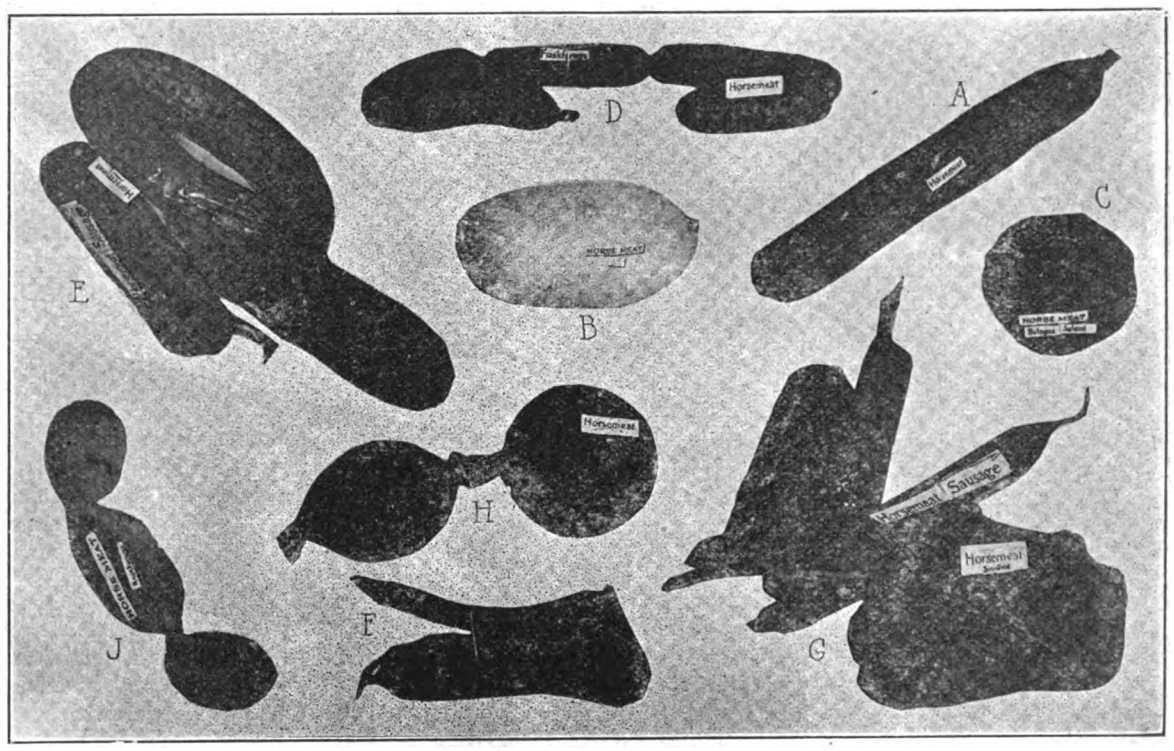
While "our friends" the teutons—(they do not like the word hun, so out of consideration for their feelings, I usually refer to them in conversation as the germ-huns)—have to put up with genuine bow-wow or doggie frankfurter—and glad to get that (when they can).

During the past three years, 'most all the tike-population of hun-land has disappeared into the würst (sausage) machine. Deviled doggie! I have before me the official statistics of the bow-wow abattoir-killings for a decade in the hun thugokracy (a government of thugs, for thugs, and by thugs!). And yet that würst (bologna) ending is not the "worst" wind-up that the mongrel breeds—bi-peds and quad-peds—of the hunokracy of Central Europe might come to! Being familiar with the germ-huns' country from one end to the other, I write whereof I know!

Origin of the Word "Kultur".

It is little known, by the way, that the deutsch word "kultur" is derived from the urdu-sanskrit kurtul (meaning rape, arson, massacre—war helldom, in brief: a war word brought to Europe many centuries ago, by the asiatic hordes of Yengiz-kan and Tamarlan). In the course of centuries, a couple of letters were transposed, and the meaning of the word was reversed. It signified "accomplishments"—just as the word "deuce" (to-day meaning devil) originally came from dieux (gods)!

The present-day huns are consistent, in a



Various Kinds of Conserved Horsemeats. A, Regulation Salami (Bologna); B, Horse-Butter in a Bladder; C, Bologna—Salami; D, Frankfurter; E, Sausage; F, "Trench Flats"; G, Smoked Horsemeat and Sausage; H, Dumbell Bologna; J, Knockwurst.

Digitized by Google

measure: they are only reverting to the original derivation of "kultur"! Writer learnt this "kultur" origin during years of travel o'er the countries of Asia.

"Ol' Hoss" and the Blacksmith.

Throughout this country, blacksmiths are constantly coming across "ol' hoss" undesirables. Now they know enough to tell the owners how they can be many a $50 bill in pocket by diverting their equine not-wanteds to the diverse horse-abattoirs of the cities, for conversion into a useful food-product for humans.

Thus can many an old farmer do his bit towards food-conservation! Hitherto a horse "put out of the way" has been generally a total loss to the owner—he was burying "good money" under the ground! Today he can put that money into his pocket! Of course, the horse-abattoir and its killings are subject to the same inspection as bovine, porcine, et al. killeries. Gonokoki-infected equines (faucy, glanders) are rejected, and sent to the fertilizer plants—just as are trichina porcines and foot-and-mouth bovines. But many minor complaints are legally passed by inspectors as non-dangerous in and as food-products cleanly prepared and well cooked.

Editor's Note.—Mr. L. Lodian has furnished us with one of the price lists used to advertise horse meat, and we reproduce the text herewith, leaving out the name of the dealers only. Should any of our readers care to obtain more details relative to the dealers' name, we will be glad to furnish it.

GET ACQUAINTED.
Why Not Now?

With the fact that we are giving you the very best reasons in the world for buying and eating horse meat.

1. It is a wholesome, nutritious food-product. Nothing cleaner in the world!
2. Horses eat nothing but clean grain, such as hay, oats, grass, etc.
3. Horses won't drink dirty water. "You can drive a horse to water, but you can't make him drink!"
4. Horses are free of tuberculosis, such as may be found in other cattle and swine.
5. There were 300,000 horses slaughtered in Europe last year.
6. Horse meat was consumed by 150 million people in Europe last year.
7. It has the most pleasing and desirable taste. JUST TRY IT!

We deliver all orders received over telephone and allow telephone charges on orders amounting to $1.00 or more.

Prices.

	Per Pound.
Porterhouse Steak	16c
Sirloin	16c
Top Sirloin	16c
Soup Meat	10-12c
Bottom Round	16c
Round Steak	16c
Filet	24c
Rount Roast	16c
Bologna	16c
Salami	26c
Frankfurters	16c
Corned Meat	10-14c
Smoked Meat	24c
Knockwurst	16c
Fresh Chopped Meat	16c

All our Meats and Sausages are sold under the strict supervision of the Board of Health.

PREFERENTIAL LIST OF INDUSTRIES ISSUED BY WAR INDUSTRIES BOARD

The War Industries Board has issued a preference list of industries comprising approximately 70 industries and more than 6,000 individual plants, which are being added to from time to time.

For the benefit of our readers we would say that this list shows, in order, those industries which are to be considered the more essential and the industries which will receive first preference in the shipment and supply of raw material. It may be consulted at any of the United States Labor Bureaus in the various cities throughout the country.

This list will form the basis upon which trucks are to be distributed. For instance, a manufacturer's order for trucks will be filled as soon as possible if he can show that the trucks are necessary for delivery or speeding up the production of actual war material; while another manufacturer, selling a product not upon the list, will be obliged to wait until other orders, more essential, have been filled.

In bringing out this ruling it is claimed that there is no idea of discriminating against other industries than those mentioned on the list, but "to defer the requirements of all other industries and plants until those on the preferential list shall have been satisfied."

Everyone interested in the sale of motor trucks should familiarize himself with the names on the list.

A NEW CORRESPONDENCE SCHOOL.

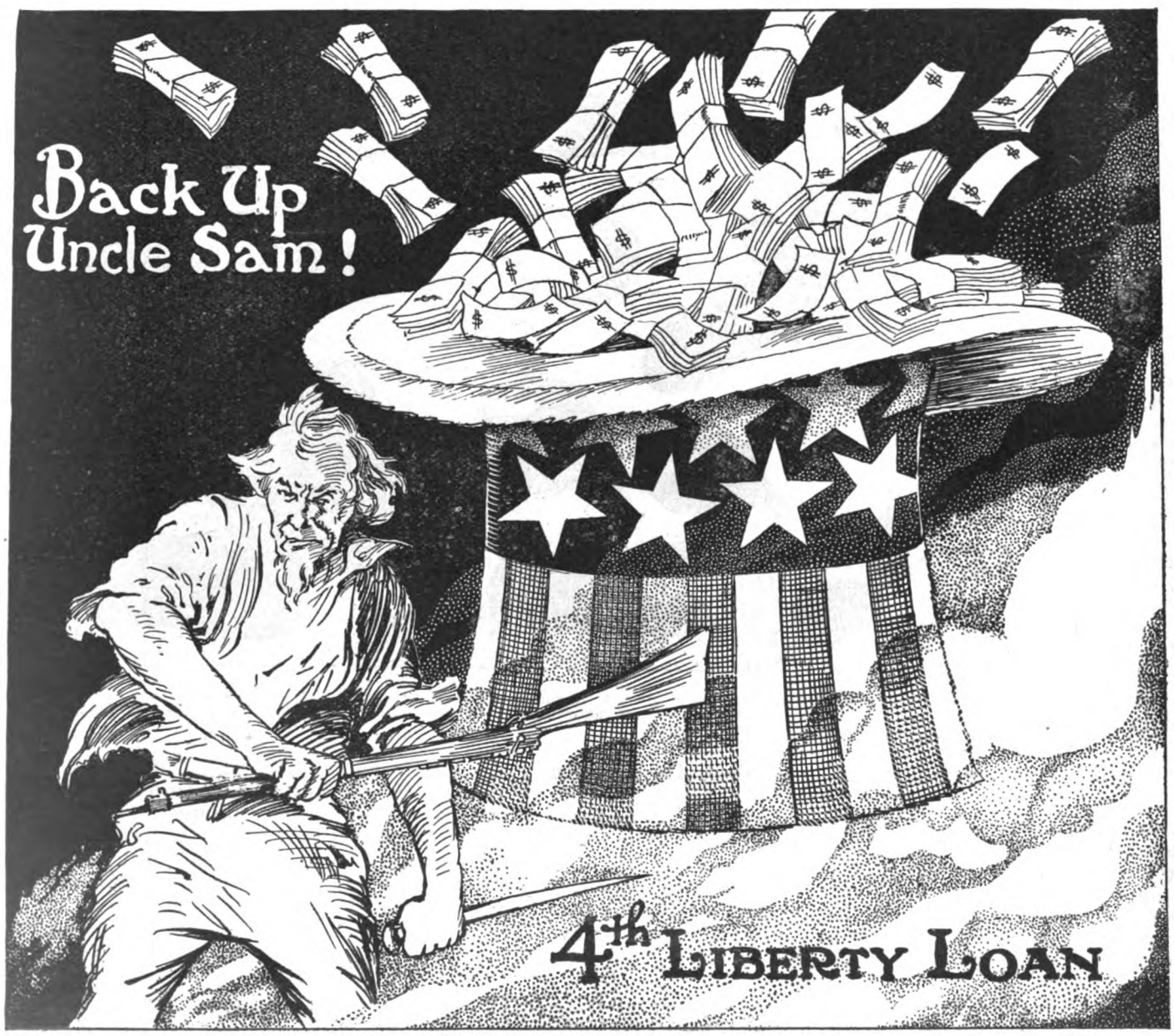
A short time ago we announced in this magazine the discontinuance of the Technical School of New York, and printed a picture of one of the drawings made by a student in the school.

Mr. Andrew F. Johnson, the principal of this school, has just founded a correspondence school at Gray, Maine, along the same lines as the old technical school. This new school will continue the correspondence courses which have been started by students of the Technical School and in addition, Mr. Johnson will give courses to all of those interested in body making for carriages or automobiles.

The price of membership is very low, a complete course being only $30. At the beginning the student is taught free-hand drawing, the use of drawing instruments, illustrating and sketching.

As the course advances, he takes up the application of geometry to wagon design, the projection of lines and surfaces and the laying out of various angles and curves. Practically every problem dealing with body design is considered in the lessons.

At the present time there is a great dearth of men in the automobile body making industry and the younger generation will make no mistake in considering their entry into this lucrative trade. Anyone desiring details or prospectus of the school should correspond with Mr. Andrew F. Johnson, Gray, Maine.



SPARKS AND SHAVINGS



Good Opportunity to Buy Second-Hand Machinery and Supplies.

Many of our readers will be interested in the advertisement which appears this month in another column of our magazine, announcing that the Senderling Mfg. Co., 624 West 47th Street, New York City, is retiring from business and that the reserve stock of standard parts used by this well-known company will be offered at private sale and at bargain prices.

This reserve stock consists of standard materials, including axles, springs, wheels, iron forgings, malleable iron and steel castings, and others too numerous to mention, as well as a large stock of prime second growth Jersey White Oak thoroughly seasoned.

The machine tools offered for sale include a Kane and Roach No. 3 combined shear and punch, a 12-inch jointer, also rip and swing saws with tables, forges, blowers, fans, anvils and hand tools, also a lot of second-hand dump trucks in good order, a couple of mounted gears, body frames, second-hand wheels, scrap iron, etc. This is something which it will pay our readers to investigate and of course prompt action is necessary, as all these materials will be sold as rapidly as possible.

Ridpath's History of the World.

If you have not yet accepted the wonderful book offer made by the Western Newspaper Association, 140 S. Dearborn St., Chicago, Ill., giving you an opportunity to inspect Ridpath's History of the World without any obligation to buy the work unless you are satisfied, we hope that you will cut out the coupon which appears in the advertisement from this company and send it in as soon as possible. The offer is such a generous one that it may be withdrawn at any time.

Digitized by Google

Index to Advertisers

Aetna Nut Co., horseshoe calks....Front cover
Akron-Selle Co., gears....Front cover
American Calk Co., calks....Front cover
American Technical Society, books....271
Anti-Borax Compound Co., welding compounds....248
Armstrong Mfg. Co., bolt dies....252
Armstrong-Blum Mfg. Co., punches and shears....Front cover
Bailey, Geo. D., Co., ball thrust bearings, 2d cover
Barcus Mfg. Co., horse stocks....3d cover
Barnett, G. & H., Co., files and rasps, Front cover
Beckley-Ralston Co., supplies....270
Bertschy-Bermo Co., welding plants....267
Birch Motor Cars, motor cars....265
Bradley, C. C., & Son, shaft coupler....245
Buchanan, C. G., Chemical Co., industrial chemicals....271
Buffalo Forge Co., blacksmiths tools....251
Burden Iron Works, horseshoes....3d cover
Butterfield & Co., taps, dies and screw plates....252
Campbell Iron Co., supplies....Front cover
Canedy-Otto Mfg. Co., blacksmiths' tools..250
Capewell Horse Nail Co., horse nails, Front cover
Champion Blower & Forge Co., blowers....247
Champion Tool Co., blacksmiths' tools....248
Childs, S. D., & Co., steel stamps, Front cover
Columbus Forge & Iron Co., anvils....246
Columbian Hardware Co., vises....266
Cortland Welding Compound Co., welding compounds....252
Cray Bros., blacksmiths' tools....267
Crescent Machine Co., woodworking machinery....4th cover
Diamond Calk Horseshoe Co., horseshoes..267
Eberhard Manufacturing Co., The, stake pockets....249
Edwards, C. D., Mfg. Co., shears....267
Electric Blower Co., blowers....269
Electric Wheel Co., wheels....267
Empire Mfg. Co., wheels....269
Felton, Sibley & Co., paints....245
Firestone Tire & Rubber Co., tires...3rd cover
Fisher & Norris, anvils and vises....252
Franklin Steel Works, toe calks....245
Gogel Mfg. Co., tire heaters....268
Greenfield Tap & Die Corporation, screw plates and blacksmiths' machinery....271
Gwilliam Co., ball bearings....4th cover
Hall Co., Sherwood, sleigh knees....265
Hart Mfg. Co., stocks and dies....4th cover
Harvey Spring & Forging Co., auto springs....250
Hay-Budden Mfg. Co., anvils....4th cover
Heller Bros., horse rasps, tools, etc....252
House Cold Tire Setter Co., tire setters, hollow and spoke augers....4th cover
Jenner, H. W. T., patents....268
Kerrihard Co., hammers....4th cover
Kimball Tire Case Co., tire protectors, Front cover
Leonard-Morton & Co., shoes....271
Linde Air Products Co., oxygen....252
L. S. P. Calking Machine Co., calking machines....246
Macgowan & Finigan Cordage Co., hammers....269
Mayer Bros. Co., hammers....272
Ness, Geo. M., Jr., steel stamps....Front cover
Neverslip Works, The, horseshoe calks....246
Nicholson File Co., files and rasps....250
Oneida National Chuck Co., chucks....269
Parker, C. L., attorney....267
Parks Ball Bearing Machine Co., woodworking machinery....4th cover
Peck, Stow & Wilcox, pincers....272
Phoenix Horseshoe Co., horseshoes and toe calks....272
Porter, H. K., bolt clipper....4th cover
Prentiss Vise Co., vises....4th cover
Rosewater Electric Co., blowers....4th cover
Sampson & Murdock, directories..Front cover
Senderling Mfg. Co., The, hardware....267
Shaler, C. A., Co., vulcanizers....Front cover
Sheldon Axle & Spring Co., axles....270
Standard Horse Nail Co., horseshoe nails, 4th cover
Standard Horse shoe Co., horseshoes....
Star Mfg. Co., agricultural implements....269
Stokes Bros. Mfg. Co., rasps....Front cover
Superior Oxy-Acetylene Machine Co., welding outfits....267
Thompson Tuyere Iron Co., tuyere iron, 4th cover
Union Horse Nail Co., horse nails....248
Western Newspaper Association, books....245
West Tire Setter Co., tire setters, hammers....271
Whisler Mfg. Co., nut splitters, jointer heads....4th cover and 269
Witte Engine Works, engines....269
Young, W. F., veterinary remedies, Front cover

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co. 269

Anvils
Columbus Forge & Iron Co....246
Fisher & Norris....252
Hay-Budden Mfg. Co....4th cover

Attorneys
Parker, C. L. 267

Automobile Springs
Harvey Spring & Forging Co....250

Axles
Sheldon Axle & Spring Co....270

Ball Bearings
Gwilliam Co. ....4th cover

Ball Thrust Bearings
Bailey, Geo. D., Co....2d cover

Blacksmiths' Machinery
Greenfield Tap & Die Corporation....271

Blacksmiths' Tools
Buffalo Forge Co. 251
Butterfield & Co. 252
Canedy-Otto Mfg. Co....250
Champion Blower & Forge Co....247
Champion Tool Co. 248
Cray Bros. 267
Heller Bros. Co. 252
Nicholson File Co. 250
Peck, Stow & Wilcox Co....272

Blowers
Buffalo Forge Co. 250
Champion Blower & Forge Co....247
Champion Tool Co....248
Electric Blower Co. 269
Rosewater Electric Co. ....4th cover

Bolt Dies
Armstrong Mfg. Co. 252

Bolt and Rivet Clippers
Porter, H. K....4th cover

Books
American Technical Society....271
Western Newspaper Association....245

Calking Machines
L. S. P. Calking Machine Co....246

Calks, Horseshoe
Aetna Nut Co. ....Front cover
American Calk Co. ....Front cover
Diamond Calk Horseshoe Co....267

Calks, Toe
Franklin Steel Works....245

Chemicals (Industrial)
Buchanan, C. G., Chemical Co....271

Chisels
Champion Tool Co....248
Peck, Stow & Wilcox Co....272

Chucks
Buffalo Forge Co....251
Oneida National Chuck Co....269

Directories
Sampson & Murdock Co....Front cover

Disc Sharpeners
Mayer Bros. Co....272

Drills
Buffalo Forge Co....251
Champion Blower & Forge Co....247

Engines
Witte Engine Works....269

Farriers' Tools
Barnett, G. & H., Co....Front cover
Champion Tool Co....248
Heller Bros. Co....252
Peck, Stow & Wilcox Co....272

Files and Rasps
Barnett, G. & H., Co....Front cover
Nicholson File Co....250
Stokes Bros. Mfg. Co....Front cover

Forges
Buffalo Forge Co....251
Champion Blower & Forge Co....247

Gasoline Engines
Witte Engine Works....269

Gears
Akron-Selle Co. ....Front cover

Hammers
Champion Tool Co....248
Kerrihard Co. ....4th cover
Macgowan & Finigan Cordage Co....269
Mayer Bros. Co....272
Peck, Stow & Wilcox Co....272
West Tire Setter Co....271

Hardware
Senderling Mfg. Co....267

Hollow Augers
House Cold Tire Setter Co....4th cover

Hoof Parers
Champion Tool Co....248

Hoof Nippers
Champion Tool Co....248

Hoof Shears
Champion Tool Co....248

Horseshoes
Burden Iron Works....3d cover
Diamond Calk Horseshoe Co....267
Phoenix Horseshoe Co....272

Horseshoe Calks
Diamond Calk Horseshoe Co....267
Neverslip Works, The....246

Horseshoe Nails
Capewell Horse Nail Co....Front cover
Standard Horse Nail Co....4th cover
Union Horse Nail Co....248

Horse Stocks
Barcus Mfg. Co....3rd cover

Kerosene Engines
Witte Engine Works....269

Motor Cars
Birch Motor Cars....265

Nut Splitters
Whisler Mfg. Co....4th cover and 269

Oxygen
Linde Air Products Co....252

Paints and Varnishes
Felton, Sibley & Co....245

Patents
Jenner, H. W. T....268
Parker, C. L....267

Pincers
Peck, Stow & Wilcox Co....272

Punches
Champion Blower & Forge Co....247

Punches and Shears
Peck, Stow & Wilcox Co....272

Screw Plates
Butterfield & Co....252
Champion Blower & Forge Co....247
Greenfield Tap & Die Corporation....271

Shaft Coupling
Bradley, C. C., & Son....245

Shears
Edwards, C. D., Mfg. Co....267

Shoes
Leonard-Morton & Co....271

Sleigh Knees
Hall Co., Sherwood....265

Spoke Augers
House Cold Tire Setter Co....4th cover

Stake Pockets
Eberhard Mfg. Co....249

Steel Stamps
Childs, S. D., & Co....Front cover
Ness, George M., Jr....Front cover

Stocks and Dies
Butterfield & Co....252
Champion Blower & Forge Co....247
Hart Mfg. Co....4th cover

Supplies
Campbell Iron Co....Front cover
Beckley-Ralston Co. 270

Swages
Champion Blower & Forge Co....247

Tires
Firestone Tire & Rubber Co....3rd cover

Tire Bending Machines
Buffalo Forge Co....251
Champion Blower & Forge Co....247

Tire Heaters
Gogel Mfg. Co....268

Tire Protectors
Kimball Tire Case Co....Front cover

Tire Setters
Buffalo Forge Co....251
House Cold Tire Setter Co....4th cover
West Tire Setter Co....271

Tire Shrinkers
Buffalo Forge Co....251
Champion Blower & Forge Co....247

Tire Upsetters
Buffalo Forge Co....251
Champion Blower & Forge Co....247

Tongs
Champion Tool Co....248

Tool Grinders
Phoenix Horseshoe Co....272

Trucks
Akron-Selle Co. ....Front cover

Tuyere Irons
Buffalo Forge Co....251
Champion Blower & Forge Co....247
Thompson Tuyere Iron Co....4th cover

Veterinary Remedies
Young, W. F....Front cover

Vises
Butterfield & Co....252
Columbian Hardware Co....266
Fisher & Norris....252
Prentiss Vise Co....4th cover

Vulcanizers
Shaler, C. A., Co....Front cover

Wagons
Akron-Selle Co. ....Front cover

Welding Compounds
Anti-Borax Compound Co....248
Cortland Welding Compound Co....252

Welding Outfit
Superior Oxy-Acetylene Machine Co....267

Welding Plant
Bertschy-Bermo Co. 267

Welding Supplies
Linde Air Products Co....252

Wheel Dishers
House Cold Tire Setter Co....4th cover

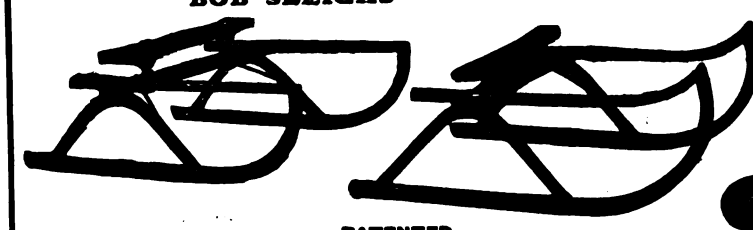
Wheels
Electric Wheel Co....267
Empire Mfg. Co....269

Woodworking Machinery
Buffalo Forge Co....251
Crescent Machine Co....4th cover
Parks Ball Bearing Machine Co....4th cover

Wrenches
Champion Tool Co....248

Wrenches (Knife Handle and Pipe)
Peck, Stow & Wilcox Co....272

THE VALLEY CITY BENT KNEES BOB SLEIGHS



PATENTED.

For pleasure, delivery, express, grocery, or, in fact, any work where a light, strong sleigh is needed.
The strongest, neatest and best Bobs made in the world, in three sizes, for 1⅛, 1¼ and 1½ shoes. These Bobs are all ironed except draw irons and shoes.
Write for farther particulars and Price List.

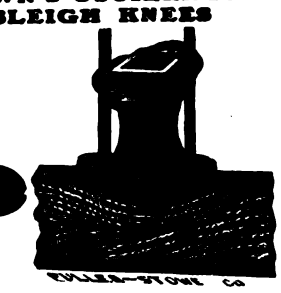
SUCCESS OSCILLATING SLEIGH KNEES



PATENTED.

BEST IN THE WORLD.
TRY SAMPLE SET.
For farm, road, and lumbering Bobs. Made in sizes 1⅛, 1¼, 2, 2½, 3 and 3½ runners.

BROWN'S OSCILLATING SLEIGH KNEES



These knees need no recommendation, having been on the market a number of years. They give perfect satisfaction. Sizes, 1¼, 1¼, 1¾, 2, 2½, 3, 3½.

SHERWOOD HALL CO., Ltd., Manufacturers, Grand Rapids, Mich.

Stake Pockets for Wagons.

Our readers frequently have occasion to furnish their customers with stake pockets for farm wagons, trucks, etc. The Eberhard Mfg. Co. makes a complete line of stake pockets and some of the leading styles are illustrated this month in a full-page advertisement. Readers who are interested can order these stake pockets from the numbers which appear in this advertisement, but orders should be sent through your jobber.

Birch Motor Cars.

The Birch Motor Cars, Dept. 1045, 81 East Madison St., Chicago, Ill., are making a special proposition to a few agents in various parts of the country whereby these agents can obtain big commissions in selling Birch Motor Cars.

Both the Birch Super Four and the Light Six are excellent propositions and sell very readily to customers. The prices are low and the commissions liberal. Doubtless many of the blacksmiths have many opportunities to dispose of automobiles in their regular line of business and the agency for such a car as the Birch means real "velvet" money for them.

They need only to "talk automobile" while the customer is in having his horse shod, and if they have a good automobile to sell they can usually convince the prospect that he really needs an automobile in his business.

Get This Car

114-inch Wheelbase
35 H. P. 32 x 3½ Tires
Electric Lights and Starter

And the Agency In Your Territory



The World's Greatest Motor Car Value

Write NOW for full specifications of New 1919 Model

BIRCH SUPER-FOUR

FIND out how you can get one of these superb cars for yourself and make money selling them to others. A big opportunity is open to ambitious men who are willing to train themselves and then get out and hustle. We pay big commissions for selling Birch Cars. Send the coupon now for full information.

Previous Experience Not Necessary We require all our agents to take a brief but thorough course of training in Automobile Driving, Repairing and Selling. We have trained hundreds of others for success in this way, and we believe this is one of the reasons for the splendid success Birch Agents are enjoying.

But the BIG REASON is the cars themselves. 80 per cent of all Birch Cars are in use by farmers and in small towns, and get the hardest kind of service. Mud, sand, rocks, hills and rough going have no terrors for these sturdy cars.

Send Coupon for *BigFree Book* and Full Information

You will be astonished at the liberality of our offer. Let us put all the facts before you at once. It costs nothing to investigate, so tear off the coupon right now. Sign it and mail it to us today.

BIRCH MOTOR CARS Dept. 1045 81 East Madison Street Chicago, Illinois
Member of Chicago Association of Commerce

Birch Agents Prosper
One of our Texas Agents sold two carloads of Birch Cars within 60 days after he received his first demonstrating car. Whether you own a car or not get full details of our great offer.

BIRCH MOTOR CARS, Dept. 1045
81 E. Madison St., Chicago

Please send free book and full particulars as to Birch Light Six and Agency.

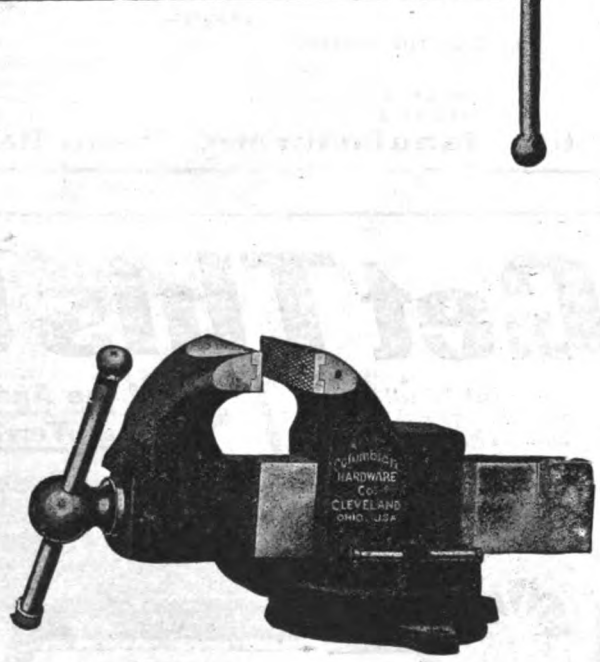
Name.....

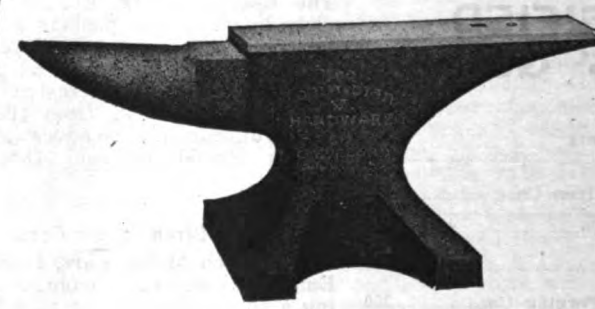
Address.....

Digitized by Google



For Distinguished Service





The Columbian Hardware Company

Manufacturers **Cleveland, Ohio**

F. M.

Digitized by Google

Announcement

THE SENDERLING MANUFACTURING CO.

Retiring from Business

Will sell at private sale all the reserve stock of standard parts used in construction of their well and favorably known Dumping Trucks; consisting of first class materials of Axles, Springs, Wheels, Iron Forgings, Malleable Iron and Steel Castings, and others too numerous to mention. Also a large stock of prime 2nd growth Jersey White Oak thoroughly seasoned.

Also machine tools, among which is a Kane & Roach No. 3 Combined Shear and Punch, a 12 in. Jointer, Rip and Swing Saws with tables, Forges, Blowers, Fan, Anvils and hand tools.

Second hand Dump Trucks in good order, a couple of mounted gears, body frames, second hand Wheels, Scrap Iron, etc., etc.

Two Shops for Rent or Sale, separated by an intervening property to be had to give a plot **75 x 100 feet. One Shop is a two-story substantial brick building** with an **18 H. P. gas engine** and **power connections both floors,** and large elevator, rope hoist. The others are frame buildings.

There are some auxiliary parts of value that are applicable to both horse and motor propelled vehicles, for which we expect to arrange with suitable parties to continue, of which due notice will be given later, and also to give our experience or assistance to such who wish to continue the building of Dump Trucks upon the same plans.

For inspection or information, please arrange by letter; or by telephone, 2660 Bryant, from 12 to 1—by letter is more sure. **The Senderling Mfg. Co., 624 West 47th St., 2nd floor, New York City.**

Edwards Shears

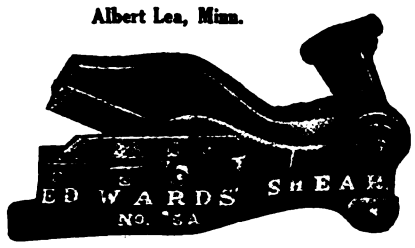
For twenty-four years the **Two Leading Low Priced Shears** in the U. S., representing the **Greatest Value** for the **Least Money.**

No. 5, weighs 200 lbs., cuts 4x½ inch soft steel.
No. 10, weighs 430 lbs., cuts 4x¾ inch soft steel.

At their price you should have had one long ago. **Order one** from the first iron man that calls on you. **They All Sell Them.**

Write for descriptive circular and prices.

C. D. EDWARDS MFG. CO.
Albert Lea, Minn.



ATTENTION, BLACKSMITHS!

BE SURE IT'S A SUPERIOR Welding and Cutting Outfit you purchase. ACETYLENE GENERATORS. Welding Supplies. Price Popular. Service Immediate. Quality Superior. Write for catalog and price list.

Agents wanted.

SUPERIOR OXY-ACETYLENE MACHINE CO.
Manufacturers of Everything for the Welder
HAMILTON, OHIO



Free 512 PAGES OF BARGAINS

POST PAID

WE WANT TO SEND YOU THIS 512 PAGE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

Tells how you can work up a profitable auto supply and repair business.

Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories
1117 W. 11th Street, Cleveland, Ohio, U. S. A.



We Make **STEEL WHEELS**
To Fit Any Axle
Plain or Grooved Tire

Steel or Hickory Axles
Any Size
A Full Line of Wood and Steel
Farm Trucks
With Steel or Wood Wheels

Write for Large Catalog and Prices

ELECTRIC WHEEL CO.
Box N, Quincy, Ill.

Keep Cars In Condition.

Never before has the automobile builder had such an opportunity to demonstrate the life of his particular make truck or passenger car. Never before has the public been compelled to use their automobiles in such great effort.

Automobile reputations are made or lost during this period. The future of each particular make depends upon the length of service, and the ability of the manufacturers and dealers to keep the cars running now in use. If the cars sold can be kept in service no better reputation can be had, and no brighter prospects for future business will be desired.

Thousands of dollars worth of old parts have been junked every year which could often be repaired. Whole cylinder castings have been thrown away, when they could have been reground and new oversize pistons fitted, making a far better engine than when new.

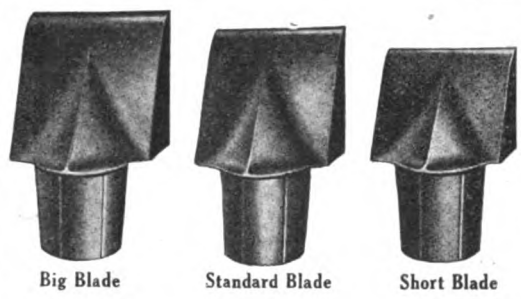
This war will help educate the people to save time, money and material, a lesson which will be instilled into every one and help make the American people stronger in the world.

Absorbine on "Tinkle Bond."

The owner of this horse is a friend of Absorbine, and reports as follows: "In regard to your Absorbine that I commenced to use in the spring on my horse "Tinkle Bond," will say that his legs are as clean now as ever. We are tracking him and he seems sound. We have worked him 50 days and he steps at present a mile in 2:23, the last eighth in 17 seconds, with plenty of speed. I hope "Tinkle Bond" and Absorbine will take the lead. I give your medicine all the credit."

Absorbine, $2.00 a bottle at druggists or sent express charges prepaid upon receipt of price. Write for further information, W. F. Young, P. D. F., 55 Temple street, Springfield, Mass.

Subscribe for The Blacksmith and Wheelwright. $1.00 a year



SHARP DULL



We Originated

the drive calk idea years ago—and ever since we've been scientifically experimenting, developing and perfecting it until today the

DIAMOND Line

stands unequaled in wear, fit, design and all-around efficiency.

DIAMOND SHOES are made for driving, draft horses and mules, from the very best horseshoe steel, and are the only ones guaranteed frost-proof. Their strong toe clips do not weaken the shoe. They're easy to fit and cost the least to prepare. Nail-holes are well punched and properly placed. Calk holes have the deepest reinforcements and absolutely fit the calk.

DIAMOND CALKS, made of very high-grade tool steel, are tempered file-proof, practically non-breakable, and have a chisel edge. Their ribbed shanks don't vary 1/10,000 of an inch in diameter, which prevents their turning in shoe or falling out. They are made Sharp, Dull, Block and Round in four sizes shanks, different sized blades, and "There's a Diamond Calk for every purpose."

Ask for Illustrated Catalogue and Price List

DIAMOND CALK HORSESHOE CO.
DULUTH, MINN.

ROUND SHARP ROUND DULL



PATENTS

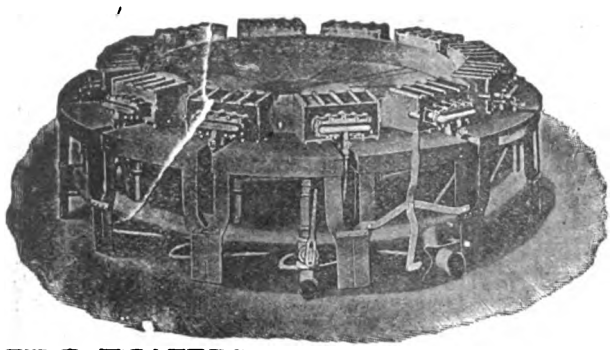
C. L. PARKER
Ex-Member Examining Corps, U. S. Patent Office
Attorney-at-Law and Solicitor of Patents
American and foreign Patents secured. Trade marks registered. Searches made to determine patentability, validity and infringement. Patent suits conducted. Pamphlet of instructions sent upon request.
McGill Building WASHINGTON, D. C.

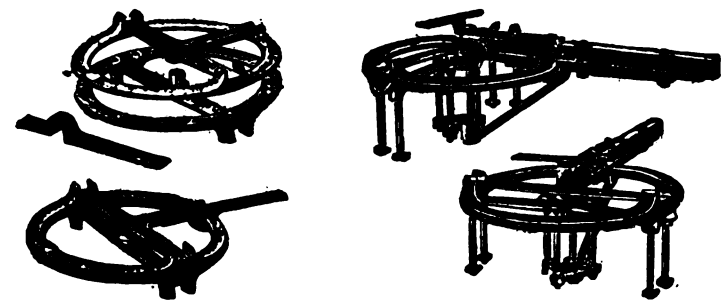
WELDING PLANTS, $25.00 to $300.00

Designed for all purposes. Small cash payment; balance, three to six months. Every mechanic and shop should have one.

BERTSCHY-BERMO CO. OMAHA, U. S. A.

Digitized by Google





TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.

OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.

Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE GOGEL MFG. CO., TOLEDO, OHIO.

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

will be inserted under this head at 3 cents a word, including the address, for each insertion, payable in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York.

PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT.

Patents

PATENTS FOR INVENTIONS.

H. W. T. JENNER, patent attorney and mechanical expert, 622 F Street, Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trade-marks registered.

PATENTS.

C. L. PARKER, attorney-at-law, and solicitor of patents. American and foreign patents secured promptly. Handbook for inventors sent free upon request. McGILL BUILDING, Washington, D. C.

For Sale

FOR SALE.

Blacksmith shop, 2 story stone building 50x50, 2 fires, all electrically equipped. Building is worth $3500.00 Stock and tools are worth $1600.00. Must sell as I have other business. $3000.00 buys everything. Don't answer unless you mean business. Above is located in best farming community in southeastern Kansas. Am doing a big business but must sacrifice. Address C. J. COONEY, St. Paul, Kans.

FOR SALE.

Good set of blacksmith tools and stock with good business for two men all year round, in town of 4000 population. Reason for selling: I am in the draft. Address, L. McBride, Belle Plaine, Ia.

FOR SALE.

Blacksmith shop and home in Western Colorado. Good business. Only shop in town; schools, mountain water; great bargain if taken promptly. W. A. NIX, Austin, Colo.

FOR SALE.

Lathes, 14x6 Shepard; 18x10 American; 30x18 Mass; 22x12, 18x6, 20, 22 and 25 planers; 20 and 24 drills; key seater; 3 milling machines; 24-in. wood planer and matcher; 8-in. 4 side sticker. BICKNELL MFG. & SUPPLY CO., Janesville, Wis.

FOR SALE.

Shop and garage, well equipped for all kinds of work. Work for two men. Good big territory to draw from. Will sell a new Barcus shoeing stock and shoeing vise separately. CHAS. O. MORRIS, Sand Springs, Montana.

FOR SALE.

In a good locality, blacksmith shop, stock, tools and all. Garage in connection. Can rent building if desired. For information write OLE SLOTTO, Fillmore, N. D.

Tires

For Sale

FOR SALE.

18 in. by 8 ft. Fitchburg screw cutting lathe complete, countershaft, face plate, etc., $275; 36-in. band saw, $125. J. L. LUCAS & SON, Inc., 3 Fox Street, Bridgeport, Conn.

FOR SALE OR TRADE.

Power blacksmith shop with good business. Address E. J. DORMAN, Wakeeney, Kansas.

FOR RENT OR SALE.

Well located blacksmith shop and garage with tools. A good business for the right man in a good town, best climate. Address, S. V. HARRIS, Bradentown, Fla.

Wanted

WANTED.

Second hand House Cold Tire Setter, with punch and shear, or with shear. Must be cheap. J. L. SCOTT, 4043 Laclede avenue, St. Louis, Mo.

WANTED.

Good all-around blacksmith. Young married man preferred. Top wages for right man. Address M. W. ABTS, Morrill, Nebr.

WANTED.

To buy a good blacksmith stand with from ten to forty acres of land, with some fruit. Address with particulars to L. L., box 33, Prairie View, Ill.

Gears

GEARS & SHAFTS

Transmission gears and shafts, differential gears and axle shafts in stock for over 125 makes (500 models) of pleasure cars and trucks. Obsolete, Orphan and Current models.

Dealers and repairmen, send for our 125-page price list and make a good profit on your repair work.

AUTO GEAR CO., Inc.

844 Eighth Avenue, New York, N. Y. — 1461 S. Michigan Ave. Chicago

275 Marietta St., Atlanta, Ga.

NO SECOND-HAND PARTS OR JUNK

Tires

DOUBLE TREAD TIRES

GUARANTEED

SPECIAL OFFER TO AGENTS. Write for Catalogue

Get our special price on new tires

M. LIBEN & CO.

205-AK West 48th St. New York City

Tires

Double Tread Tires

Notice Our Prices Before Going Elsewhere

PRICE LIST

Size	Plain	Size	Plain
30x3	$5.00	35x4	$9.00
30x3½	5.50	36x4	9.50
32x3½	6.50	36x4½	10.00
32x4	7.00	36x5	10.00
33x4	7.50	37x4½	10.00
34x4	8.00	37x5	10.00
34x4½	8.50		

For Non-Skid, 50 cents more on all sizes.

We Carry a Full Line of New and Used Tires & Tubes

GINSBERG & BERKOWITZ, Inc.

236 WEST 48th STREET, NEW YORK

BUY EARLY AND SAVE MONEY

Double Tread Tires and Tubes

GUARANTEED

Come to the Tire Clearing House—here are prices—clear cut and plain as daylight. We buy wholesale the best "try out" Tires—and you get the benefit—you want truthful tires, and truth is never crushed to earth if given a square deal—real truth is puncture proof—

SO ARE OUR TIRES.

Size	Plain	Non-Skid	Tubes
28x3	$4.40	$4.95	$2.00
30x3	5.50	6.05	2.00
30x3½	6.60	7.15	2.50
32x3½	7.15	7.70	2.75
34x3½	8.25	8.80	3.00
30x4	7.70	8.25	2.75
32x4	8.80	9.35	3.00
33x4	8.80	9.90	3.50
34x4	8.80	9.90	3.50
35x4	9.90	11.00	3.60

Get your order in quick for goods listed here—by all means get in touch with us for further information about our special process—it means money in your pocket. Get in right—write today—yes—today.

Look up rating in Dunn's or Bradstreet's.

Size	Plain	Non-Skid	Tubes
36x4	$9.90	$11.00	$3.60
32x4½	9.90	11.00	3.75
34x4½	11.00	12.10	4.00
35x4½	11.00	12.10	4.10
36x4½	11.00	12.10	4.25
37x4½	12.10	13.20	4.35
34x5	11.00	12.10	4.50
35x5	13.20	14.30	5.00
36x5	13.20	14.30	5.00
37x5	13.75	14.85	5.00

For (non-skid) sizes up to 32x4, 50c extra; all other sizes $1.00 extra.
For rebuilding your old tires we charge you 60% of the above prices.

B. LIBEN & COMPANY

261-A West 54th Street NEW YORK CITY 112-A East 110th Street

THE HOME OF DOUBLE TREAD TIRES

Increases Value of Horse.

In the olden days when a horse was strained or had any blemish it ended his career, as another horse was speedily procured in his place. At the present time, owing to the high prices horses are now bringing on the market, few can afford to dispose of a blemished horse of which there is any hope of treating and again making sound.

One of the important means of treatment has been the popular remedy Absorbine. Absorbine is a pleasant as well as a convenient remedy to use, does not blister or remove the hair, and the horse may be used during treatment.

Absorbine has been successfully used for more than a quarter of a century and here is what a few of its users think of it: "I have received the Absorbine all o. k. and used it on my horse with great success. He had fistula about ready to burst when Absorbine came. Began to use it by steaming with hot bran poultice over Absorbine and never saw anything yield to treatment so quickly. My horse is almost well. I have killed the fistula and don't want to be without Absorbine in my house."

"A word about your Absorbine. I first used it on a pair of horses which had been hurt hauling gravel. One of them was hurt so badly a friend said I would not use him for two months, as he was hurt across the kidneys. In a week he was doing his work again as if nothing had been wrong with him."

A booklet on "How to treat a blemished horse" may be obtained by writing W. F. Young, P. D. F., 55 Temple St., Springfield, Mass.

Northwestern Horse Nails.

Many of our readers are undoubtedly using the Northwestern horse nail, as these nails have been on the market and have given great satisfaction for many years. The manufacturers claim perfect form and finish for these nails and state that they will hold the shoe firmly in place. The reinforced point makes this nail an easy one to drive and a safe one to use. Write for full particulars to the Union Horse Nail Co., Chicago, Ill.

Ball and Roller Bearings.

A full line of ball and roller bearings is carried in stock by the Gwilliam Company, 253 W. 58th Street, New York City. This company is also sole agents for the U. S. of the Bowden Patent Wire Mechanism for the transmission of reciprocating motion through flexible and tortuous routes. Correspondence from our readers is invited.

Red Tip Calks.

Now is the time to send in your orders for the world renowned red tip calks and horse and mule shoes, manufactured by the Neverslip Works, New Brunswick, N. J. The Neverslip line embraces all styles of screw calks, iron, steel and extra light steel shoes, drilled or calked; drive calks, sharp or blunt, driving, draft and mule shoes and all necessary tools.

The red tip calks are extensively advertised throughout the country and in fact all over the world. It is always advisable for you to order from your dealer or jobber early in the season, so that your requirements may be promptly taken care of.

Witte Engine Works.

The Witte Engine Works of Kansas City, Mo., have recently added another large section to their factory which covers approximately 10,000 feet of floor space. This addition will be used solely for the erection of portable engines and saw-rigs which are now in great demand because of the call for wood, both for manufacturing purposes and for fuel.

The Witte Engine Works claim to be the largest exclusive kerosene and gasoline engine factory in the world which sells its product directly to the user. The factory was established in 1870 and has been continuously under the management of Ed. H. Witte, president and principal owner since 1884. Doubtless many of our readers desire to obtain a stationary engine which will operate upon either gasoline or kerosene and if so we should advise them to write this corporation for their catalog.

Firestone Carriage Tires.

Every up-to-date blacksmith should put on rubber tires. The Firestone Tire & Rubber Co. manufactures a tire which is favorably known and widely advertised. The manufacturers guarantee that the carriage owner will get real work from every Firestone tire which you may apply in your shop.

These tires will wear evenly down to the channel without cutting or chipping. They have more than usual resiliency, lightness and endurance, and if you put Firestone tires on a buggy or any other vehicle, your customer will be well satisfied and will come back to you when the tires are finally worn out. The slogan of the Firestone Tire & Rubber Co. is "Most Miles per Dollar," and this feature will certainly appeal to the customers of your shop.

The Bailey Ball Thrust.

This device, which is very popular with Ford owners, is intended to prevent rear axle trouble in the Ford car. This bearing replaces to the 1/1,000th part of an inch, plain washers parts 2528-29 at the left side of Ford and Chevrolet 490 differentials, eliminating all trace of sliding or grinding contact and minimizing the friction that results.

The Bailey installation does away with the danger of noisy or broken gears, due to ordinary washer construction. Many blacksmiths throughout the country are acting very successfully as agents for Bailey Ball Thrusts, and they are assisted in selling this specialty by the fact that it is heavily advertised in the Saturday Evening Post and other national magazines. The field for blacksmiths to enjoy profitable returns is unlimited because there are Ford cars everywhere. The retail price of this specialty is $3.75, but agents are allowed a generous margin of profit and our readers ought to look into this matter as soon as possible and before too many of the Ford owners in their vicinity have already been supplied with Bailey Ball Thrusts. Write for full particulars, dealer's discount, etc., to the Geo. D. Bailey Co., 4506 N. Ravenswood Ave., Chicago, Ill.

Tires At Low Prices.

The Service Auto Equipment Co., 957 Traders Bldg., Kansas City, Mo., is offering tires at low prices. They say that these tires are guaranteed for 6,000 miles with no seconds. A full line is carried of all sizes, non-skid or plain, and these tires are shipped prepaid on approval.

Subscribe to THE BLACKSMITH AND WHEELWRIGHT. $1.00 per year.

Digitized by Google



JUST PUBLISHED

AUTOMOBILE WELDING

WITH THE OXY-ACETYLENE FLAME

By M. KEITH DUNHAM

167 Pages **Price $1.00** Fully Illustrated

Sent Postpaid to Any Part of the World.

This is the only complete book on the "Why" and "How" of Welding.

EXPLAINS in a simple manner apparatus to be used, its care, and how to construct necessary shop equipment. Proceeds then to the actual welding of all automobile parts, in a manner understandable by everyone.

Gives principles never to be forgotten. Aluminum, cast iron, steel, copper, brass, bronze and malleable iron are fully treated, as well as a clear explanation of the proper manner to burn the carbon out of the combustion head.

AUTOMOBILE OWNERS, GARAGE AND SERVICE STATIONS, BLACKSMITHS AND MACHINE SHOPS, as well as industries using the oxy-acetylene flame, will find this book of the utmost value, since the perplexing problems arising when metal is heated to a melting point are fully explained and the proper methods to overcome them shown.

CONTENTS

CHAPTER I.—APPARATUS KNOWLEDGE.

Oxygen Supply—Care of Oxygen Cylinder—Acetylene Generator—Care of Generator—Regulators—Care of Regulators—Creeping Regulators—Gauges—Care of Gauges—Welding Torch—Care of Welding Torch—Effects of Heat—Hose and Goggles.

CHAPTER II.—SHOP EQUIPMENT AND INITIAL PROCEDURE.

Preheating Agencies—Welding Table—Location of Welding Outfit—Starting the Welding Outfit—Adjustment of Flame—Principle of Welding—General Welding Knowledge—Welding Rods and Fluxes—Choice of Tip—Expansion and Contraction.

CHAPTER III.—CAST IRON.

Simple Welding—How to Hold the Flame—Hard Cast Iron—Pin Holes and Blow Holes—Lug on Cylinder—Water Outlet—Cylinder Welding—Compression Head—Finishing and Testing—Scored Cylinders—Cylinder Parts—Fly Wheels—Pistons—Crank Cases—Babbitted Bearings—Valve Guides—Preserving Threads—Conclusion of Cast Iron.

CHAPTER IV.—ALUMINUM.

Use of—Welding Knowledge—Puddle System—Flux System—Comparison of Systems—Welding Rod—Preparation of the Weld—Inlet Manifold—Arm of Crank Case—Welding the Arm Without Taking Out the Motor—Break in the Body of Case—Welding Cold—Wrong Method of Setting Up—Lug or Boss Welding—Preheating the Case—Gas Preheating Flame—One Side or Both—Collapse of Weld—Broken Bearings—Direction of Welding—Shrinkage Cracks—Missing Parts—Finishing—Die Mould Castings—Body—Other Parts.

CHAPTER V.—STEEL

Welding Knowledge—What the Flame Does to Steel—The Welding Rod—Simple Welding—Position of Flame—Reinforcing the Weld—Frame Welding—Lengthening the Chassis—Tube Housings—Worn Parts—Gear Welding—Case Hardening—Light Metal Welding—Gasoline Tank—Welding Adjacent to Rivets—Shaft Welding—Construction of Parts.

CHAPTER VI.—MALLEABLE IRON COPPER, BRASS, BRONZE.

How to Detect Malleable Iron—Brazing Malleable Iron—Rear Housing—Reinforcing the Braze—Brazing Tube to Housing—Building Up Worn Parts—Copper—Brass and Bronze—Silver Soldering.

CHAPTER VII.—CARBON BURNING AND OTHER USES OF OXYGEN AND ACETYLENE.

Principle of Carbon Burning—Method of Operation—Lead Burning—Soldering—Case Hardening—Heating Uses.

CHAPTER VIII.—HOW TO FIGURE COST OF WELDING.

Oxygen Consumption—Dissolved Acetylene Consumption—Torch Consumption Test—Acetylene Generator Consumption—Cost Card—Conclusion.

ADDRESS ALL ORDERS TO

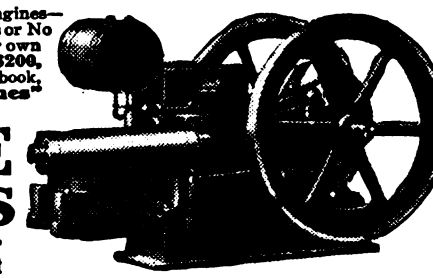
M. T. RICHARDSON COMPANY, 71-73 Murray St., NEW YORK

Direct to You—Factory Prices

BURN KEROSENE—BIG SAVING—BETTER ENGINES



Lowest factory terms on Engines—2 to 30 H-P. Cash, Payments or No Money Down—Write your own order and save **$15 to $200**, as explained in my new book, **"How to Judge Engines"**—sent FREE, postpaid.



WITTE ENGINES

Produce Power at Lowest Cost

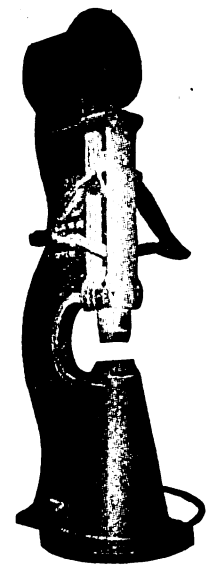
Built in the largest Exclusive Engine factory, selling direct. I build nothing else—back every engine I make with a good 5-Year Guarantee as to quality, durability, fuel requirements and workmanship. You take no chances. **I guarantee** safe delivery—make prompt shipment, all sizes: Stationary, Portable or Saw Rig. Money back if not satisfied on my new 90-Day Engine Offer. Write for new book to-day, and latest factory prices.—ED. H. WITTE, Pres.

32 YEARS SUCCESS

WITTE ENGINE WORKS

2445 Oakland Ave. Kansas City, Mo.
2445 Empire Bldg. Pittsburgh, Pa.

The Perfect Power Hammer



Note the difference in construction over other makes:

Extra Long Guides, insuring a direct movement of the ram without any side motion, which causes guides and springs to break on other Hammers.

The only Hammer made with a disk attachment with special anvil for sharpening harrow and plow disks.

A recently invented **Friction Clutch** fitted with **Ball Bearings,** absolutely controls the operation of the Hammer by foot pressure from the lightest tap to the heaviest blow. This ease of operation makes the Hammer particularly well adapted for plow work, as you can get as light a stroke as you desire.

Will ship to any responsible party on approval. If not as represented, no sale.

Made in two sizes:

3 inch square, 40 lb. ram—shipping weight, 1,150 lbs.
4 " " 80 " " — " " 1,800 "

Write any jobber for prices, or

Macgowan & Finigan Cordage Co.,

204 North Third St., ST. LOUIS, MO.

THE SCREW-CUTTING LATHE

How to select, set up, adjust and operate

By JAMES F. HOBART, M. E.

THIS book is a concise and exhaustive treatise on everything pertaining to the SCREW-CUTTING LATHE, including costs, erection, operation and adaptability. It is written by one who thoroughly understands his subject in all its details, and is so copiously illustrated that everything in it will be readily understood.

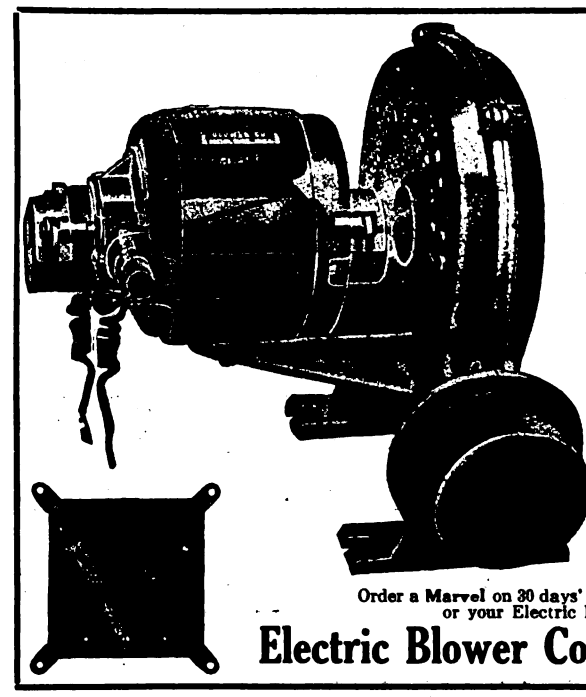
It will be found invaluable to those desiring to know just how a Screw-Cutting Lathe should be run.

There are ***92 illustrations,*** and the book is substantially bound in cloth. ***Price, $2.00.*** A copy will be sent postage prepaid to any address on receipt of price.

M. T. RICHARDSON CO.

PUBLISHERS

71-73 Murray St., New York



"One Fire" Marvel

A. C. or D. C.
or
UNIVERSAL MOTORS

Extra Large Ring Oil Bearings

Case Hardened Armature Shaft

$35.00 Net

Order a Marvel on 30 days' trial through your Dealer, or your Electric Light Company

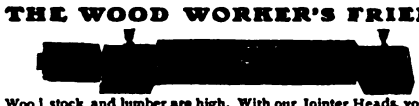
Electric Blower Co., 352 Atlantic Avenue BOSTON, MASS.

STAR STEEL SHAPES

PLOWSHARES	LANDSIDE PLATES	PLOW POINTS
LISTERSHARES	LANDSIDE POINTS	SEEDER POINTS
MOLDBOARDS	SHOVEL POINTS	SUBSOILERS
CULTIVATOR SHOVELS		DRILL POINTS
Soft Center	Solid Cast	Crucible Steel

STAR MANUFACTURING CO., Carpentersville, Ill.

THE WOOD WORKER'S FRIEND



Wood stock and lumber are high. With our Jointer Heads you can buy rough lumber of any kind and dress it to suit your job. Saves time, money and lumber. Would this be any object to you? If so, get circulars and prices. Sold on 30 days' trial. Mfd. by

Whisler Mfg. Co., Gibson, Iowa

"NATIONAL" BLACKSMITHS' DRILL CHUCK

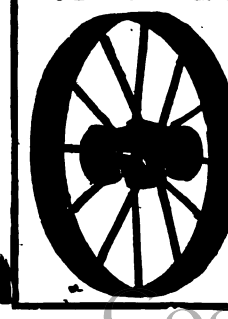


Made especially for Blacksmithing and Carriage Work.

Positive, durable, strongest, self-cleaning, always works, quickest to change Drills, casts no shadow, will save its cost over other Chucks in saving of time. BUY THE BEST. Money refunded if not as represented. Ask your jobber for it, or send direct for prices and circular.

ONEIDA NATIONAL CHUCK CO., Oneida, N. Y.

EMPIRE STEEL WHEELS



Plain or Grooved Tire
To Fit Any Wagon.

FARM TRUCKS
All Standard Types

Write today for Proposition to Blacksmiths

EMPIRE MFG. CO.
P. O. B. 206
QUINCY, ILL.

Digitized by Google

WAGON BUILDING

"Build me a wagon that will last forever."

"Sorry, Sir, but 'axle troubles' (due to wear—wear on the spindle, or on the box, or both) make it impossible."

You've often received a specification like that and been obliged to give that answer—haven't you?

The Sheldon "TON-DON"—an axle that will not wear, run hot or break—allows your meeting the requirements of the man who wants a wagon to last forever, **and we have told him so.**

The Sheldon "TON-DON" was originally made for buggies and carriages. Its success was so instantaneous and pronounced that we were deluged with requests for an axle embodying the same principle for use on Delivery, on Business and on Express Wagons.

Hence, the "TON-DON" CONCORD EXPRESS.
In EFFICIENCY—The HIGHEST.
In CONSTRUCTION—The SIMPLEST.
In SERVICE—The MOST SATISFACTORY.

The Spindle of the Sheldon Ton-Don Axle

Ordinary axles wear flat on the bottom of the spindle because the bottom side is the point of contact and where the wear of the spindle is concentrated. It takes a spindle of unusual hardness to resist this wear—greater hardness than any ordinary axle affords. The spindle of the "TON-DON" is hardened by a special process, producing a wearing surface of such hardness that a fine file makes no impression on it—yet the center remains soft or "natural."

The Phosphor-Bronze Lined Box

The peculiarity of this box lining is that while somewhat softer than the spindle, there is no perceptible wear after thousands of miles of running, but becomes harder and more wear-resisting with use.

Phosphor-Bronze (of a mixture which increases its toughness, smoothness under friction, and wear-resisting qualities) is a metal used for making the propellers of ocean steamships, bearings for locomotives, crank-shaft bearings for automobiles and other fine machinery. Imagine what a metal must be to meet such conditions, and you will grasp the advantages of applying such metal to axle purposes.

THESE AXLES CARRIED IN STOCK BY THE FOLLOWING JOBBERS AND CAN BE OBTAINED AT MANUFACTURERS' PRICES.

Baltimore, Md.....E. Scott Payne Co.	Providence, R. I....Congdon & Carpenter Co.
Boston, Mass.....E. P. Sanderson Co.	Rochester, N. Y.....Burke Iron & Steel Co.
Buffalo, N. Y.....H. D. Taylor Co.	San Francisco, Cal....Waterhouse & Lester Co.
Chicago, Ill.....E. D. Kimball Co.	Scranton, Pa.....Bittenbender & Co.
Cincinnati, O.....G. B. Schulte Sons Co.	Seattle, Wash.....Gray Bros. Co.
Indianapolis, Ind.....W. J. Holliday & Co.	Springfield, Mass.....Chas. C. Lewis & Co.
Los Angeles, Cal.....Percival Iron Co.	St. Louis, Mo.....Sligo Iron Store Co.
Milwaukee, Wis....Shadbolt & Boyd Iron Co.	Washington, D. C.....Louis Hartig
Pittsburgh, Pa.....McLean & McGinness	Wilmington, Del.....Delaware Hardware Co.
Portland, Oregon.....J. E. Haseltine & Co.	Bridgeport, Conn.....Chapman & Bangs Co.
Ft. Wayne, Ind.....Mossman, Yarnelle & Co.	San Antonio, Texas . Heusinger Hardware Co.
New Orleans, La. .....Joe. Schwartz & Co.	

SHELDON

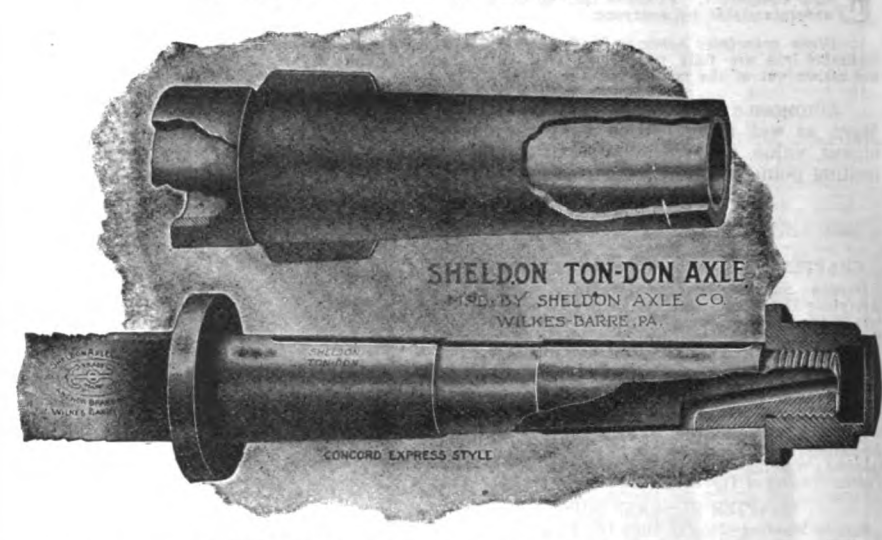
"TON-DON"

CONCORD EXPRESS STYLE

NOT A BALL OR ROLLER BEARING—BUT

ANTI-FRICTION—EVERLASTING—INTERCHANGEABLE

IT WILL NOT CUT, HEAT OR STICK



NOTICE THE PATENTED OILING DEVICE
HAS ALL THE ADVANTAGES OF FRICTION AND ANTI-FRICTION AXLES WITHOUT THEIR DISADVANTAGES
"TON-DON" MEANS KNOWN QUALITY WITHOUT FANCY PRICE
MADE ALSO FOR BUGGIES AND SURRIES

SHELDON AXLE & SPRING CO.,
WILKES-BARRE, PA.

LARGEST AXLE FACTORY IN THE WORLD.

SUPPLIES

for AUTOMOBILES, TRUCKS and TRACTORS

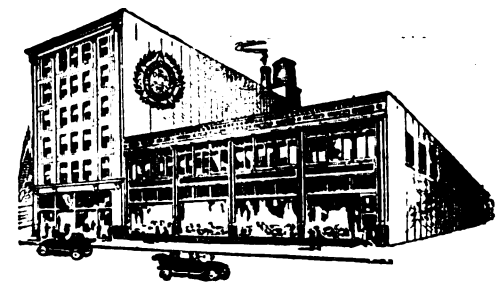
TOOLS and EQUIPMENT

for GARAGES and REPAIR SHOPS

THE BECKLEY-RALSTON CO.

(WHOLESALE ONLY)

1801-1815 MICHIGAN AVENUE **CHICAGO**



OUR NEW CATALOG

contains 500 pages. If you have an established place of business and are entitled to buy at trade prices we will gladly send you a copy of this book. When writing please use your business letterhead and ask for catalog No. 82.

916 Pages instead of 824 **1918—SEVENTH EDITION** 3362 Illustrations instead of 2000

$3.82 prepaid **DYKE'S AUTO ENCYCLOPEDIA** $3.82 prepaid

Entirely re-written, hundreds of illustrations and many new subjects added. Practically a new book. A non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 50 Instructions—Simplified and Practical.

3362 Illustrations—the kind you understand at a glance.

2 Supplements, part printed in two colors, treating on the construction, operation, repairing and adjusting of the FORD and PACKARD—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.

778 illustrations and 279 pages on Electric Ignition, Electric Starters and Generators, etc.

51 pages and 79 illustrations on the Delco system alone.

60 pages and 254 illustrations on Adjustments, Tests, etc., of leading Electric Systems.

154 pages and 1189 illustrations on Repairing.

Oxy-Acetylene welding. Axle, Differential and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.

27 pages and 180 illustrations on Tires and Tire Repairing.

44 pages and 119 illustrations on Carburetion.

89 pages and 291 illustrations on Engines and Parts.

16 pages on Digest of Troubles.

6000 lines to the Index. This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. Index begins on colored paper, easy to refer to.

Dictionary is also included, which gives the meaning of motoring terms.

Inserts: There are five—printed in colors. New features you never before saw or heard of in one of the inserts.

Additions to the Seventh Edition:

TRUCKS, TRACTORS, MOTORCYCLES, AIRPLANES AND AIRPLANE ENGINES

HOW TO BECOME AN EXPERT AUTOMOBILE MECHANICIAN

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion subject so thoroughly, you can adjust any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

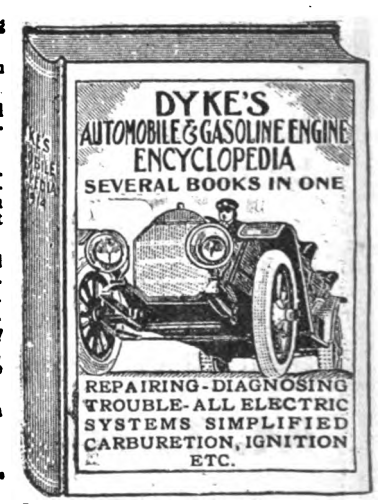
You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical Automobile book in America. Price $3.82, prepaid.

Address all orders to

THE BLACKSMITH & WHEELWRIGHT
73 MURRAY STREET NEW YORK



It's worth ten times its cost if only placed on the shelf and used as a reference.

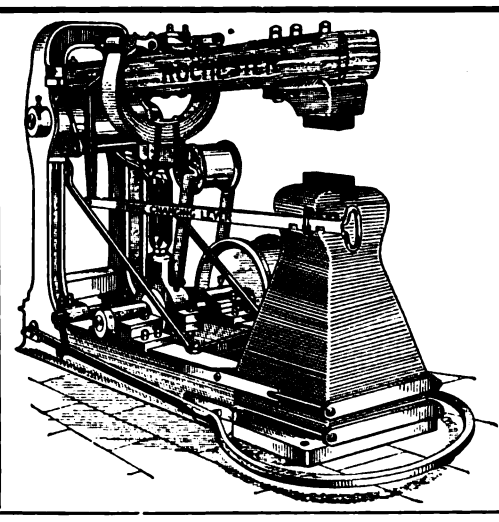
Digitized by Google

He That Counts All Costs Will Never Put Plow to Ground

Don't Put Off Buying That Which You Can Buy Today

THE ROCHESTER HELVE HAMMER

is adjustable for length of stroke while running. The long stroke provides for handling larger work than other hammers of the same head sizes. The Hickory Helves give springy forging blows, combining the advantages of forging and drop hammer.



WEST TIRE SETTER — WEST HYDRAULIC SHELL BANDING MACHINES

Saves Energy. Does Quicker and More Satisfactory Work and Pays for Itself.

SEND A CARD TO THIS ADDRESS FOR OUR CATALOGUE AND PRICES

WEST TIRE SETTER CO.
ROCHESTER, NEW YORK

Don't Send a Penny

These Len-Mort work and outdoor shoes are such wonderful value that we gladly send them, **no money down.** You will find them so well-made and so stylish and such a big money saving bargain that you will surely keep them. So don't hesitate. Just fill out and mail the coupon. We will send a pair of your size. No need for you to pay higher prices when you can buy direct from us—and know what you are getting before you pay even a penny. Why pay out $5.00 and $6.00 for shoes not near so good? Act now. Mail the coupon today while this special offer holds good.

Great Shoe Offer

We can't tell you enough about these shoes here. This shoe is built to meet the demand of an outdoor city workers' shoe as well as for the modern farmer. Send and see for yourself what they are. Built on stylish lace Blucher last. The special tanning process makes the leather proof against the acid in milk, manure, soil, gasoline, etc. They outwear 3 ordinary pairs of shoes. Your choice of wide, medium or narrow. Very flexible, soft and easy on the feet. Made by a special process which leaves all the "life" in the leather and gives it wonderful wear-resisting quality. Double leather soles and heels. Dirt and waterproof tongue. Heavy chrome leather tops. Just slip them on and see if they are not the most comfortable, easiest, most wonderful shoes you ever wore. Pay $3.85 for shoes on only arrival. If, after careful examination, you don't find them all you expect, send them back and we will return your money. No obligation on you. This is at our risk, not yours.



Send

Only the coupon—no money. That brings these splendid shoes to you. You are to be the judge of quality, style and value. Keep them only if satisfactory in every way. Be sure to give size and width. Mail the coupon now. Order by No. X15012.

Leonard-Morton & Co.
Dept 1262 Chicago

Leonard-Morton & Co.
Dept. 1262 Chicago

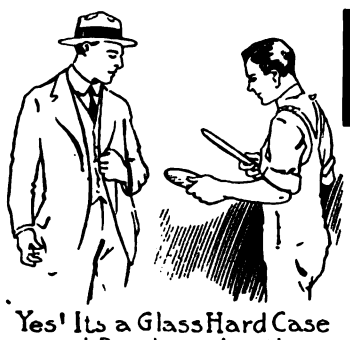
Send the Len-Mort Shoes No. X15012. I will pay $3.85 for shoes on arrival, and examine them carefully. If I am not satisfied, will send them back and you will refund my money.

Size.....Width.....

Name.....

Age.....Married or single.....

Address.....



Yes! Its a Glass Hard Case and Produced with a Non-poisonous Chemical

FERRO CASE

For Case-Hardening

Is Something You Have Been Looking For

A NON-poisonous chemical that is used by sprinkling upon the red-hot steel, or in a cyanide melting furnace, same as cyanide has formerly been used.

Consumers, large and small, have used Ferro Case for years. So will you, after a trial.

Today is the Time to Write for Prices and Your Dealer's Name Will be Appreciated.

C. G. BUCHANAN CHEMICAL CO.

Makers of Industrial Chemicals and the only makers of Ferro Case

120 East Pearl Street - - - - Cincinnati, Ohio

Screw Plates



AUTO REPAIR WORK PAYS

and the blacksmith who has a set of taps and dies is not only prepared to do the thousand and one jobs found in the day's work but he is prepared to take on auto and tractor repair work as well.

COMBINATION SCREW PLATES

contain taps and dies for cutting both U. S. S. and S. A. E. (Automobile) standard threads.

Every Tool Guaranteed. *Send for Catalog.*

GREENFIELD TAP AND DIE CORPORATION

GREENFIELD, MASSACHUSETTS, U. S. A.

NEW YORK, 28 WARREN ST. -:- CHICAGO, 13 SOUTH CLINTON ST.

DETROIT OFFICE, 74 CONGRESS ST., W.

Canadian Plant, WELLS BROS. CO. of CANADA, LTD., GALT, ONTARIO

Just Out

Auto Books

The 1918 Edition of Automobile Engineering



The 1918 Edition of Automobile Engineering answers 10,000 questions on the construction and repair of all types of pleasure and commercial cars, including 1918 models. Two entire volumes are devoted to the various ignition, starting and lighting systems, and hundreds of wiring diagrams have been added. Welding, vulcanizing and public garage operation are thoroughly covered. Five thick volumes, 5¾ by 8¼ inches, flexibly bound in **American Morocco**, gold stamped. 2,500 pages; 2,100 illustrations, diagrams, etc., that make difficult points as simple as A-B-C. Written in plain, every-day language. Concise and to the point.

7 Days' Trial

Signing and mailing the coupon brings all five volumes to you for seven days' trial. Don't send a penny—just pay the small shipping charge when the books arrive. Read them—study them—examine them carefully before you decide to buy. If they fail to please, return them **at our expense.** If you keep them, send $2.00 within seven days and $2.00 a month thereafter until $17.80 has been paid. The regular price of this set will be $25.00, so act now!

Tells About

Welding, Motor Construction and Repair, Carburetors, Valves, Cooling, Lubrication, Fly-Wheels, Clutch, Transmission, Final Drive, Steering, Frames, Tires, Vulcanizing, Ignition, Starting and Lighting Systems, Wiring Diagrams, Shop Kinks, Public Garage Operation, Electrics, Storage Batteries, Steam Cars, Motorcycles, Commercial Trucks.

Consulting Service FREE

In addition to the books you get free of all charge a $12.00 Consulting Membership. If any question puzzles you—write us. Our corps of auto experts will solve any auto problem. Ask all the questions you want for a whole year. This service is absolutely free.

MAIL This Coupon

See these books before you decide to buy. Remember—don't send us a penny. Just fill in and mail the coupon. This offer is open to any person living within the boundaries of the United States and Canada.

AMERICAN TECHNICAL SOCIETY
Dept. A-7647
CHICAGO, U. S. A.

AMERICAN TECHNICAL SOCIETY
Dept. A-7647 Chicago, U. S. A.

Please send me a set of Automobile Engineering for 7 days' free examination, shipping charges collect. If I decide to buy, will send $2 in 7 days and balance $2 a month until $17.80 has been paid, when books and Consulting Membership will be mine. Otherwise will notify you to send for them at your expense.

NAME.....

ADDRESS.....

REFERENCE.....

Digitized by Google

PHOENIX HORSE SHOES

Constant Demand is the Best Proof of Their Superiority.

Practical to the Highest Degree. Made of Unexcelled Material.

BULL DOG CALKS

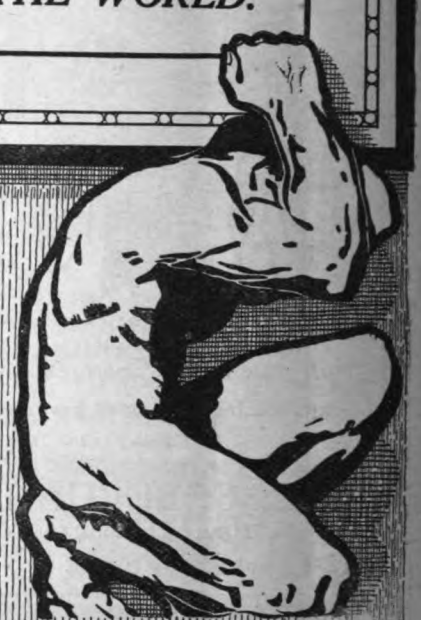
Hold Firmly to the Shoe. Never Jump Out When Set. Easy to Drive in Shoe.
Perfect in Every Detail.

FOR SALE BY ALL DEALERS. WRITE FOR SAMPLES.

WE ARE THE LARGEST HORSE SHOE MANUFACTURERS IN THE WORLD.



PHOENIX
Horse Shoe Company
CHICAGO, ILLINOIS
ROLLING MILLS and FACTORIES } JOLIET, ILLINOIS / POUGHKEEPSIE, N. Y.



JOB WANTED



An able bodied workman seeks a position in some good blacksmith or machine shop.

He is an old acquaintance and friend of the Editor of the Blacksmith and Wheelwright, to whom he is permitted to refer.

He is not particular as to what locality he works in, provided he has plenty of good hard work to do, and his employer honest and careful.

With such a boss, he agrees to never touch intoxicants or indulge in other dissipation. He agrees to be on hand ready for work at seven o'clock in the morning, or any earlier hour the shop opens. He will work overtime without grumbling, even to twenty-four hours daily for as long a period as may be necessary.

He will agree never to strike, ask for higher wages, or even want to go fishing or take a holiday.

He will board himself and remain in perfect health indefinitely. He has no family cares to worry about. He and his brothers, older and younger, are of the well known L. G. P. HAMMER clan, world renowned for skill, integrity and ability.

He is willing to work for twenty cents a day and agrees to do more work than any six skilled men at $3.00 per day. After his wages have been paid for twenty months, he agrees to work for nothing during the remainder of his natural life, which he estimates at fifty years.

He agrees to come on trial, and after thirty days' work, if his boss is not satisfied he will return home without any charge for his services.

He guarantees that he will relieve his employer from all drudgery, so he can spend more time with his family, and not be so eternally tired that he can get no enjoyment out of life.

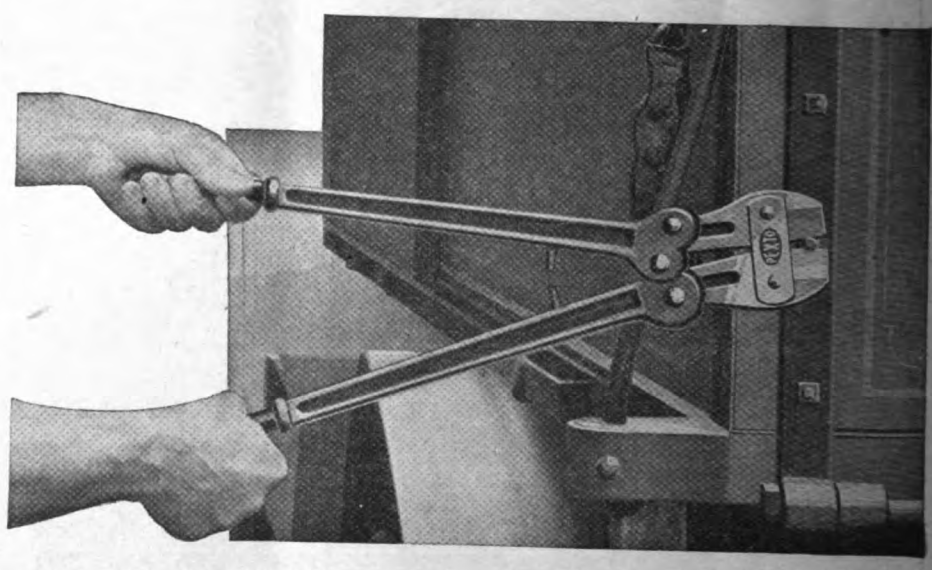
He will treat all customers so pleasantly and do their work so skillfully that they will always bring their work to his shop, and advise their friends to do likewise.

He is not subject to enlistment or draft, and is ready to leave at once and begin work immediately on arrival.

ADDRESS:

LITTLE GIANT
103 Rock Street
MANKATO, MINN., U. S. A.

MAYER BROTHERS COMPANY MANKATO MINN U.S.A. LITTLE GIANT



Pexto in Quality Moderate in Price

Read the heading again!

Here's a strongly constructed cutter that will clip bolts or wire up to ¼ inch—a moderate priced cutter with all the speed and easy cutting qualities of a high priced tool.

Designed especially to take care of the large variety of work for which you do not feel justified in buying a more expensive tool.

Sizes range from 9 inches to 15 inches, capacity to ¼ inch, medium in weight.

There's a large line of other Pexto Tools, including pincers, nippers, parers, butterises, farriers' hammers, etc.

If your dealer cannot supply you, write us.

The Peck, Stow & Wilcox Co.

PEXTO MFRS. Mechanics' Hand Tools, Tinsmiths' and Sheet Metal Workers' Tools and Machines, Builders' and General Hardware.

Southington, Conn. Cleveland, Ohio

Address correspondence to 209 W. Center St. Southington, Conn.

PEXTO
BLACKSMITHS' TOOLS

Digitized by Google

...W YORK
...LIC LI...

ESTABLISHED 1880 — The Pioneer Journal of its Class

THE BLACKSMITH & WHEELWRIGHT

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U. S. Patent Office.

Entered as Second-Class Matter at the Post Office at New York, N. Y., under the Act of March 3, 1879

Vol. LXXVIII. No. 5 — NEW YORK, NOVEMBER, 1918 — TERMS: One Dollar a Year. Foreign, $1.50. (6s. 3d.)

Edwards Shears

For twenty-four years the **Two Leading Low Priced Shears** in the U. S., representing the **Greatest Value for the Least Money.**

No. 5, weighs 200 lbs., cuts 4x½ inch soft steel.
No. 10, weighs 430 lbs., cuts 4x¾ inch soft steel.

At their price you should have had one long ago. Order one from the first iron man that calls on you. **They All Sell Them.**

Write for descriptive circular and prices.

C. D. EDWARDS MFG. CO.
Albert Lea, Minn.



STEEL STAMPS
BURNING BRANDS
RUBBER STAMPS
STENCILS
GEO. M. NESS, JR.
61 FULTON ST. NEW YORK
Send for price list.

SUREGRIP CALKS
American Calk Co.
DETROIT, - - MICH.

The Capewell Horse Nail

Horseshoers are the best judges of a horse nail. Quality is proved by actual test. The way the nail drives, sets, clinches and holds proves its value. The horseshoer is making these practical tests daily.

FOR YEARS Capewell nails have "made good" under these tests. For that reason the vast majority of shoers use them.



The Capewell proves itself the most satisfactory and the most economical.

Not the cheapest nail regardless of quality but the world's best at a fair price.

The Capewell Horse Nail Co.
Hartford, Conn.

The World's Leading Horse Nail Makers



Saw Those Heavy Bars ON A MARVEL Power Hack Saw

Machine stops when work is cut off. Requires very little power.
Price is Low. Write Us.
Ask for reply by return mail.
ARMSTRONG-BLUM MFG. CO.
340 N. Francisco Ave., Chicago, Ill., U. S. A.

STEEL STAMPS
LETTERS and FIGURES
For Marking Your Tools and Your Product
NAME PLATES OF ALL KINDS
S. D. CHILDS & CO.
DEPT. 2
136 S. CLARK ST. CHICAGO

ATTENTION, BLACKSMITHS!

BE SURE IT'S A SUPERIOR Welding and Cutting Outfit you purchase. ACETYLENE GENERATORS. Welding Supplies. Price Popular. Service Immediate. Quality Superior. Write for catalog and price list. Agents wanted.
SUPERIOR OXY-ACETYLENE MACHINE CO.
Manufacturers of Everything for the Welder
HAMILTON, OHIO

The Perfect Power Hammer



Note the difference in construction over other makes:

Extra Long Guides, insuring a direct movement of the ram without any side motion, which causes guides and springs to break on other Hammers.

The only Hammer made with a disk attachment with special anvil for sharpening harrow and plow disks.

A recently invented **Friction Clutch** fitted with **Ball Bearings,** absolutely controls the operation of the Hammer by foot pressure from the lightest tap to the heaviest blow. This ease of operation makes the Hammer particularly well adapted for plow work, as you can get as light a stroke as you desire.

Will ship to any responsible party on approval. If not as represented, no sale.

Made in two sizes:

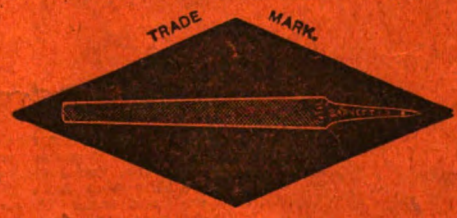
3 inch square, 40 lb. ram—shipping weight, 1,150 lbs.
4 " " 80 " " — " " 1,800 "

Write any jobber for prices, or

Macgowan & Finigan Cordage Co.,
204 North Third St., ST. LOUIS, MO.

THE TEETH IN
BLACK DIAMOND RASPS
ARE MINGLED
So as to Cut Clean and Free and Leave no Furrows In the Work

Twelve Medals of Award by Jurors



At International Expositions

C. & H. BARNETT COMPANY
Black Diamond File Works, PHILADELPHIA, PA.
Owned and Operated by NICHOLSON FILE CO.
Copy of Catalog sent Free to any interested file users upon application.

AETNA STEEL TOE CALKS
Made by THE AETNA NUT CO., Southington, Conn.
BLACK HORSE BRAND

BEST SHAPE
BEST SPUR
TO DRIVE
BEST STEEL



TOE AND HEEL CALKS

SOLD BY ALL DEALERS

Stokes Bros.' Improved Horse Rasps
Every Rasp Warranted Perfect



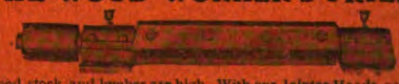
STOKES BROS. MFG. CO., Freehold, N. J., U. S. A.

"NATIONAL" BLACKSMITHS' DRILL CHUCK



Made especially for Blacksmithing and Carriage Work.
Positive, durable, strongest, self-cleaning, always works, quickest to change Drills, casts no shadow, will save its cost over other Chucks in saving of time. BUY THE BEST. Money refunded if not as represented. Ask your jobber for it, or send direct for prices and circular.
ONEIDA NATIONAL CHUCK CO., Oneida, N. Y.

THE WOOD WORKER'S FRIEND



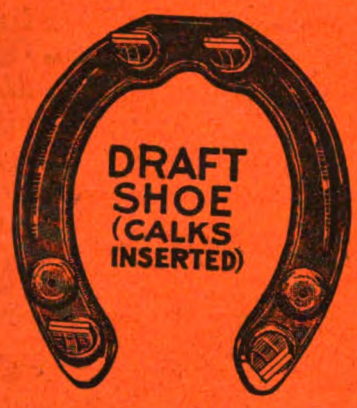
Wood stock and lumber are high. With our Jointer Heads, you can buy rough lumber of any kind and dress it to suit your job. Saves time, money and lumber. Would this be any object to you? If so, get circulars and prices. Sold on 30 days' trial. Mfd. by
Whisler Mfg. Co., Gibson, Iowa

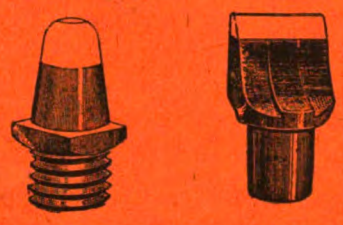
BUYERS' GUIDE AND INDEX TO ADVERTISEMENTS, PAGE 296

Digitized by Google



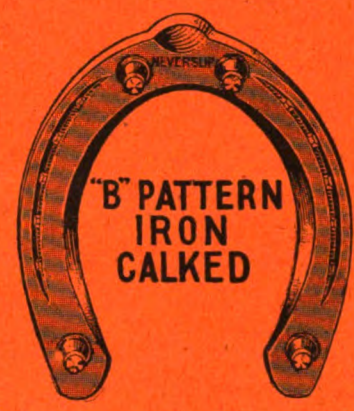
Get Ready
For Icy, Sleety Weather
RED TIP CALKS — HORSE AND MULE SHOES





Order Now

REMEMBER THE NEVERSLIP



Line embraces all styles of Screw Calks, Iron, Steel and Extra Light Steel Shoes, Drilled or Calked; Drive Calks, Sharp or Blunt, Driving, Draft and Mule Shoes, and all necessary tools.

THE ONLY COMPLETE LINE

THE NEVERSLIP WORKS New Brunswick, N. J.

The Better Your Equipment The Bigger Your Profits

Buy CANEDY-OTTO
AND INCREASE YOUR INCOME

Once Tried, Always Used : There's a Reason—Quality

OVER 200 DIFFERENT STYLES

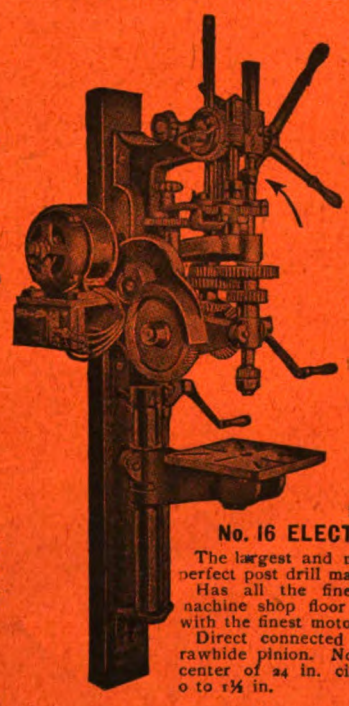
SEND FOR CATALOGUE No. 12



No. 19 DRILL

A low-priced combined hand and power self-feed drill.

Drills to center of 16½ in. circle.



No. 16 ELECTRIC DRILL

The largest and most mechanically perfect post drill manufactured.

Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.

Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1¼ in.



No. 100 ROYAL FORGE

The most popular forge ever made.
Fan, 12 in. Hearth, 31½x45½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x30 in. Blower, 12 in.



Blower, 12"
Wt., 135 lbs.
Height, 47"

ROYAL BLOWER

(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.

Fire pot is 8x9 in. inside.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS



No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.

All machines are tested before leaving the factory, and guaranteed in every respect.

Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.



No. 1 1/2 SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



No. 8 ELECTRIC BLOWER

The best outfit money can buy.

Digitized by Google



"F-S" PAINTS





There's Satisfaction in the High Quality of "F-S" Products

It is great to have confidence in the quality of finish on your well-done work. "F-S" Coach, Carriage and Automobile Varnishes and Japans give much satisfaction by their superior beauty, durability and working qualities.

FELTON, SIBLEY & CO., Inc.

Manufacturers of Colors, Paints, Varnishes since 1863

136-140 North Fourth Street, Philadelphia

(155)



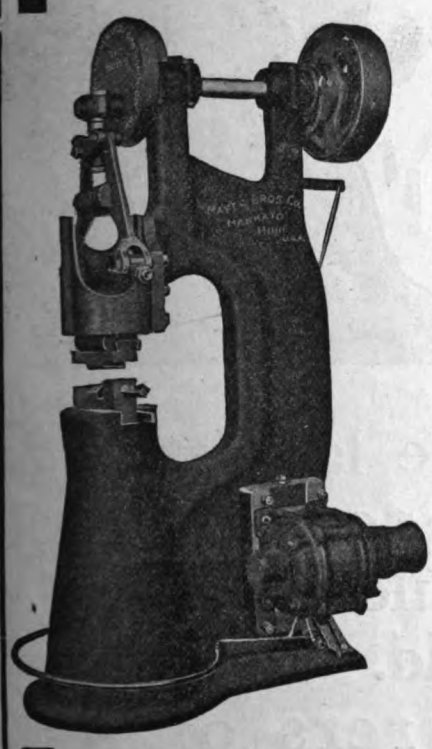
Before the American Bird of Victory Can Fly

American mechanical genius gives of its best. And among all the American products that enter into the making of these distinctly American machines, NICHOLSON FILES have a prominent place.

The Name NICHOLSON means, to builders of Aeroplanes, files valued for speedy cutting powers and extra service-giving QUALITY. Their skilled workers demand the files that they have known in times of peace. A file for every purpose.

NICHOLSON FILE COMPANY
Providence, R. I., U. S. A.

JOB WANTED



An able bodied workman seeks a position in some good blacksmith or machine shop.

He is an old acquaintance and friend of the Editor of the Blacksmith and Wheelwright, to whom he is permitted to refer.

He is not particular as to what locality he works in, provided he has plenty of good hard work to do, and his employer honest and careful.

With such a boss, he agrees to never touch intoxicants or indulge in other dissipation. He agrees to be on hand ready for work at seven o'clock in the morning, or any earlier hour the shop opens. He will work overtime without grumbling, even to twenty-four hours daily for as long a period as may be necessary.

He will agree never to strike, ask for higher wages, or even want to go fishing or take a holiday.

He will board himself and remain in perfect health indefinitely. He has no family cares to worry about. He and his brothers, older and younger, are of the well known L. G. P. HAMMER clan, world renowned for skill, integrity and ability.

He is willing to work for twenty cents a day and agrees to do more work than any six skilled men at $3.00 per day. After his wages have been paid for twenty months, he agrees to work for nothing during the remainder of his natural life, which he estimates at fifty years.

He agrees to come on trial, and after thirty days' work, if his boss is not satisfied he will return home without any charge for his services.

He guarantees that he will relieve his employer from all drudgery, so he can spend more time with his family, and not be so eternally tired that he can get no enjoyment out of life.

He will treat all customers so pleasantly and do their work so skillfully that they will always bring their work to his shop, and advise their friends to do likewise.

He is not subject to enlistment or draft, and is ready to leave at once and begin work immediately on arrival.

ADDRESS:

LITTLE GIANT

103 Rock Street

MANKATO, MINN., U. S. A.





ADVANCE OF THE GRAND ARMY

NAPOLEON'S name fills more pages in the world's solemn history than that of any other mortal. The advance of the Grand Army into Russia is the turning point of his career and marks the beginning of his downfall. Mighty armies are once again marching over the same battlefields where Napoleon fought a hundred years ago. All the causes of this mighty struggle may be learned from the pages of history. The one complete, accurate, authoritative and reliable history, containing the rise and fall of every empire, kingdom, principality and power, is the world famed publication,

Ridpath's History of the World

Dr. Ridpath is universally recognized as America's greatest historian. Other men have written histories of one nation or period; Gibbon of Rome, Macaulay of England, Guizot of France, but it remained for Dr. Ridpath to write a history of the **entire World** from the earliest civilization down to the present. We offer the latest edition, 4000 pages, 2000 illustrations, brand new, down to date, beautifully bound in half morocco.

At a Great Sacrifice in Price

We will **name** our **special low price** and **easy terms** of payment only to Blacksmith and Wheelwright readers and in direct letters to all who mail the coupon printed on the lower corner of this advertisement. **Tear off the coupon,** write your name and address plainly and **mail now.** Our **plan of sale** enables you to buy by saving only about ten cents a day for the ensuing year. Mail the coupon now before you forget it. The sample pages are free.

32 Page Booklet Free

We will mail you 32 free sample pages without obligation on your part to buy. These will give you some idea of the splendid illustrations and the wonderfully beautiful style in which the history is written. You can purchase this great history at the **lowest price ever offered** and pay for it in **small sums monthly** if you prefer.

Six Thousand Years of History

Ridpath takes you back to the dawn of history long before the Pyramids of Egypt were built; down through the romantic troubled times of Chaldea's grandeur and Assyria's magnificence; of Babylonia's wealth and luxury; of Greek and Roman splendor; of Mohammedan culture and refinement; to the dawn of yesterday. He covers **every race, every nation, every time** and holds you spellbound by his wonderful eloquence. **Mail the coupon.**

Western Newspaper Association
CHICAGO



FOLD HERE, TEAR OUT, SIGN AND MAIL

16 18

FREE COUPON

Western Newspaper Association
H. E. Sever, Pres.
140 So. Dearborn St.,
Chicago, Ill.

Please mail 32 free sample pages of Ridpath's History of the World, containing photogravures of Napoleon, Cæsar and other great characters in history, and write me all particulars of your special offer to The Blacksmith and Wheelwright readers.

Name .....

Address.....

Mail this Coupon

Digitized by Google

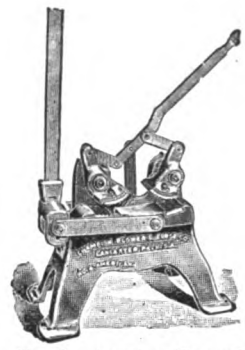


Digitized by Google

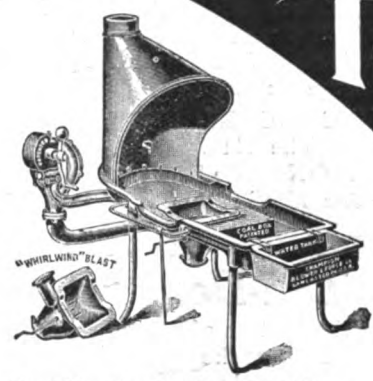
THE FAMOUS CHAMPION BLACKSMITH TOOLS



No. 408. Steel Blacksmith's Forge.



No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.

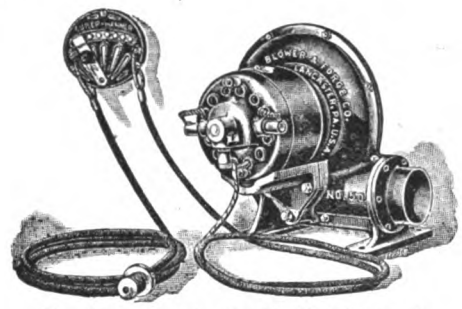


No. 433. Cast Iron Blacksmith's Forge.



No. 400. Crank turns either way.

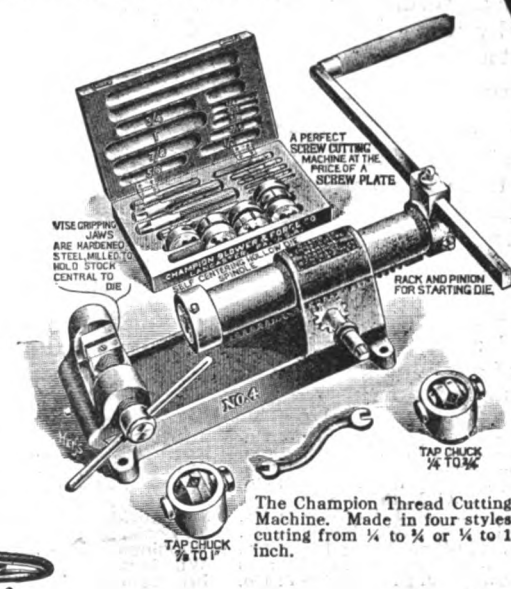
FAMOUS 400



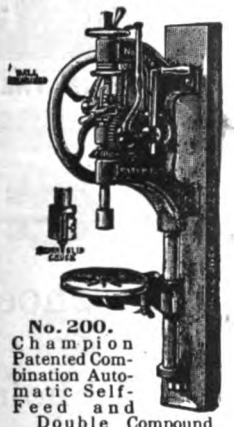
No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower.

Don't Fail to Get 1918 Catalog

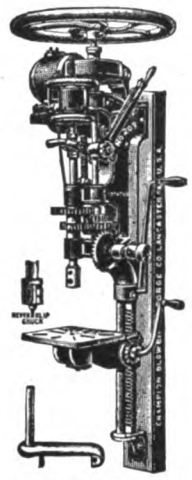
Before purchasing a Hand Blower, Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



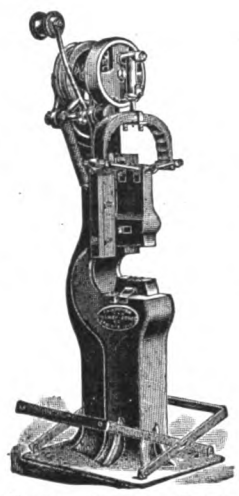
The Champion Thread Cutting Machine. Made in four styles cutting from ⅛ to ¾ or ¼ to 1 inch.



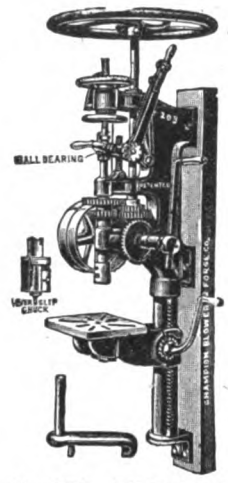
No. 200. Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



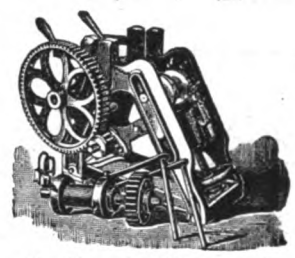
No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.



Hercules Patented Power Hammer. Weight of ram, 65 pounds.



No. 203. Self-Feed and Double Compound Lever Feed Drill.



The Champion "Columbian" Tire Bender. Made in 3 sizes.



LET THE WORLD REST EASY

THERE WILL BE PLENTY OF WORK TO DO

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

Digitized by Google

WAGON BUILDING

"Build me a wagon that will last forever."

"Sorry, Sir, but 'axle troubles' (due to wear—wear on the spindle, or on the box, or both) make it impossible."

You've often received a specification like that and been obliged to give that answer—haven't you?

The Sheldon "TON-DON"—an axle that will not wear, run hot or break—allows your meeting the requirements of the man who wants a wagon to last forever, **and we have told him so.**

The Sheldon "TON-DON" was originally made for buggies and carriages. Its success was so instantaneous and pronounced that we were deluged with requests for an axle embodying the same principle for use on Delivery, on Business and on Express Wagons.

Hence, the "TON-DON" CONCORD EXPRESS.
In EFFICIENCY—The HIGHEST.
In CONSTRUCTION—The SIMPLEST.
In SERVICE—The MOST SATISFACTORY.

The Spindle of the Sheldon Ton-Don Axle

Ordinary axles wear flat on the bottom of the spindle because the bottom side is the point of contact and where the wear of the spindle is concentrated. It takes a spindle of unusual hardness to resist this wear—greater hardness than any ordinary axle affords. The spindle of the "TON-DON" is hardened by a special process, producing a wearing surface of such hardness that a fine file makes no impression on it—yet the center remains soft or "natural."

The Phosphor-Bronze Lined Box

The peculiarity of this box lining is that while somewhat softer than the spindle, there is no perceptible wear after thousands of miles of running, but becomes harder and more wear-resisting with use.

Phosphor-Bronze (of a mixture which increases its toughness, smoothness under friction, and wear-resisting qualities) is a metal used for making the propellers of ocean steamships, bearings for locomotives, crank-shaft bearings for automobiles and other fine machinery. Imagine what a metal must be to meet such conditions, and you will grasp the advantages of applying such metal to axle purposes.

THESE AXLES CARRIED IN STOCK BY THE FOLLOWING JOBBERS AND CAN BE OBTAINED AT MANUFACTURERS' PRICES.

Baltimore, Md.	E. Scott Payne Co.	Providence, R. I.	Congdon & Carpenter Co.
Boston, Mass.	E. P. Sanderson Co.	Rochester, N. Y.	Burke Iron & Steel Co.
Buffalo, N. Y.	H. D. Taylor Co.	San Francisco, Cal.	Waterhouse & Lester Co.
Chicago, Ill.	E. D. Kimball Co.	Scranton, Pa.	Bittenbender & Co.
Cincinnati, O.	G. B. Schulte Sons Co.	Seattle, Wash.	Gray Bros. Co.
Indianapolis, Ind.	W. J. Holliday & Co.	Springfield, Mass.	Chas. C. Lewis & Co.
Los Angeles, Cal.	Percival Iron Co.	St. Louis, Mo.	Sligo Iron Store Co.
Milwaukee, Wis.	Shadbolt & Boyd Iron Co.	Washington, D. C.	Louis Hartig
Pittsburgh, Pa.	McLean & McGinness	Wilmington, Del.	Delaware Hardware Co.
Portland, Oregon	J. E. Haseltine & Co.	Bridgeport, Conn.	Chapman & Bangs Co.
Ft. Wayne, Ind.	Mossman, Yarnelle & Co.	San Antonio, Texas	Heusinger Hardware Co.
	New Orleans, La.		Jos. Schwartz & Co.

SHELDON

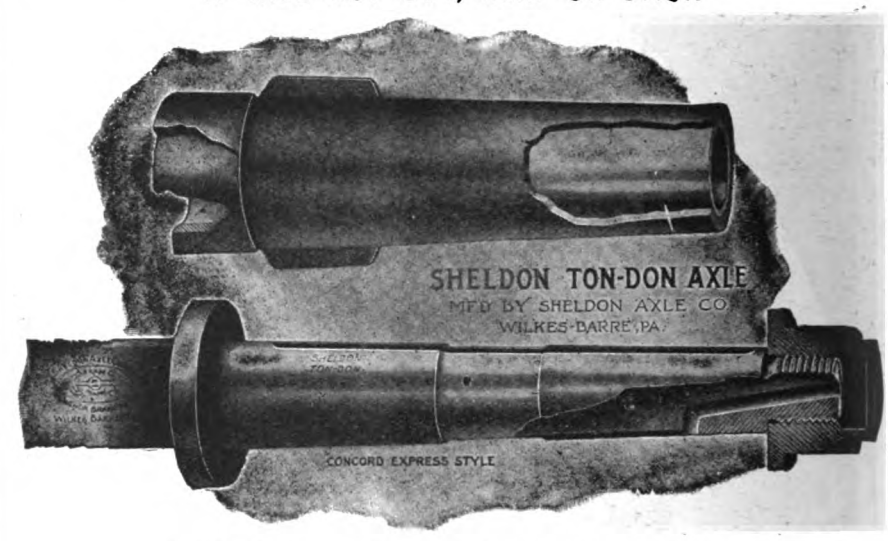
"TON-DON"

CONCORD EXPRESS STYLE

NOT A BALL OR ROLLER BEARING—BUT

ANTI-FRICTION—EVERLASTING—INTERCHANGEABLE

IT WILL NOT CUT, HEAT OR STICK



NOTICE THE PATENTED OILING DEVICE
HAS ALL THE ADVANTAGES OF FRICTION AND ANTI-FRICTION AXLES WITHOUT THEIR DISADVANTAGES
"TON-DON" MEANS KNOWN QUALITY WITHOUT FANCY PRICE

MADE ALSO FOR BUGGIES AND SURRIES

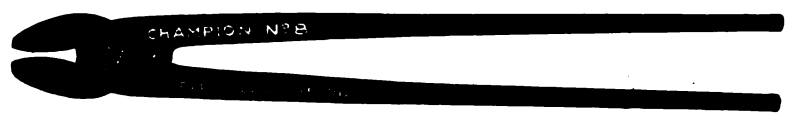
SHELDON AXLE & SPRING CO.,
WILKES-BARRE, PA.

LARGEST AXLE FACTORY IN THE WORLD.

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge

Nothing to get out of order.



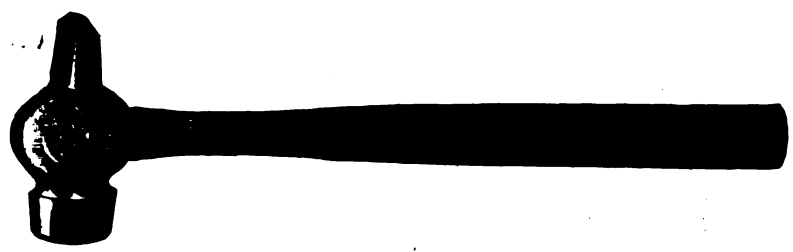
Will hold securely any size of shoe.

No. 8 16 Inches Long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

Weights, 1¼ to 3 lbs.

This Hammer is the most popular Sharpening Hammer on the market.

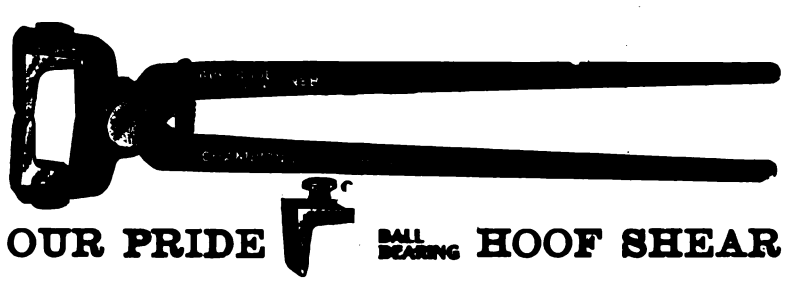


Corrugated Pein.

IT GIVES RESULTS.

No. 12 ELECTRIC SHARPENING HAMMER

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.



Blades easily replaced when worn out.

All parts interchangeable.

OUR PRIDE BALL BEARING HOOF SHEAR

Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY, - Meadville, Pa., U. S. A.

THE LIVINGSTON CO., 131 E. 23rd Street, NEW YORK, Eastern Representatives

Digitized by Google

1919 MODEL
THE L. S. P. CALKING MACHINE

The Greatest Time and Labor Saving Machine On Earth



1919 MODEL—Fully covered with Patents

OUR 1919 Model is the same as our 1918. We agree with the users and so would you, that it cannot be improved.

Do not mistake this for a machine which makes toe calks or a foot vise. This machine is for turning heel calks, both Blunt and Sharp, sticking and welding toe calks, clipping and trimming ends of shoes. IT CALKS SHOES, doing the work just the same as you do by hand with the hammer, only it is done much better and easier, and in a fraction of the time.

In turning heels, you can turn up just as much stock as you wish, upset or stoveup to make as heavy as you like and square up the calks without use of hammer. There is no losing of toes when you weld on the L. S. P.

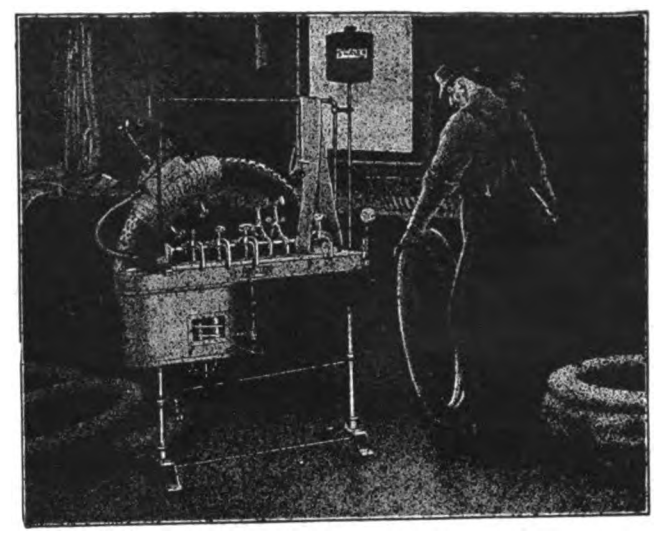
It is a strong, handsome, well made machine and will last, as you might say, a life time, fully warranted for one year. It is in use in the best shops in the United States, users claiming more for it than we do.

Write at once for full information and prices.

L. S. P. CALKING MACHINE CO.

P. O. Box 225 WYALUSING, PA., U. S. A.

NATIONAL MACHINE CO., Brighton, Ontario, Canada



Make Money Repairing Tires

The high cost and limited supply of tires makes it necessary for motorists to conserve their casings and tubes—to get the maximum mileage. Present conditions offer tire repair men a big opportunity to make money.

Experienced help is not necessary. A boy can learn how to make perfect tire repairs in 30 minutes. Every car owner in your town is a possible customer. Jobs are plentiful, because tires blow out and puncture every day. Motorists are ready to pay liberal prices for repairing punctures, blow-outs, cuts, tears, rim cracks, etc.

SHALER SHOP VULCANIZER

will do as much and as perfect work as the large, expensive vulcanizing outfits which cost from $250 to $500. The price of this Complete Steam Vulcanizing Plant—heated with either gas or gasoline—is remarkably low—$70 subject to Trade Discounts. Outfit shown above is Type N. P. R.—No. 41—other models heated by steam or electricity are described in our catalog.

Write for Catalog

which explains every detail about the SHALER Repair Shop Vulcanizers, the principle of the approved SHALER Wrapped-Tread method of mending casings, and tells about our "Money-Back" Guarantee. Don't delay, write at once.

C. A. Shaler Company

1807 Fourth Avenue Waupun, Wis., U. S. A.

(Oldest and Largest Manufacturers of Vulcanizers)

FREE SAMPLE OF FLUX



WELD TRADE A MARK CAST

A SUPERIOR FLUX FOR

OXY-ACETYLENE WELDING

"WELD-A-CAST" Flux No. 1 for Welding Cast Iron.

Eliminates pin holes and blow holes, leaving the metal soft.

"WELD-A-CAST" Flux No. 3 for Welding Brass, Bronze, High Speed Steel, and all High Carbon Steel.

Prove it! Write for Sample.

CORTLAND WELDING COMPOUND CO.

CORTLAND, N. Y.

Would You Sell Your Life For $65?

You wouldn't part with even an arm or a leg for that figure, would you?

Yet every vicious horse you shoe is likely to do more damage in the twinkling of an eye than can be repaired at several times the cost of **Barcus Stocks.**

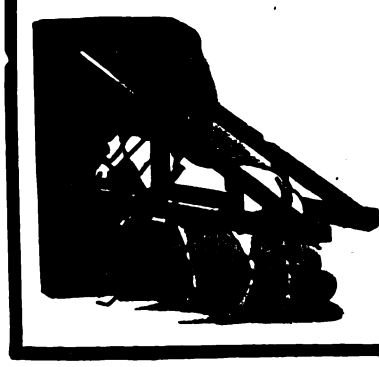
When you place a horse in a Barcus Stock, he is harmless—he cannot hurt either you or himself. Costing only $65 it is cheap insurance, indeed.

BARCUS STOCKS not only furnish the logical way to observe "Safety First," but they are also a positive aid to good shoeing. The BARCUS is a modern Stock—automatic working parts instead of the bothersome ropes, straps and blocks that made the old style stock almost more of a nuisance than a help.

If you don't know about **Barcus Stocks** you owe it to yourself and your family to write **at once** for the complete details.

The Barcus Mfg. Co.,

Wabash, Ind.



Please send me full particulars regarding your Horse Stocks without any obligation on my part.

Name.....

Town..... *State*.....

Digitized by Google

Firestone



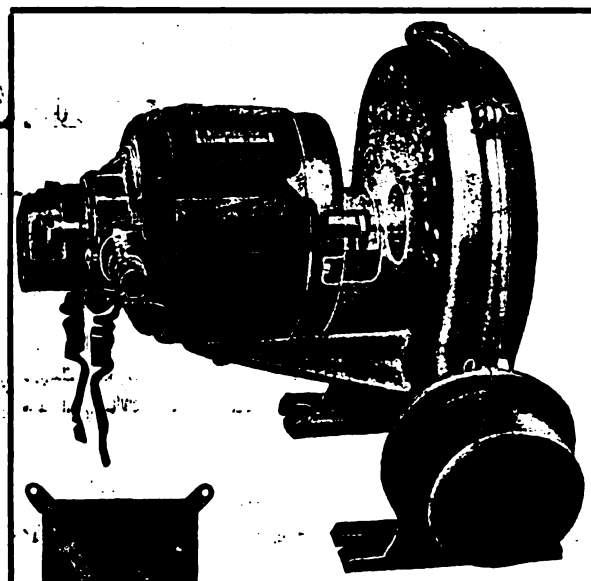
Driving Quality Home

YOU will get real work from every Firestone Tire you apply; it will wear evenly down to the channel without cutting or chipping; it will have more than usual resiliency, lightness and endurance. It will bring your customers back when after long service it is finally worn out.

That's the reason for Firestone success. Careful design and building, plus quality, come home in "Most Miles per Dollar"

FIRESTONE TIRE AND RUBBER CO.
Firestone Park Akron, Ohio
Branches and Dealers Everywhere

CARRIAGE TIRES



"One Fire" Marvel

A. C. or D. C.
or
UNIVERSAL MOTORS

Extra Large
Ring Oil Bearings

Case Hardened
Armature Shaft

$38.00 Net

Order a Marvel on 30 days' trial through your Dealer, or your Electric Light Company

Electric Blower Co., 352 Atlantic Avenue BOSTON, MASS.

ROBERGE'S GREAT BOOK

"THE FOOT OF THE HORSE"
By DAVID ROBERGE

The author of this book for many years enjoyed the entire confidence of Robert Bonner, who, in his day, owned many of the fastest trotters the world has ever seen. Bonner and Roberge worked together in shoeing the former's horses. Many believe that David Roberge was the ablest horseshoer this country has ever seen. His book is filled with plates and illustrations showing proper methods of shoeing horses for every kind of lameness. We have sold large numbers of these books and they have always given entire satisfaction. The work represents the life experience of its author. Sent to any address, postage prepaid; on receipt of price, $5.00. Address
M. T. RICHARDSON CO., Publishers, 71-73 Murray Street, New York.

Advertising Rates in The Blacksmith and Wheelwright made known on application.

SUPPLIES

for AUTOMOBILES, TRUCKS and TRACTORS

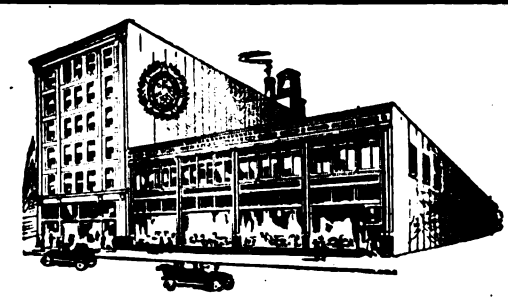
TOOLS and EQUIPMENT

for GARAGES and REPAIR SHOPS

THE BECKLEY-RALSTON CO.

(*WHOLESALE ONLY*)

1801-1815 MICHIGAN AVENUE CHICAGO

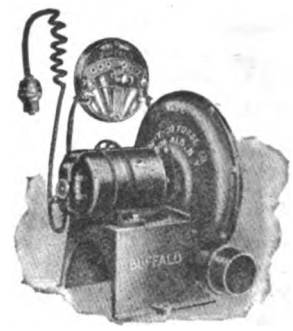


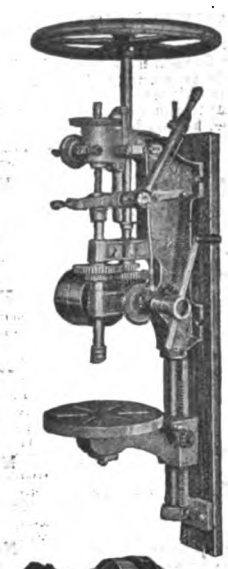
OUR NEW CATALOG

contains 500 pages. If you have an established place of business and are entitled to buy at trade prices we will gladly send you a copy of this book. When writing please use your business letterhead and ask for catalog No. 82.

Digitized by Google



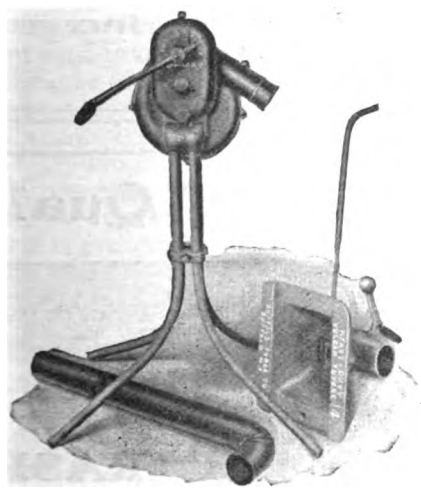




Modern Shop Efficiency

BLACKSMITHS AND GARAGEMEN are determined to have the best that may be had in Blacksmith Shop Equipment.

The work of the modern shop demands modern efficient tools—tools that will stand up under severe service.

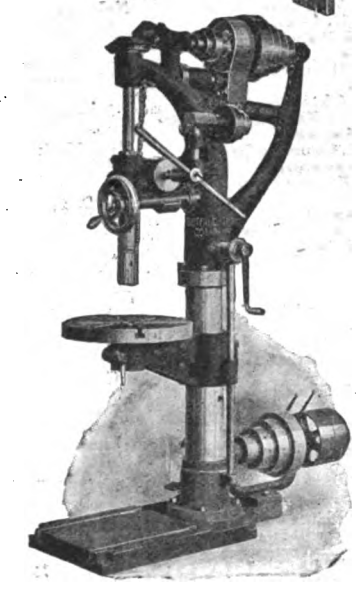


Forges; electric blowers; drills—floor and post type; shears—for cutting angles, bars and sheets—and of every size from the little bench type hand power shear to the heaviest power shear made—these are the tools you should know about.

Write Dept. 6 for Catalog

Buffalo Forge Company, Buffalo, N. Y.

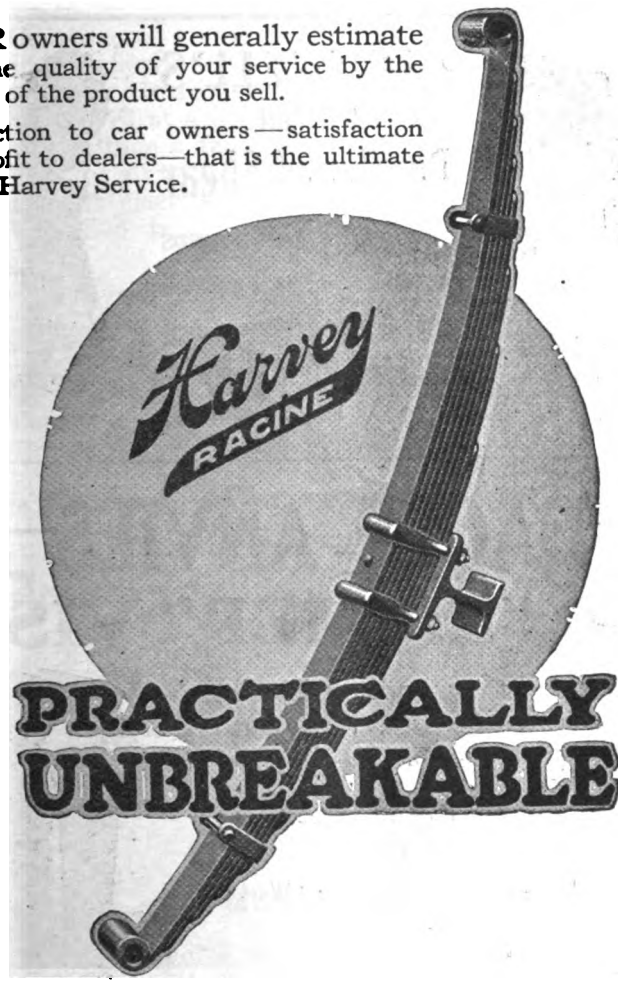
"Buffalo"



Service

CAR owners will generally estimate the quality of your service by the quality of the product you sell.

Satisfaction to car owners—satisfaction and profit to dealers—that is the ultimate aim of Harvey Service.



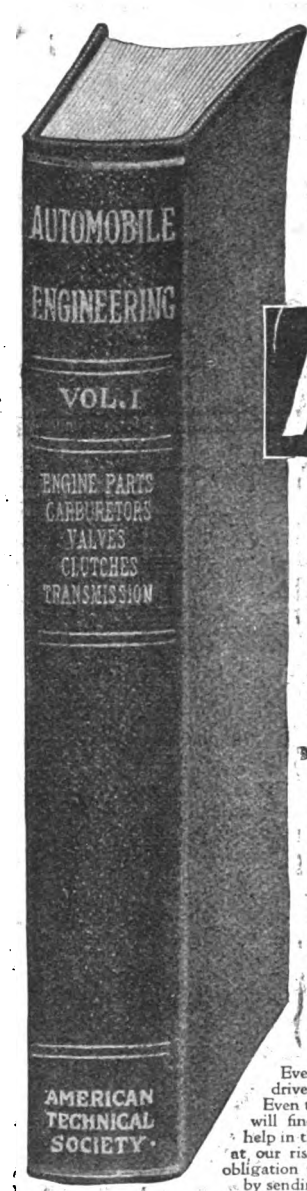
PRACTICALLY UNBREAKABLE

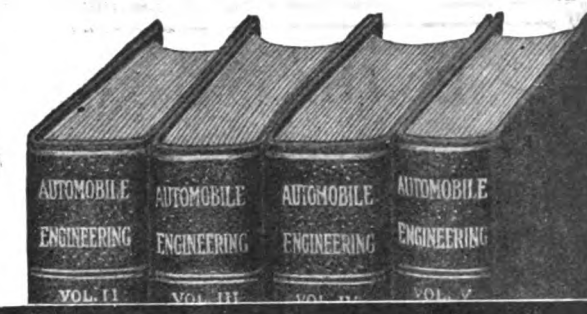
THERE'S A HARVEY JOBBER NEAR YOU

Our new catalogue giving complete measurements of over 900 styles of Springs is yours on request

HARVEY SPRING & FORGING CO.

919 - 17th Street, RACINE, WIS.





AUTO BOOKS

NEW 1918 EDITION

Now ready for you—this marvelous five-volume Library on Automobile Engineering! The newly-written reference work covering the construction, care and repair of pleasure cars, motor trucks and motorcycles. The most complete and advanced information in Ignition, Starting and Lighting Systems, Garage Design and Equipment, Welding and other Repair Methods. Five wonderful volumes beautifully bound in flexible covers, gold stamped. 2,500 pages (5¾x8¼ in.), 2,100 illustrations, tables and explanatory diagrams. This great automobile library, combining the knowledge of the greatest experts in the business, now yours on payments so small as to average only 50c a week, or only 7c a day.

7¢ A Day

SHIPPED FREE

No money in advance. Not a cent. See the books in your own home or shop absolutely free, at our risk. Read them, examine them, study them for seven whole days before you need decide whether you want to keep them or not. Send no money to get the books for free examination. Make no deposit. Assume no obligation. Simply put your name and address on the coupon below and mail it to us. The books will be promptly shipped to you for your examination. Take seven days to ascertain their value to you. If you are not more than delighted with them and do not consider the books one of the biggest bargains you ever made, just send them back to us and you won't owe us a penny. If you value the books and see them to be worth many times their price to you, send only $2 in seven days and then $2 a month until the special introductory price of **$17.80 has been paid.**

Partial List of Contents

Explosion Motors, Welding, Motor Construction and Repair, Carburetors and Settings, Valves, Cooling, Lubrication, Fly-Wheels, Clutch, Transmission, Final Drive, Steering Frames, Tires, Vulcanizing, Ignition, Starting and Lighting Systems, Wiring Diagrams, Shop Kinks, Commercial Garage Design and Equipment, Electrics, Storage Batteries—care and repair, Motorcycles, Commercial Trucks, Glossary.

Send No Money

Every repair man, every auto mechanic, every auto driver and owner will prize this magnificent library. Even the most experienced veteran in the business will find a wealth of practical information and help in this work. Prove their value to yourself at our risk. See the books without cost or obligation to you. Not a cent do you risk by sending the coupon. So do it today—NOW—while this special offer is open. **You have nothing to lose, and much to gain.**

FREE

Consulting Service. With each set we give you free, a year's Consulting Membership in the American Technical Society. The regular price is $12. Put your problems to our Staff of Experts for entire year.

AMERICAN TECHNICAL SOCIETY
Dept. A-7648
Chicago, Ill.

American Technical Society
Dept. A-7648 Chicago, Illinois

Please send me the 5-volume Automobile Engineering for 7 days' examination, shipping charges collect. If I decide to buy, I will send $2 within 7 days and the balance at $2 a month until the $17.80 has been paid. Then you send me a receipt showing that the $25 00 set of books and the $12 Consulting Membership are mine and fully paid for. If I think I can get along without the books after the seven days' trial, I will return them at your expense.

Name.....

Address..... Reference .....

Digitized by Google

LINDE OXYGEN

From Coast to Coast 65 Producing Plants and Distributing Stations provide an unlimited supply of Linde Oxygen for users everywhere.

LINDE SERVICE means no investment except for oxygen actually received—no expensive overhead or upkeep charges.

Linde Oxygen may be obtained from any of the following Linde Plants and Distributing Stations where a large suppply of charged 100 to 200 cu. ft. cylinders is kept on hand constantly to insure immediate shipments.

Mail or telephone your order to THE LINDE AIR PRODUCTS CO., at the nearest point. Shipments will be made on day order is received.

PRODUCING PLANTS AND WAREHOUSES

Alabama
*Birmingham
10th Ave. & 26th St.
California
*Emeryville, Oakland
*Los Angeles
1665 Mission Road
Colorado
*Denver
S. B'way & Exposition Ave.
Connecticut
Hartford
1695 Main Street
District of Columbia
Washington
9th & Maryland Ave., S. W.
Georgia
*Atlanta
Flyant St. & Southern R. R.
Savannah
OgeecheeCanal,So.of BaySt.
Illinois
*Chicago
3633 Wall Street
East St. Louis
6th & Walnut Ave.
Peoria
721-731 So. Washington St.
Indiana
*East Chicago
S.E.Cor. Kennedy & 145th St.
Fort Wayne
414 E. Columbia Street
*Indianapolis
2819 Roosevelt Ave.
Iowa
Davenport
113 Harrison Street
Des Moines
117 W. 8th Street
Kansas
Wichita
Rock Island Ave. & 2nd St.
Kentucky
Louisville
128 East Main St.
Louisiana
New Orleans
901 Fulton Street
Maryland
*Baltimore
29th & Montebello Ave.
Massachusetts
Cambridge
25 Waverly Street
Springfield
Napier Street
*Worcester
961 Southbridge St.
Michigan
*Detroit
St. Aubin Ave. & Newton St.
Grand Rapids
Pearl Street by the Bridge
Minnesota
Duluth
Seventh Ave., West
*Minneapolis
1809 Hennepin Ave.
Missouri
*North Kansas City
14th & Charlotte St.
*St. Louis
4218 Forest Park Blvd.
Nebraska
Omaha
1007 Jones Street
New Jersey
*Elizabeth
Linden Ave.
Newark
354 Plane Street
New York
Albany
Montgomery & Colonie Sts.
*Brooklyn
475 Driggs Ave.
*Buffalo
155-183 Chandler St.
*Utica
Walnut & Schuyler Sts.
Ohio
*Cleveland
802 East 72nd Street
*Cincinnati
Stanton & Mellish Aves.
Columbus
310 Dublin Ave.
Dayton
521 E. First Street
Lima
339 East High Street
Ohio
Toledo
441 South Erie Street
*Youngstown
601-621 Jones Street
Oklahoma
Oklahoma City
27 E. Grand Ave.
Tulsa
1 North Boulder St
Oregon
Portland
15th & Hoyt Streets
Pennsylvania
Erie
1502 Sassafras Street
*Norristown
*No. Philadelphia
18th & Cambria Streets
Pittsburgh
16th & Pike Streets
*Trafford
Tennessee
Chattanooga
212-228 King Street
Memphis
203 Washington St.
Texas
*Dallas
Harwood and Coombs St.
Houston
Cedar & Baker Sts.
San Antonio
512 Dolorosa St.
Utah
Salt Lake City
112 West Second St., South
Virginia
Richmond
1709 E. Carey Street
Washington
*Seattle
Henrietta St. & 8th Ave., So.
Spokane
121-123 S. Madison St.
Wisconsin
Manitowoc
810 Quay Street
*Milwaukee
36th St. & National Ave.

(Star) * Designates Plants.

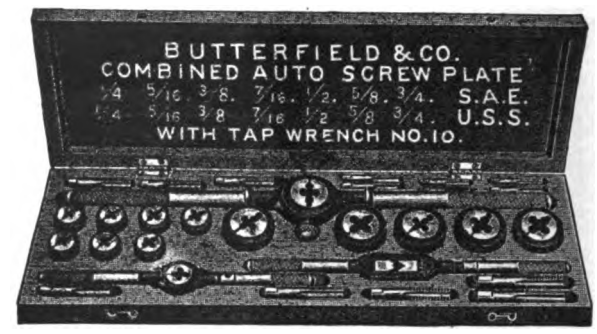
Other Plants and Distributing Stations are planned for other industrial centers throughout the country and will be established as fast as and wherever the local demand for oxygen warrants.

THE LINDE AIR PRODUCTS COMPANY

Largest Producers of Pure Oxygen in America

Forty-Second St. Building NEW YORK

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.
New York Store: 126 Chambers Street

The Horse Rasp of Quality



Ask your Dealer for the

IMPROVED HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, **"Slim," "Light," "Slim Light"** and **"Fine Cut."** Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial. New catalogue mailed free on application.

HELLER BROTHERS CO. *Established in 1836* **Newark, N. J.**

IS THAT IT?

Because you couldn't handle that big order you had to let it go to the man whose shop was equipped with

THE KERRIHARD POWER HAMMER.

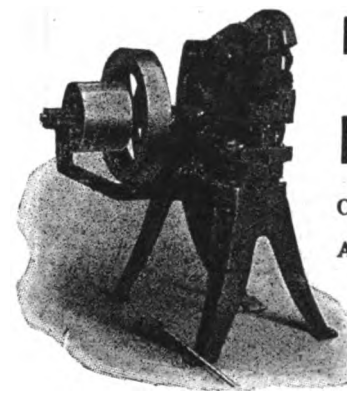
Is That It?

Better have us send you particulars.

Write to us this day.



THE KERRIHARD COMPANY
Kerrihard Station, Red Oak, Iowa, U. S. A.



BICKNELL'S
POWER
Punch and Shear

CUTS FLATS AND ROUNDS

A Time Saver in Any Shop

Write for Price

Bicknell Mfg. & Supply Co.
Janesville, Wis.



PARKS WAGON SHOP SPECIAL



You may think you don't need this practical woodworker in your shop. Take advantage of our trial offer, and be convinced how much it will save you. Machines sent on trial anywhere in United States and Canada.

Machine is a combination of Circular, Rip and Cross Cut Saws,
22" Band Saw,
12" Jointer,
Rim Rounder,
Felloe Borer,
Spoke Tenoner,
All ready for instant use.
No Changing.

Light size takes 2 to 3 H. P., heavy size 3 to 4 H. P.

Write for catalog and full information about how a woodworker should be arranged to be convenient to operate.

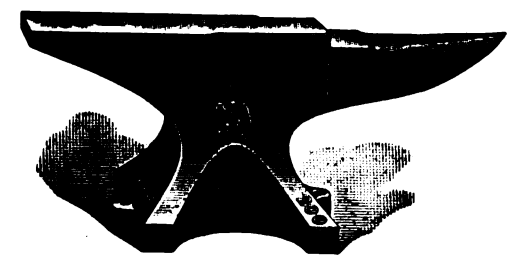
Parks Ball Bearing Machine Co.
North Side Station
Cincinnati, O.

1843 EAGLE ANVILS 1918
AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE

BLACKSMITH AND WHEELWRIGHT

Vol. LXXVIII. No. 5. NEW YORK, NOVEMBER, 1918. TERMS ONE DOLLAR A YEAR

Design, Construction, Operation and Repair of Automobiles and Motor Vehicles

Part X—Construction of the Ford Transmission Gear-Set and How It Works, Together With Explanation of the Ford Magneto

In our last issue we took up the details of all transmissions except that of the Ford. Although the Ford gear-set is operated the simplest of any on the market, in construction it is the most complicated.

It is termed the planetary type and is so termed because of the fact that the gears revolve about a common center point of driven gears. The revolving gears are termed triple gears and are mounted on studs upon the flywheel. When the car is stationary or operating at low speed or reverse, these triple gears turn together with the flywheel, which is revolving at the time.

In Figure 42 are shown the component parts of a Ford transmission. A represents the flywheel, B the three sets of triple gears, C the driven gear, D the reverse gear attached to the reverse drum, E the low speed drum and gear, F the brake drum and hub upon which is mounted the driven gear C. G is the disc drum which is keyed to the transmission shaft shown at M attached to the flywheel. H shows the clutch discs, J the clutch push ring, and K the driving plate, together with the clutch spring, fingers, etc.

This driving plate connects with the universal joint and the rear axle. In reassembling the unit, the triple gears B are placed upon the studs mounted in the flywheel and shown at N. D is slipped over the hub on E, and F is slipped through E and the driven gear C keyed to it. The three gears then mesh with the three on the triple gear stud. The disc drum G is keyed to the transmission shaft M, the clutch discs H are then slipped into the drum F. First a driven disc which fits into the drum, then a driving disc, and so on alternately until all of the discs have been put in place. J is placed against all of the discs and K bolted to F, completing the assembly.

Car Driven Through C.

One can see then that since K is fastened to F and upon F is keyed the gear C, anything that will drive the gear C will cause the car to move forward. Let us see what happens when the car is stationary and the engine is started. The weight of the car of course holds the gear C stationary and the

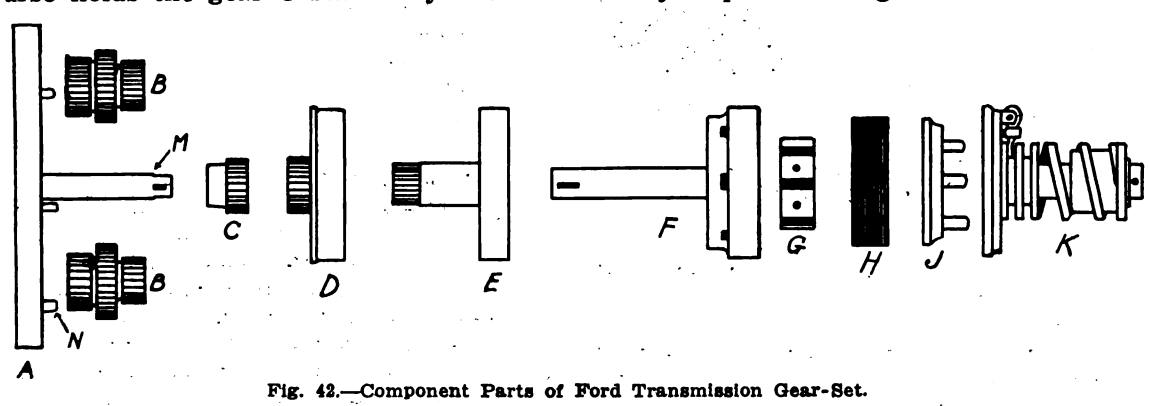


Fig. 42.—Component Parts of Ford Transmission Gear-Set.

flywheel A starts to revolve, carrying around with it the three triple gears B.

Since these gears mesh with the gear C, and C is held stationary, they roll upon C, each one revolving upon its stud N, but they also mesh with the gears upon D and E. Therefore D and E both revolve. The number of teeth on D, the number of teeth on E and the number of teeth on C all differ, and so if C is prevented from revolving both D and E must revolve, and if they are allowed to revolve freely there will be no cause for the gear C to revolve or the car to move.

Suppose, however, the gear upon E were held stationary by means of a band around the drum. The triple gear B is meshed with this gear and also with the driving gear C, which is fastened to the member which drives the axle. We have said that these two gears have a different number of teeth. Manifestly

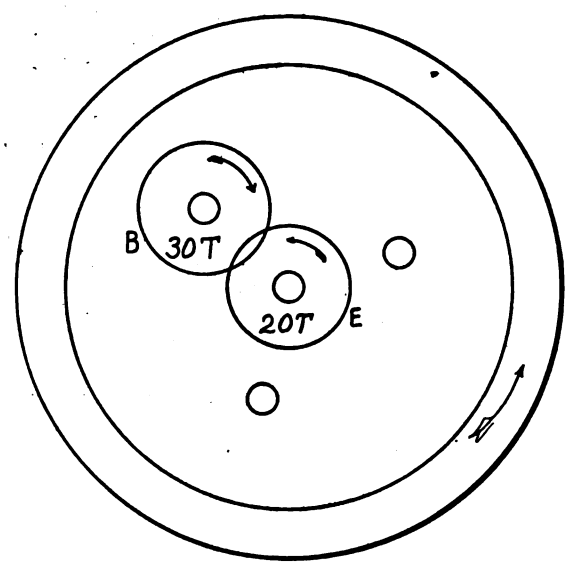


Fig. 43.—Illustrating Gear Action at Low Speed.

it is impossible for the triple gear to travel at two different speeds at the same time, since all three gears are riveted together. Therefore if E is held tightly enough, C will be forced to revolve, thereby driving the car.

The same thing is true if the cone D is held. The gear C will be forced to revolve and the car will be driven at a different rate of speed, all depending upon the size of the gears and the number of teeth in each.

It is hard to see why the car will move forward if the gear E is held, and backward if the gear D is held. The average mechanic cannot understand this and so we will try to explain it by means of diagrams. It is entirely a question of gear ratios. To understand this let us refer first to Figure 43. Let B in this figure represent the triple gear which meshes with the low speed gear E at the center. Assume that B has 30 teeth and E has 20 teeth and that the flywheel turns in the direction of the arrow at the outside. Then every time the flywheel makes one revolution the gear B makes only two-thirds of a revolution, or, in other words, turns only 20 of its 30 teeth.

In other words, it has rolled all the way around the center gear, but has not made a complete revolution. The general effect then is that it has only revolved in the direction shown by the small arrow on its face. Now bear in mind that on this gear are riveted two other gears, one of which meshes with the driven gear C. This being the case, the gear C is driven slowly in the direction in which the flywheel is revolving, giving a low speed forward.

The Reverse Action.

Suppose instead of holding the low speed drum E we hold the drum D stationary. We can see what happens in Figure 44. B shows the triple gear which meshes with the gear upon the reverse drum D. In this case the triple gear we will assume has but 26 teeth, while that upon the drum has 27. We will assume that the flywheel is revolving as before in the direction of the arrow. For every revolution of the flywheel the triple gear will turn once, and one more tooth in the direction of the arrow.

In other words, it will roll forward or will travel faster than the flywheel itself. Therefore if it is fastened firmly to the gear which is meshed with the driven gear C, the driven gear will be carried in a direction opposite to the revolution of the flywheel, thus giving a reverse motion to the wheels.

When the cone D is held stationary the car will move backwards slowly. When this drum is released and E is held the car will move forward slowly.

There still remains one more drum, F. To this you will remember was keyed the gear C, and to this drum is also fastened the driving plate which connects directly to the rear axle. F therefore always revolves while the car is moving and only when the car is moving. Therefore if we put a friction band around F this band can be used as a brake if necessary.

The three drums, D, E and F, are surrounded by what are termed friction bands; pieces of steel bent in hoop shape and lined with some sort of friction material. Each of the bands is compressed by means of a foot pedal in the car. The foot pedal at the extreme left when pushed forward compresses the band around E. The one in the middle when pressed forward compresses the band around D, and the one at the extreme right acts as the surface brake and compresses the band around F. When the pedals are released each of the bands should run free, that is, no part of the friction material should touch either of the drums. Otherwise a dragging noise will be heard as long as the transmission is running. A five-minute examination of a Ford transmission will show just how the brake bands, as they are often termed, are adjusted.

High Speed Clutch.

So far we have considered the action of a transmission at the idling, at the slow, and at the reverse speeds. Let us see now what happens when the high speed clutch is thrown in. When idling, the flywheel, to-

Digitized by Google

gether with all of the triple gears, is revolving. The transmission shaft M is likewise turning. Since none of the bands are compressed around the various drums these drums are free to move and the car remains standing. Since the transmission shaft M is turning with the engine, the disc drum G is also revolving and carrying with it every alternate plate in the assembly H, for every alternate plate is fitted into the keys in the brake drum F. These plates are held apart by means of the foot lever at the extreme left, which is held at the center of the slot in the floor boards.

As soon as this foot pedal is released it drops backward and permits the heavy spring

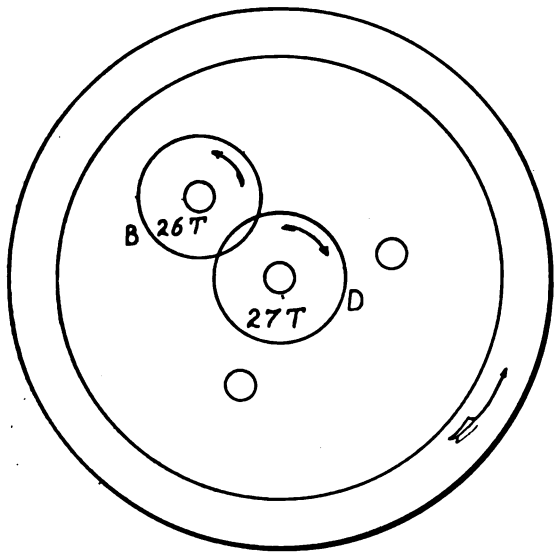


Fig. 44.—Illustrating Gear Action at Reverse Speed.

which is mounted upon K to press against three little fingers and these in turn press against the clutch-push-ring J. This presses all of the plates in the assembly H together, locks the brake drum F to the transmission shaft M and the car moves forward at high speed.

Of course high speed is never meshed before the car is moved forward at low, else the engine would be stalled. We simply leave out the other speeds to simplify the explanation.

The Ford Magneto.

Contained with the Ford transmission gear set is the Ford magneto. Of all magnetos on the market the Ford probably is the most simple. It has only two main members, the stationary electro magnets and the movable steel magnets which are mounted to the flywheel. The former are illustrated in Figure

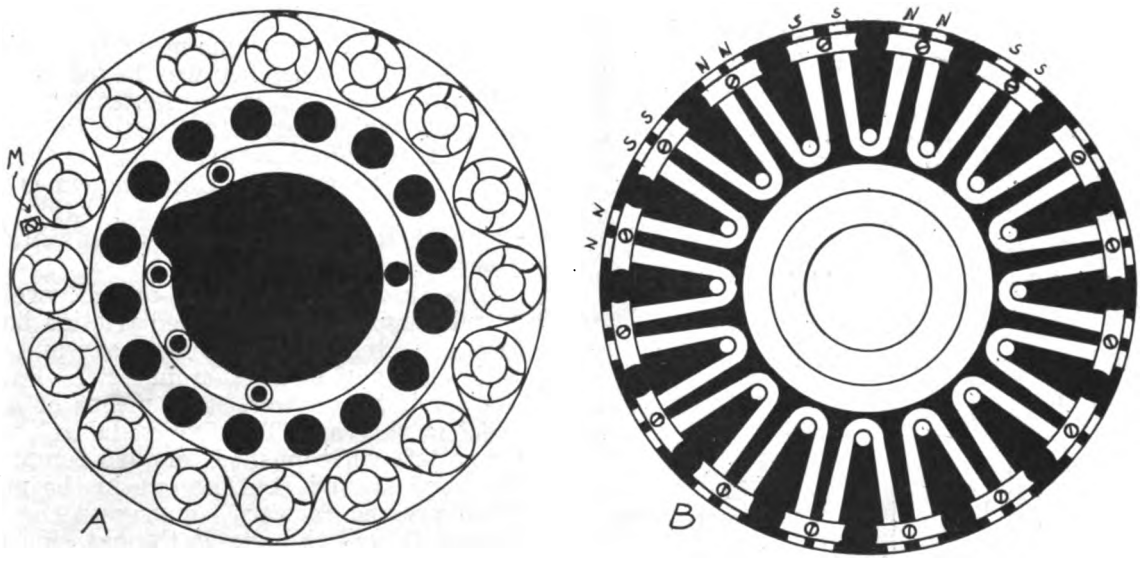


Fig. 45.—Component Parts of Ford Magneto.

45 at A, the latter at B. The electro magnets are made up of posts of soft iron upon which are wound coils of flat copper ribbon. Each turn of each coil is insulated from the other turns and the whole coil carefully made water-and-oil-proof by layers of insulating type and shellac.

One end of the series of coils is grounded to the frame at M, while the other end is brought to the top of the device and connected with an insulated brass plate. It is upon this plate that the magneto terminal plug point rests.

The permanent magnet assembly shown at B consists of 16 ordinary steel horseshoe magnets so placed that all of the like poles are together. That is, two north poles on a set of magnets are together and the south poles of the next set. The little letters N and S indicate the poles upon the diagram.

It is easy enough to locate the poles of any horseshoe magnet, if one remembers the rule that like poles repel each other, unlike poles attract. Suppose, for instance, you were replacing the magnets in a Ford machine. You would take a pair of these magnets and place them with their poles together. If you found that the poles stuck to each other you would reverse them, then you would find that the poles would not stick, showing that a north pole of one magnet was against the north pole of the other, and the south against the south of the other.

You might not know which was the north pole and which was the south pole. You would simply know that the poles were alike and could place them upon the flywheel with their like poles together.

The strength of the Ford magneto depends indirectly upon the distance which the steel magnets are located from the coils or electro magnets. The steel magnets should come just as closely as possible to the spools without hitting, and in adjusting them an ordinary visiting card can be slipped in between the spools and the steel magnet retaining plate.

Put the card between the magnets and one of the spools, then turn the flywheel all the way around to be sure that none of the steel magnets is too far away from that particular coil. Perform this experiment with every coil in the whole assembly. A thin sheet of iron or other metal can be used beneath a pole of the magnet to bring it nearer to the spool if necessary.

In replacing the fabric upon the transmission bands, upon the surface of the cone clutch or the facings upon a multiple disc clutch, there is one point which must be observed. All of the rivet heads must be sunk below the surface of the fabric else the member will not function properly. In a case of a clutch, if the rivet heads project the clutch may not work at all and the mechanic will have all of his work to do over.

Lubrication of Transmission.

Where the gear-set is not a unit by itself it may be lubricated either by a medium or heavy grade of grease, or non-fluid oil. If it is in combination with a multiple disc clutch, oil is generally used, while in the case of a Ford oil must be used for the reason that the oil in the transmission serves to lubricate the engine as well.

Don't make the mistake of mixing sawdust, cork or any foreign matter with the oil to quiet the transmission, for such a course only results in damage to the unit and at best only quiets the gears for an hour or so.

In our next issue we will take up the reason for and the construction of the universal joint and consider the rear axle and differential of the various types.

(To be continued.)

WHY LEATHER SUBSTITUTES?

Leather substitutes have proved themselves in the marine field over a service testing period of several years. When the Shipping Board was considering what upholstery materials to use on the vessels of the new Merchant Marine they had a choice between leather and leather substitutes. Leather would have cost several times more per foot and to use it would have intensified the shortage of leather already existing and placed the Shipping Board in competition with the War Department for the supplies of leather needed for army shoes, saddles, harness, etc., for which purpose leather is indispensable. It would have increased the price of leather both to the Government and to civilian users, and in the increased competition for leather, the Shipping Board's own requirements would not always be supplied promptly.

Artificial leather did not present this problem. The supply was ample and could be increased, if necessary. The Government was using it for truck and ambulance upholstery; it was being used on the output of some of the largest producers of automobiles and of several high-grade furniture manufacturers. Many pleasure craft were fitted out with cushions and benches covered with artificial leather. There was plenty of precedent for its use, therefore naturally it was chosen.

The Shipping Board realized that if they adopted high-priced leather about one foot in four would be wasted in trimming the irregular shaped hides. A great deal of expert labor would be squandered in cutting each of these hides separately. There was no waste with artificial leather. It came on long rolls of uniform width and quality and could be cut in large multiples by machine. It was perfectly adapted to time-saving methods of production, and time was a vital factor.

The Shipping Board knew that the service on cargo vessels is very trying, and especially on upholstery. Firemen, oilers and the crew generally while at work get a large amount of grease and grime on their clothes and persons unavoidably. An absorbent material like leather soon becomes unsightly and unsanitary and cannot be cleaned. They knew artificial leather was absolutely impervious to grease, stains, dust, soot or foreign matter of any kind. Being absolutely waterproof, it could be washed with soap and water and quickly restored to its original attractive and sanitary condition. Moreover, the artificial leather was strong, much stronger than split leather and had splendid wearing qualities. It was mildew and mould-proof as well as water-proof. It did not oxidize, fade or deteriorate from climatic changes—heat or cold would not affect it.

The material selected by the Shipping Board is known as Marine Special.

Marine Special, besides having all the advantages over leather mentioned above, is amply guaranteed by a responsible company. Leather is never guaranteed, because obviously an animal product, subject to all the eccentricities usual in natural growth, it cannot be.

Artificial leather is in wide use in the marine field for protective tops and curtains on pleasure and work craft of all types. The Pyroxylin coating on a topping material such as Rayntite Fabrikoid furnishes the best protection from the elements of any coating in present use. While it is more expensive it is more economical in the long run. Pyroxylin coated fabrics do not oxidize or fade. They remain pliable throughout their life. On the folding type of boat tops they fold compactly and wrinkles pull out quickly when the top is raised. Strong sunlight has no effect on a material like Rayntite and it can always be washed and kept well-groomed and gives a perfectly handsome appearance. The material is made in a variety of colors to suit the fancy of almost any owner and to harmonize with the color of almost any hull.

Digitized by Google

An All Around Trailer Car Which Should Be of Great Use to the Average Farmer

In Connection With A Passenger Car There Is One Very Practical Arrangement Which Can Be Made for Carrying Heavy Loads and a Great Amount of Produce

During the dull periods of the year, after the farm implements have been fixed for spring and summer use, the blacksmith should be able to pick up considerable money by building express, automobile and truck bodies which may be used by the farmer in his work about the farm.

Such a body, of course, must be designed for the work to be done with it and if the blacksmith is familiar with the farmer's work, he should be able to put out a car body which should be of more use to the farmer than the ordinary bodies carried in stock.

Of course this does not always follow, for there are many designs of bodies carried, but very frequently a farmer may have a peculiar combination of work to do and with a few changes or additions to a standard design, the farmer may be very well satisfied with a body. We illustrate just such a body herewith, and in order to make it more practical we have designed it to be used upon a trailer car.

The big advantage of a trailer car is that it may be unfastened from the passenger car very quickly, leaving the passenger car to be used for traffic purposes only, whereas when an automobile is fitted with a truck body considerable time is consumed in removing the body and placing a passenger body upon the chassis. A second advantage which is had by the use of a trailer car is that much greater loads may be carried than upon the passenger car chassis unless the passenger car chassis is fitted with a conversion unit of some sort.

For this issue we have designed a four-wheel trailer car which may be used in combination with any ordinary automobile. It may be used for carrying green stuff to the market, for hauling in light loads of cordwood, for carrying grain and other provisions and during the hay season for carrying hay to the barn. In fact it may be used for practically anything around the farm and as much as four wheels. It may be towed to the garden or field and left until it is loaded, or until the farmer has a chance to tow it back to the barn again.

Our first suggestion is that the blacksmith should locate some second-hand or used car dealer and make arrangements with him to let him know when he has an old automobile which cannot be used again as a passenger car. In this way the blacksmith may be able to obtain a number of old chasses without the engines and transmissions, and in which the rear axles have been worn out.

The chassis should be stripped down and only the frame, the front and rear axles, the wheels and the steering connecting link between the wheel spindles used. If the car has a gear or worm drive axle all of the gears should be removed from the differential and the rear axle housing around the differential should be fitted with sheet iron covers to prevent the entrance of dirt. If the axle is of the semi-floating type and the wheel axles are retained by the gears in the differential housing, the gears should be left in place else the wheels will slip from the axles.

Unless provision were made for steering the trailer car would "run wild," and so a special arrangement must be made. A clamp such as is shown at G should be forged and fastened around the front axle at the center. This clamp is fitted with a countersunk bolt H, which acts as a pivot for the trailer or towing arm J. J is fastened to this clamp by the bolt H and at the end is provided with a clamp, bolted around the steering rod K. This steering rod or connecting rod link is the shaft which connects the two wheel spindles. The outer end of the arm J should be forged into an eye and hooked upon the rear axle or body of the towing car.

It is not at all necessary to equip the trailer car with four tires unless the farmer happens to have a few old ones on hand. If the car is to be used simply around the farm it may be run upon the old iron wheels, and though this arrangement is rather noisy it makes but little difference when it is used in the fields or upon soft dirt roads.

If it is to be used upon hard road surfaces the tires may be removed and the rims fitted with rope tires. This may be done by winding the rope across the rim closely all the way around, or the rope may be applied by starting at the edge of the circumference and winding around the circumference drawing it as tightly as possible. Needless to say the rope should be put in place while it is dry.

The body should be made of hardwood throughout, well braced at all of the joints and corners by strap iron. The main sills are two planks 11 feet long 5 inches wide and 3 inches thick. These sills or planks should be bolted securely to the frame and the blacksmith will find that the regular car body fittings may be used. Above the sills are bolted eight cross bars measuring 4½ feet long 5 inches wide 3 inches thick, and upon these cross bars the body is constructed.

At the bottom the body width is 4 feet

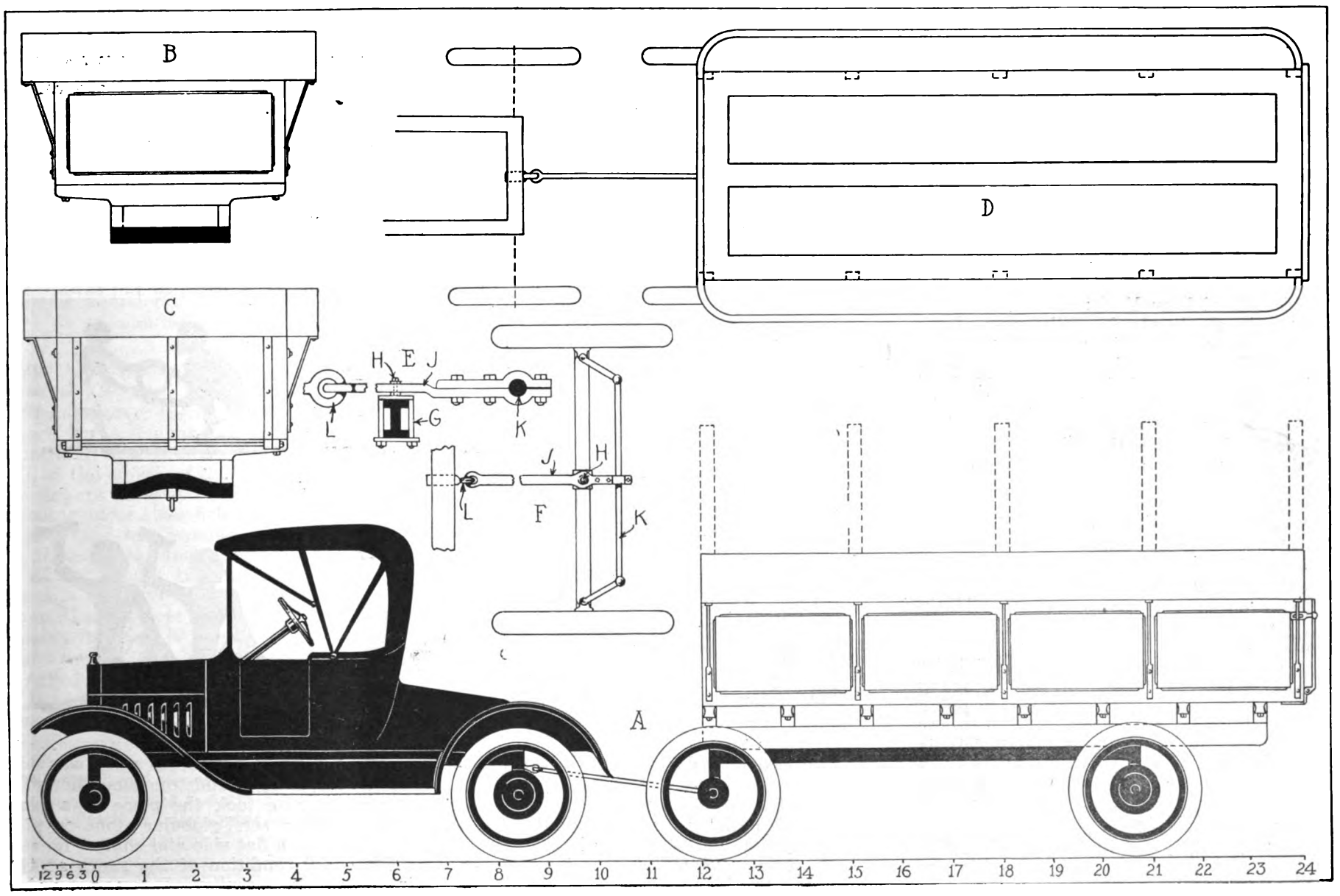


Diagram and Sketches Showing the Construction of a Handy, All-around Trailer Car for the Farmer.

Digitized by Google

6 inches and the length 12 feet. It should measure approximately 2 feet in height and, at the top, an additional extension should be built 11 inches high and extending 15 inches beyond the body at the sides. This extension gives a shelf-like appearance at the sides and makes possible a larger body than could be had otherwise for a certain clearance must be allowed for the wheels.

The tail gate only reaches to the bottom of this shelf. The shelf extension should be supported by five one-half inch round iron braces bolted securely to the sides of the body and beneath the extensions. The four side panels as well as the one at the front are made of one inch stock.

For supporting the body the five uprights should be made from stock measuring 3 inches wide by 2 inches thick. All of the stock used in the sills should be of oak, free from knots and blemishes. Only two floor boards are used and these extend the length of the body and measure 1½ inches in thickness. These floor boards should be mortised into the sills rather than placed upon them. In this way the floor presents a smooth appearance and makes for easy sliding in loading.

If the farmer intends to use the body for carrying lumber or similar stuff the floor should be reinforced by three pieces of strap iron 2 inches wide by ⅛ of an inch thick evenly spaced upon the floor. Each side of the body should be provided with eyes for holding side stakes as shown in the dotted lines in the views A and D. These sticks should measure 3 inches in height and be made from 3 by 2 stock.

As a general rule body manufacturers arrange these stakes so that they may be lifted out. and we would suggest in this case that each stick be provided with a bolt so that it may be fastened in place. The upper ends of the sticks should all be provided with large eyebolts through which ropes may be passed. These come in very handy if the body is to be used for hauling cordwood or cut-lengths of wood, and as they will not lift out from the body the load may be stacked to considerable height along the stakes.

The tail gate should be made so that it may be removed very quickly in event of the farmer's desiring to carry lengths of wood which might extend beyond the rear of the machine. This may be done as shown in the illustration by making the hinges in two parts and passing a length of iron rod through the three hinges. putting a nut upon each end to hold it in place.

JOLT FOR THE SMITH.

The conversation at a social session turned to the thoughtless regard that some people have for their fellowmen, when the following story was related by Representative Charles P. Caldwell of New York:

Recently a delegate from the rear of the township appeared at the village blacksmith shop, leading a mule, that didn't seem to be taking a very optimistic view of life, and asked to have the animal shod.

"What's the matter with the shoes he's got on?" demanded the blacksmith, cautiously examining the mule's feet. "I shod him only yesterday afternoon, and they look all right to me."

"Never mind how they look, Jim," returned the owner of the mule. "Jes' you go ahead and shoe him ag'in. Me an' Jake Hawkins will pay the bill."

"Jake Hawkins," responded the blacksmith, wonderingly. "What has Jake got to do with it?"

"A whole lot," was the startling rejoinder of the owner. "We're bettin' on how many times you can shoe that mule before going through the roof of the blacksmith shop and out among the airships." — Philadelphia Evening Telegraph.

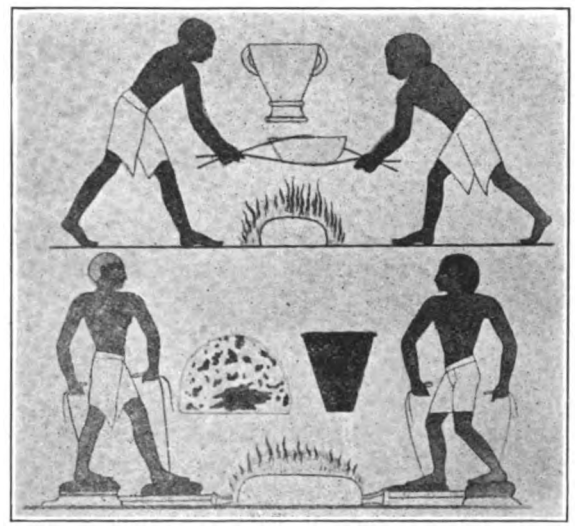
If this blacksmith had been a subscriber to The Blacksmith and Wheelwright he would have had the Barcus Horse Stock installed in his shop and could have shod this mule or any other without danger of injury to himself or the roof of his shop.—Ed.

An Illustrated History of Smithing

Part II—The Metalworker of 3500 Years Ago, the First Foot Bellows and the Casting of Metals

By H. H. MANCHESTER

With the rise of the empire, at Thebes in Egypt, under the 17th Dynasty, about 3500 years ago, we begin to find numerous pictures in the tombs illustrating the life of the New Kingdom, as others had that of the Old Kingdom of Memphis 1000 to 2000 years before. Very fortunately some of



Above Is Shown the Method of Handling the Crucible; Below, Egyptians Working the Foot Bellows. Scenes Represent Time About 3500 Years Ago.

these show smiths at their work, and enable us to get a fair idea of the methods employed by the trade in that era.

The smith was still a general metal worker and did not specialize in gold, copper, tin or iron as at present. One epoch-making improvement in his materials, however, had already taken place. This was the invention of bronze by the mixture of copper and tin. As tin was not mined in Egypt, the first manufacture of bronze presumably took place elsewhere, possibly in Asia Minor. At all events, we find tin being imported for this purpose through the Phoenicians, and a commerce with Asia Minor already in existence.

Introduction of the Horse.

Another great change in Egypt which was to have an important influence on the work of the smith was the introduction of the horse. There were no horses in the Old Kingdom of Memphis, although small asses are pictured in the earliest tombs. The horse was brought in by the Hyksos kings, and was probably one great cause which enabled them to overrun Egypt.

Along with the horse came the chariot for war and peace, and there are several pictures showing smiths working on vehicles of this sort. The horse was not as yet shod, and there is nothing to show that the smith was as yet the guardian of its hoofs.

A great improvement in the tools of the smith was the bellows, the first records of which date from that period. The bellows illustrated at that time were all worked by the feet. They consisted of skins from which hollow bamboo pipes led to the furnace. The ends of these pipes were usually of pottery, which would stand the fire much better than bamboo.

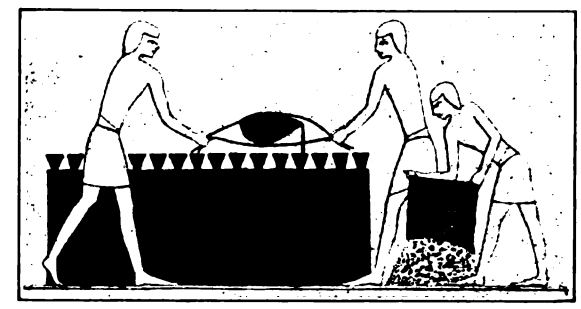
There are several pictures showing smiths working bellows of this sort. The smith would stand with each foot on one of a pair of bellows. To drive out the air he would rest with his weight on one foot, in the meantime pulling up a cord fastened to the other bellows in order to fill it with air. Thus he could work them in turn by simply shifting his weight.

The Foot Bellows.

The invention of the foot bellows made it much easier for the smith to work in iron, and we find evidences that this metal was far more frequently employed than in the Old Kingdom. It was not, however, anywhere nearly as common as bronze, and did not become so for many centuries.

Alongside of the bronze and iron tools were still employed flint ones, such as in use thousands of years before, but the advantages of the metals gradually led to their being preferred to flint or stone.

The bow drill, which had probably been invented in the time of the Old Kingdom, was now used for many purposes, and seems to have been very effective. There are various pictures illustrating its use in boring wood, stone, and probably metal.

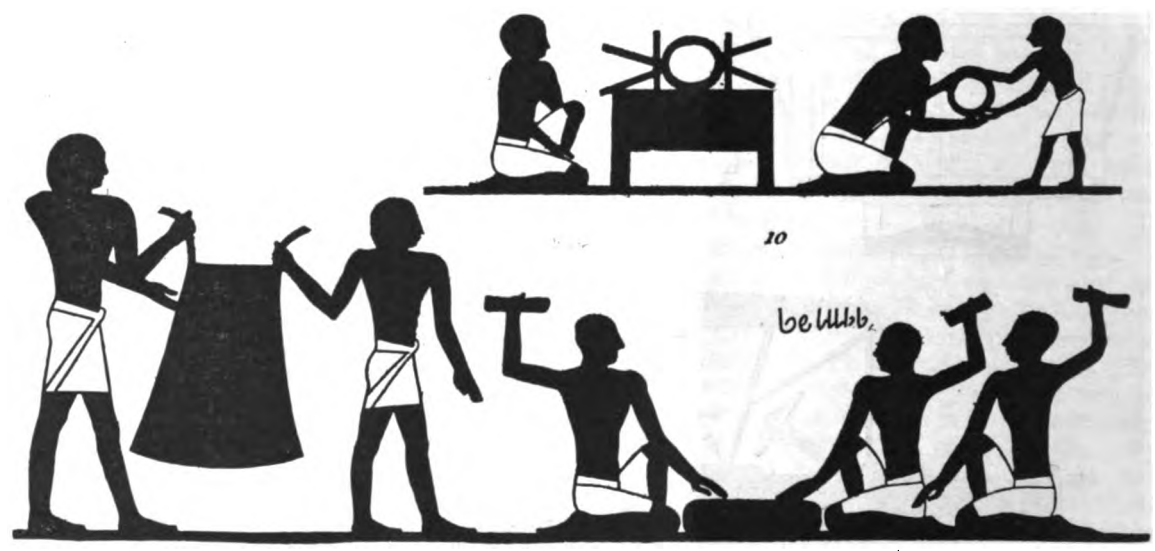


How the Egyptian Smiths Cast Metal, 3500 Years Ago.

Hammers as yet had no handles, but instead of being small semi-globular stones, as under the Old Kingdom, they were now long and cylindrical like mallets without a handle.

Other Tools Used.

Other favored tools at that time included adzes, chisels, awls, punches and saws. The file was not yet invented, its work was done with a scraper or a sandstone smoother. The scraper likewise took the place of a plane when it was a semi-globular stone or piece of metal with a flat side and sharp edges.



Heating or Melting and Beating Metal About 3500 Years Ago.

The social condition of the smith at that time was rather peculiar. He was not a slave

Digitized by Google

and scarcely a freeman. All the smiths, like members of the other trades, were grouped together in what might be called a guild. They were expected to live together in one locality, and were under close control of the great man of the district. At their head was a scribe who represented them before the nobility, and whose orders they were compelled to obey.

While they were probably allowed to do small jobs on their own account, they were subject to the demands of the king, nobles and temples. While on such work they received only provisions as pay, and there was a continual wrangle between the workmen, who complained that they didn't get enough to eat, and the scribes, who claimed that the workmen wasted all their provisions the first of the month. At all events, they seem to have received no more than necessary to support life.



Egyptian Smiths at Work 3500 Years Ago. Making the Mould, Blowing the Fire, Weighing the Metal and Tabulating the Weights.

Followed Their Fathers' Trade.

The sons were expected to follow the trade of their fathers, and, with the conservatism of Egypt, this custom was in numberless cases carried out through many generations.

The ancient Egyptian, Sallier Papyrus, satirized the condition of the workman in no moderate terms. The scribe declared:

"I have never seen a blacksmith on an embassy, nor a smelter sent on a mission; but what I have seen is the metal worker at his toil, at the mouth of the furnace of his forge, his fingers as knotted as the crocodile, and smelling more than fish-spawn. The artisan of any kind who handles the chisel does not go through so much movement as he who handles the hoe; but his fields are the timber, his business is the metal, and at night when the other is free, he works with his hands over what he has already done—for at night he works at home by the lamp."

All of which illustrates how much the lot of the skilled artisan has improved since that time.



The First Machine Tool, the Bow Drill, As Used by an Egyptian Artisan 3500 Years Ago.

Rather Small Salaries.

A more exact if not as picturesque an idea of the condition of the smith as well as other artisans in those days may be gathered from the laws of Hammurabi, who was king of Babylon about 2200 B. C. According to his decree the smith and other skilled workmen received only from 1 to 2 cents a day. This is not, however, as little as it appears on the surface, because all prices as well as wages were on a very low level. Wheat, for example, which was the great staple of the time, was only 6 cents a bushel. Hence a fairer statement of the smith's wages would be that he could earn from three to six bushels of wheat a week.

While this seems very little, it was better than in the other countries of ancient times, partly because of the fertility of the Tigris and Euphrates valley, and it was many centuries before there was any decided improvement.

MADE-AT-HOME LABOR-SAVING DEVICES.

In eleven communities of one county in Oregon the women are making home-made driers, home-made fireless cookers, and home-made iceless refrigerators under the direction of the home demonstration agent.

In connection with this project one woman found that an investment of 50 cents in a dish drainer and a wire dishcloth for pots and pans saved her 10 minutes of the time required to do the dishes after each meal, or 30 minutes a day. In a year she figured this time, if accumulated, would give two weeks, of 12 hours a day, leisure. Was the investment worth while?

If you like this magazine and feel that it is useful and interesting, the **one best** way to show your appreciation is to purchase your accessories and supplies so far as possible from our advertisers. Also write to our advertisers for catalogs, printed matter and prices, not forgetting to always mention the fact that you saw the advertisement in the Blacksmith and Wheelwright.

The Rock Drill Blacksmith

Part III—Continuation of the Description of the Various Types of Drills and Reasons for Their Use

Copyright, J. F. SPRINGER

Let us continue with the description of the various bits used; first the Z bit.

This is a peculiarly shaped bit. On the cutting face, there is a diagonal cutting edge extending, like a diameter, from one side to the other. At the ends of this diametral cutting edge are other cutting edges curved like arcs. These two curved edges and the diagonal edge together form a kind of Z. Hence the name. Naturally, this bit chips or cuts the face of the rock with a Z-shaped cut at each blow. As this bit is turned a little between blows, a circular groove or channel is cut in the rock of the same size as the hole. The rock inside the circular channel is taken care of by the diagonal cutting edge. The Z-bit has in this diagonal a bull bit. The arc-shaped cutting edges keep the hole round and in effect do the work of a reamer.

This bit, when stood up in normal position with its face resting on a horizontal surface, would be in contact with that surface only at the center of the bit. The reason for this consists in part in the rounded edge of the diagonal. Further, the arc-shaped cutting edges are set back a little.

It is somewhat difficult to harden properly. It is, in fact, understood that the arc-shaped edges are likely to get a higher degree of hardness than the diagonal. As these very arcs perform a severe service, any excessive hardness is apt to result in the chipping of the unusually hard steel.

The Rose Bit.

The rose bit has six or more radial cutting eges. Naturally, the angles between edges are made equal. In the case of a 6-edge bit, this would require each of these angles to be equal to 60 degrees. The rose bit is, except for the larger number of radial edges, precisely of the same style as the standard cross bit. But this extra number of cutting edges is, in certain circumstances, a very great advantage.

If the rock is hard, the cross bit may be found the better type. But the cross bit has to be very carefully formed on the reaming edges. Otherwise, we are to expect a tendency to cut a rifled hole. The rose bit, because of the considerable number of reaming edges, is well adapted to cut a hole without rifles.

The Double Cross Bit.

The ordinary cross bit has two diametral cutting edges set at right angles to each other. The double cross bit is similar, only instead of single cold-chisel edges, there are double ones. Each double edge consists of two parallel edges. In the double cross bit, none of the cutting edges is a true diameter. Each is a little to one side of the center. In fact, in the case of each double edge, the center lies btween the single edges. The double cross bit has a considerable total of cutting edge.

Thinking of a radius and not of a diameter, we may note that there are altogether eight cutting edges, each of which is nearly a radius in length and is located nearly in the position of a radius. As the bit turns between blows, there will be a pretty complete covering of the bottom of the hole. That is, the cutting action will be felt all over the bottom surface.

The cuts will cross and re-cross one another, chopping the bottom everywhere into fine bits. The double cross bit is said to ream the hole better than the cross bit. It is, in fact, said to be equal to the rose bit in respect to its ability to cut a round hole. However, it is understood to be a difficult bit to forge. It is not easy, it appears, to make the metal flow, "when being forged, to the extremes of the cutting edge."

Difficulty in Hardening Cross and Double Cross Bits.

In forging bits like the cross and the double cross bits, the metal back of the cutting face is not a perfect cone. It is nicked in between cutting edges. In other words, the cutting edges are each on a kind of wing, and between wings are spaces where there is no metal. Leaving these spaces doubtless helps the blacksmith to get enough metal to make the cutting face bigger than the stock. However, these nicks or grooves or open spaces make trouble in the hardening.

In the cross and double cross bits, these grooves between wings are often of considerable size. When the bit has been heated and then put into a quenching bath, the outer ends of the cutting edges will be much better situated to feel the cooling action of the water than the central part of the cutting face.

There will be a good deal of hot inside metal back of the center of the cutting face and less—perhaps a good deal less—back of the outer ends of the cutting edges. The cooling action of the water will, in addition, be less felt by the hot inside metal back of the center of the cutting face than by the

Digitized by Google

hot inside metal back of the outer ends of the cutting edges.

The result of this situation will, naturally, be that the center of the cutting face will come out of the bath in a softer condition than the cutting edges on their outer ends. If the bit is to do its work properly, it will be necessary, will it not, to remedy this in some way?

But I am not, at this point, explaining how to meet difficulties as I am pointing out what the job is that the blacksmith has to do. When the problems are clearly seen and appreciated, the methods and processes with which to meet them will seem more interesting and valuable. How to meet difficulties will concern us later on.

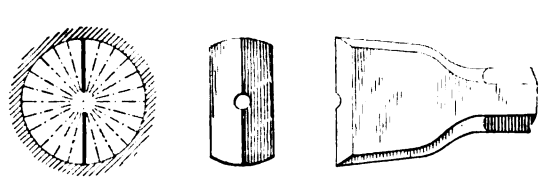
The Double Chisel Bit.

This bit has two straight parallel cutting edges running from one side of the drill face to the other, but not through the center. That is, each cutting edge is a little to one side of the center, the one to the right and the other to the left. This bit cuts the rock at the bottom of the hole a good deal like the double cross bit. That is, the cutting edges, as the drilling goes on and the bit is turned, cut pretty much all over the surface, cutting or chopping the rock into small pieces.

There is, however, a spot in the center of the rock bottom of the hole where the cutting edges never strike. The result is a little hillock in the center of the bottom of the hole, unless the rock is of such a character as to break up rather easily. This hillock tends, it seems, to hinder the drill from going on down. Further, this bit has been criticised for having an insufficient reaming surface.

The H-Bit.

This bit is a modification of the double chisel bit. The two parallel cutting edges



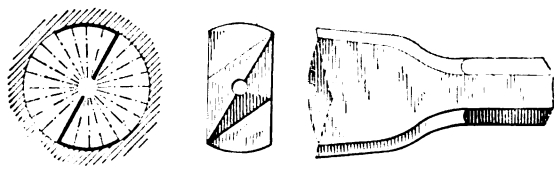


Fig. 8.—Above, Bull Bit; Below, Z Bit.

with the center of the cutting face between them are retained. But a little cutting edge is added. It joins the center of one of the long edges to the center of the other. Naturally, if hollow drill steel is used, this little connecting edge is interrupted at its center. The total cutting edge of this style of bit gives us a capital H, hence the name. The cutting edge performs the service of preventing the little hillock from forming.

The Double Arc Bit.

This is a bit which seeks to meet the requirements that generally exist. An effort has been made, it seems, to combine in it some of the most desirable characteristics of other types. There are two principal cutting edges. These are both curved, and the center lies between them. There is a little connecting edge which joins the centers of the two curves. If the steel is hollow, it is, of course, interrupted by the hole.

The total cutting edge forms a kind of H, only the uprights are not straight but curved. There appear to be quite a number of advantages realized in this bit. It cuts all over the bottom of the hole, including the center. It thus resembles in its action the ordinary H bit. But it has a very considerable reaming surface. This is a point of superiority over both the double chisel and the H bits.

It does not cut over the bottom any more thoroughly, perhaps, than the cross and the double cross bits. But it has a very great advantage over them in respect to the matter of even hardening. The grooves on the sides of the head of the bit—that is, the grooves between the wings—are undoubtedly much less pronounced. When the hot bit is put into the quenching bath, there is consequently not such a very great difference between the center of the cutting face and the other portions, as is the case with the cross and double cross bits.

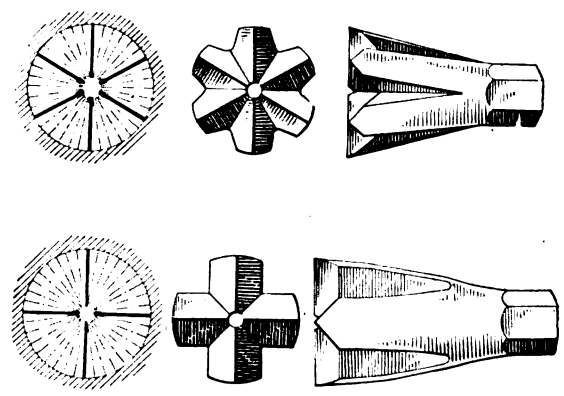


Fig. 9.—Above, Six Cutting Edge Rose Bit; Below, Cross Bit.

It would seem that it should be much easier to get approximately the same hardness all over the face with the double arc bit. Other things being equal, it appears to me that if a given style of bit is easy to harden, that consideration ought to make it prevail over all competitors which are subject to difficulty in this respect.

In the figures showing the "bull," the "Z," the "rose," the "cross," the "double cross," the "chisel," the "double chisel," and the "double arc" bits, three things are illustrated with respect to each. The cutting face is shown in the middle; the side is shown on the right; and the manner in which the cuts are made is shown on the left.

All these eight bits are shown made from hollow steel. The reader will, probably, have no difficulty in understanding the changes that would occur if the steel were solid. The manner in which the cuts are made in the bottom of the hole is of importance, as perhaps the reader has already gathered. The diagrams showing these cuts do so in the following way.

The heavy lines show a cut due to a single blow. The dotted lines show how the cuts are made that are due to repeating the blow for a number of times and at the same time turning the bit in the hole. If the diagrams are closely examined, it may be seen that in some cases the cutting lines cross one another and in other cases they do not. This crossing of the cutting lines, we may safely assume, means the real chopping up of the rock.

The view shown on the right in each case enables one to judge of the drill head in a general way. We get from it an idea of the general form and the comparative weight of metal. In the cases of the rose, the cross, the double cross and the double arc bits, we are able to get a pretty good conception of the side grooves of the head—that is, of the notches between wings. Particularly with the rose and the double arc bits, we get a good idea of the relatively small size of these notches.

Even hardening should, consequently, in both cases, be comparatively easy to what it is with the cross and the double cross bits with their big open notches. I am indebted

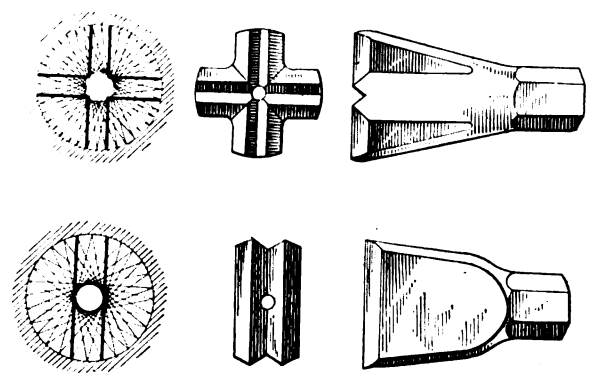


Fig. 10.—Above, Double-Cross Bit; Below, Double Chisel-Bit.

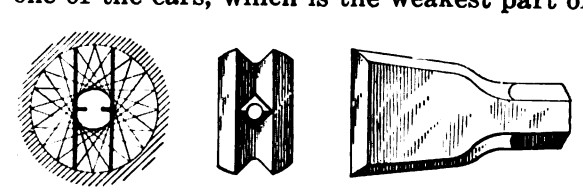
to an article by Mr. George H. Gilman in Engineering and Mining Journal (May 12, 1917) for these views.

A hand drill bit will often be curved more or less from one end of the cutting edge to the other. When the drill rod is stood up vertical on a flat, horizontal surface, only the central points of the cutting edge will be in contact with the surface. Now this curving of the cutting edge may be gentle or it may be rather sharp. The authorities seem to differ somewhat in respect to the object in view in giving the curvature to a hand drill.

Apparently, a gentle curve is the thing for soft rock and a sharp curve for hard rock. One authority states that "the short drills used for drilling plug and feather holes in granite (a very hard rock) are invariably made very rounding or convex; whereas in drilling deep holes in sandstone consisting of coarse grains, poorly cemented together, a perfectly straight-edged drill is common.

"A rounded or convex bit cuts a cup-like bottom in the drill hole, which aids in keeping the drill centered; and it is not improbable that the cut acts like a mortar in which the chips from the edges of the hole collect at the center and are more quickly pulverized. The collection of chips at the center of this stone mortar gives the bit more work to do at its center, which is precisely what should be done in view of the fact that the outer edges would otherwise have most of the work to do."

The same writer gives also a good reason why a hand drill bit should be rounded during the period when the hole is still shallow. He says: "To me it seems apparent that a rounded cutting edge is especially desirable in starting a hand drilled hole, for it insures effectiveness of the first few blows by concentrating the work upon a small area. Moreover, for the first few inches of the hole, a rounded cutting edge is desirable because any slight tilting of the drill will not mean the concentration of the energy of the blow upon one of the ears, which is the weakest part of



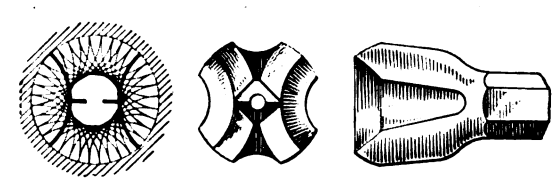


Fig. 11.—Above, H Bit; Below, Double-Arc Bit.

the drill and the most easily broken. In machine drilling this is not important, but in hand drilling, it certainly cannot be overlooked."

From the foregoing it may be gathered that under ordinary circumstances, a rounded cutting edge is the thing for a hand drill. The harder the rock the sharper the curvature should be. Soft rock is to be dealt with by means of a gently rounded edge. No curvature at all, which means a straight edge, may occasionally be suitable, as in the case already mentioned.

Hand drills are usually made with the width (not the thickness) of the cutting edge greater than the diameter of the bar stock from which the drill is made. Naturally, the smith will upset the end of the bar in order to get the metal for this enlargement of the width. For example, the hand drill may often be nothing more or less than a two-ended crowbar. If the stock from which the crowbar is made is 1½ inches in diameter, then it will be quite proper, under ordinary circumstances, to broaden the cutting edge to full 2½ inches.

One object covered by this enlargement is the prevention of binding. The two-ended crowbar used as a hand drill will be operated by lifting and dropping—that is, as a percussion drill. The bar will need to be turned a little between blows. If the cutting heads are distinctively larger than the rest of the crowbar, then wedging and binding will be altogether eliminated or reduced to a minimum.

(To Be Continued)

Digitized by Google

Another Old Timer Story

Picking Up the Pot of Gold at the End of the Rainbow Is Not Hard Work If You Know Where the Rainbow Ends

By F. L. PHILLIPS

"It appears to me as though you intended to drop the ancient and honorable callin' of blacksmith and pursue that pot of gold at the end of the rainbow," said the old timer as he eased himself into a groaning chair near the smith, who stood over his forge heating a spring preparatory to hardening it.

"Got so now I hardly know the old shack when I come in the door. My horse used to be able to find the place all by himself but now he sticks his head in the door and then wants to back out again. I guess it is 'cause he sees so many of his enemies, the trucks, standin' 'round on your floor.

"'Stead of kickin' my feet into a pile of horseshoes now-a-days, I stub my toe on old truck tires and radiators. You might make a mighty good blacksmith I will admit, but that's no reason why anybody should bring a Swiss watch to you for repair. What do you know about trucks anyway?"

"Well," said the smith, "suppose you tell me what you want to know about it. If I told you all I know I might be hurtin' your feelin's a bit. I always thought you was a tight-fisted old heavy-weight, but I manage to keep the secret to myself and I won't tell you about it unless you ask me again. Why in blazes don't you scrape some of the moss off your back and get into the game? I should think you would have had your lesson this fall, let alone what you learned last spring when your strawberry crop all rotted in the barn just because you couldn't get them to market.

"You know, I think that somebody ought to hand me a leather medal for being the saviour of my country, particularly my part of the country? I was the first one to persuade old Bill Jenks to risk his life in his pocketbook on a truck. Why the first year that he bought the thing he forgot all about tellin' me how many peaches rotted on his trees. He forgot to tell me that the storekeepers were all discriminatin' against him and he forgot tell me that people would not eat his peaches just out of spite.

"What he did was to get in the market about two hours ahead of every one of you fellers in the mornin' and 'bout the time you got one load into the city he had been home and back again. Course, like everything else, where there are seven or eight of you short-sighted farmers plantin' three or four hundred peach trees apiece, there is bound to be too many peaches 'round here. The early bird does not catch the worm. He is the feller that gets his crop to market first.

"The feller that can get the most loads of peaches down to the city in the first two days is the feller that cleans up the most money, and if he is wise, he buys a truck and carries his whole crop down before you have finished pickin'. Course, I don't suppose you will listen to any arguments anyway, and now that the season is over, you will try to tell me my advice is like that of the weather man, when he tells about the weather the day before yesterday.

"If I'd a been you last June, when I saw all of these growing strawberries on the vines I would have bought, begged, borrowed, or stole a motor truck from somewhere and just as soon as things were ripe, I would have hustled them into some crates and burned up the roads to the nearest town. I might have sold the things for a little less money then to get rid of them in a hurry, but at any rate I would not have had three-quarters of them laying in my barn and let all my neighbors sell theirs before I had a chance to get them off the farm."

"Say, look-a-here," said the old timer, "I don't come in here for your advice. I came in here to get my horse shod."

"Well," said the smith, "you know the cheapest thing in the world is advice, and if you don't let me give it to you, I will have to charge you one dollar extra for the shoe I have just put on, so that you might as well seal up your ears, 'cause I am goin' to get some of this talk out of my system anyway.

"Now say, light up your pipe and listen. This here horse that I am workin' on now is one of the four that you are feedin' every day of the year. You are using all four of them now and you probably will be, until the middle of next month. Until then they will be payin' for themselves, all well and good; but beginnin' with December first you are going to use one of the horses. The other three are goin' to hang around in the stable chewin' off the side of the stall, eatin' their heads off and gettin' crankier than the old kaiser.

"You might just as well consider them as a dead investment except that instead of bein' an asset they are a liability. You cannot stop feedin' them 'cause if you do you will have to sell them to the boneyard. You will have to keep a steady stream of feed goin' down their throats until next Spring when you begin your Spring plowin' to say nothing of the chances you take if one of them gets the influenza or the colic.

"Suppose, however, you had been bright, like I said, last spring, and bought a truck. You could have used it all summer and when the snow fell you could run it underneath your shed and forget about it until you needed it again. You would not have to get up in the middle of the night and feed it on warm milk or put a hot water bag on its stomach. It couldn't die and it couldn't kick the side off the stable. You wouldn't be afraid it would bite you.

"Instead of being a liability like your horses it would be a real live ability, 'cause you could use it any time you wanted to, for most anything you wanted to, even to haul a snow plow if necessary. I have seen them run trucks in two feet of snow in some parts of the country.

"I suppose you think you are patriotic because you try to keep all your money in your stockin' or underneath your pillow, but I can't see as you are giving Uncle Sam one-half as much as you should, to say nothing about earnin' more money yourself. Heard you have got a lot of money invested in your farm and yet you let about half of it go to seed, so to speak, just because you haven't got the time to attend to it.

"I suppose if you owned three stores in the city and was runnin' a grocery business, you would occupy one of the stores yourself and close up the rest of them instead of rentin' them out or puttin' in a little more money and establishing some branch stores.

"Well, it is your own money, and I don't know as I care whether you spend it or not, but seein' as how you are a friend of mine, I wish you would open your eyes and look around. Heard you are complainin' every day or so because your farm only pays enough money to support yourself and your wife. Who is goin' to feed the boys over in France if you don't do your part? They have got to have a lot of food now-a-days. A man can't fight on an empty stomach and it is up to you farmers to stretch your legs and work for your livin'. There is only one way you can do it and that is to make the most of your land, and you can't make the most of your land unless you have the proper equipment.

"You know way back in old Egypt they plowed the land with nothing but a bent-up stick and used cows to pull it with. You may laugh at that, but if you will only stop to think of it you are almost as much behind the times yourself. Here we have got all sorts of modern farm machinery and yet all you use is a piece of bent up iron and pull it around with a horse, and yet you expect to make your livin' out of your land, and then kick because you have to work twenty-six hours a day.

"If you only get wise and buy either a truck or a tractor, you will be entered in the race with the rest of the up-to-date farmers. Why man, your next door neighbor owns nearly half as much land as you do. He hasn't got a great big husky brother to help him like you have, but you don't notice any of his land goin' to waste, and I'll bet his bank account makes yours look like a sore toe.

"There, there's your dernd old horse. For goodness sake, get it out of the way so that I can get busy on Butterworth's truck. I have had it two days now and if I don't get it out of the place by night my wife will have to order a gravestone for me."



An Exceptionally Handy Truck Body for the Farmer or Ordinary Business Man. The Truck Shown Is a Fulton.

Digitized by Google

Away Down in Louisiana

Garden Rakes for Fall Use Can Be Made in Spare Time if the Smith Is Looking for Odd Jobs.

BY JAMES F. HOBART, M. E.

Yes, Mr. Editor, I do get into some mighty queer shops sometimes; and quite often into some where there are very clever smiths at work. There is a little shop on the bank of the Mississippi River "Somewhere in Louisiana," where three men are hard driven nearly all the time making Oyster Rakes.

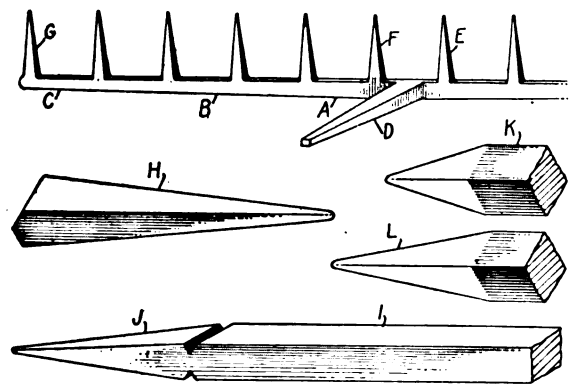


Fig. 1.—The Completed Rake and Shape of the Teeth.

These implements are somewhat like two garden rakes with their handles hinged together a couple of feet from the rake heads, and they are used for removing and bringing up oysters from the beds in the waters of the Gulf of Mexico.

With these oyster rakes, or "tongs," as they are sometimes called, we have nothing whatever to do, but the smiths who make them frequently put in the very little spare time they have in making up some of the strongest and best garden rakes the writer ever laid eyes upon. The very fact that the rakes are patterned and built like the oyster tools is what makes them so very strong.

A Garden Rake.

A portion of one of these very fine garden rakes is shown by Fig. 1, the head, A, being made of soft black steel and the teeth forged by hand from toe calk steel and welded into place. It will be noticed that the head tapers from A along to B and C. This is done, the tapering, as each tooth is welded in place, as will be described later.

The tang, D, is first welded on, then the teeth, E and F, are put in place, after which the teeth toward B and C are welded on, then the teeth on the other end of the rake are put in place.

But the teeth are all forged to shape and length before one of them is welded on. A forged tooth is shown at H, "Toe-calk" steel three-eighths inch square being purchased for this purpose, same as is used for the oyster rake teeth.

Forging Rake Teeth.

The first step in the tooth-forging is to heat one end of a bar of the steel to a deep cherry red, then a tooth is forged and cut

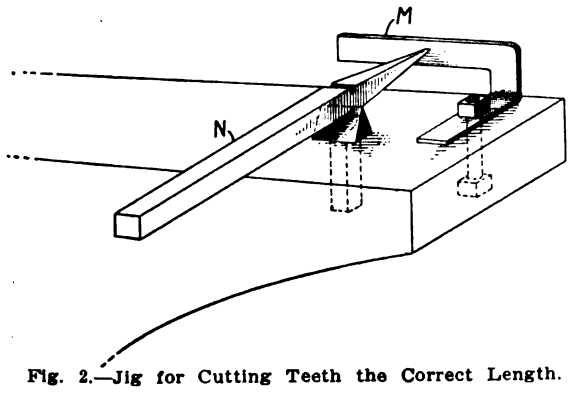


Fig. 2.—Jig for Cutting Teeth the Correct Length.

off at a single heat. The smith kept three pieces of steel in the fire and had all he wanted to do to get two forged while the third was heating. He had the electric blower on its slowest speed and also had an opening in the forge air pipe, the opening being controlled by a swing, or "butterfly" valve, about like a common stove-damper, by means of which the blast was cut down to almost nothing.

The first operation in forging a tooth was to point the steel bar as shown at K, Fig. 1. Next, the shank of the tooth was flatted a bit as at L, then the shank was hammered still farther back and the finished tooth came in view as shown at H, the tooth having been cut off at I and J by two blows from the forging hammer on the remains of the forging heat.

A Cut-off Gauge.

A very handy and mighty simple cut-off gauge was used by this smith. He simply bent up a piece of old tire steel as shown at M, Fig. 2, bolted it to the face of the anvil as shown by a three-eighths inch bolt through the small round hole in the anvil.

The forged bar N was laid on the deadhead, the point of the tooth touching gauge M. Then a single blow of the hammer was delivered on top of bar N, which was rolled over and another blow struck upon it. Only two blows were struck to cut off any tooth, and so expert had the workman made himself that very often the two blows would completely sever the finished tooth without the hammer touching the dead head cutter. At other times it was necessary to hold the tooth down upon the anvil with the hammer

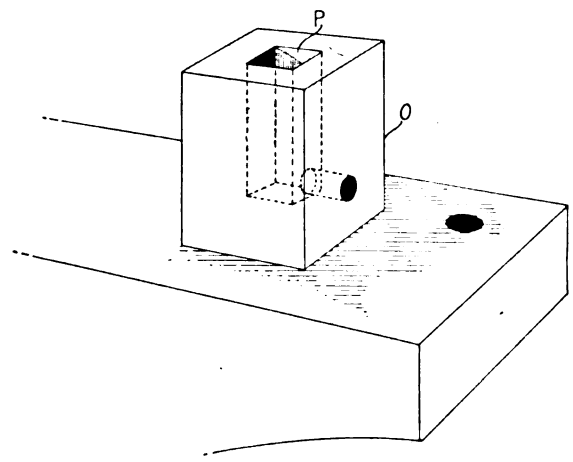


Fig. 3.—The Tooth Swage.

while a few bendings, back and forth, quickly broke off the thin fin of steel.

A Tooth Swage.

Three other tools were used by the smith in making the rakes. The tooth swage shown by Fig. 3 was a piece of tool steel which had been forged to fit snugly into the hardy hole of the anvil as shown at O, Fig. 3, fitting in it with no side movement or shake.

A hole was then drilled down from the top almost to the anvil, and another hole was drilled through the tool, crosswise of the first hole, so dirt could work out and not fill up hole P, which was squared at its top end to fit pretty closely the finished rake teeth. The manner of using this tool will be described a little later.

A Tooth Gauge.

To make sure that all the teeth were spaced accurately at the same distance apart, a tooth gauge, as shown by Fig. 4, was cut out of steel about one-sixteenth inch thick, as shown. One end of the gauge, at Q, was made exactly long enough to fit between two of the teeth, as shown by Fig. 5.

The tang, having been welded to the middle of a bar of square half-inch black steel, as shown by Fig. 5, the tooth gauge is laid on, projecting equally on either side of the tang, then a punch, S, is placed against the tooth gauge and driven into the rake head a little more than one-sixteenth of an inch, as shown at T.

In the engraving the first tooth, P, has been already put in place, therefore gauge Q is placed against that tooth when the groove for another tooth is to be made, but for the first tooth the gauge Q is to be placed central with shank of the rake. Punch S is merely a cold chisel with the cutting point removed until the end is about three-sixteenths of an inch wide with the corners slightly rounded.

In the channel thus made, as shown at T, is placed a tooth after a welding heat has been taken on both head and tooth. But before the teeth can be put in place for welding, as shown at U, Fig. 5, one side of each tooth must be forged down as shown at R. This forging is not done until a tooth is to be used, thereby saving the heat, or most of it, by means of which the tooth forging was done. The manner of the tooth-forging is shown. The tooth is placed over a corner of the anvil, and upside down from that as shown by Fig. 5, the corner of the anvil lying along dotted line T. A couple of hammer blows are delivered upon the top side of the

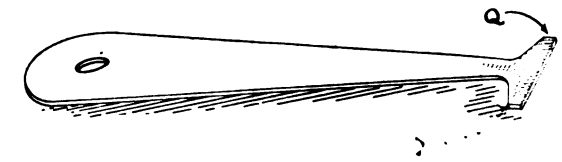


Fig. 4.—The Spacing Gauge.

tooth while in that position, then the tooth is shifted 90 degrees until the anvil edge lies along dotted line U, when a few more blows are struck upon the portion of the tooth which projects upon the face of the anvil.

Flatting a Tooth.

The tooth is moved to and fro 90 degrees a few times, while finishing blows are being struck, and a few light blows are given to the edges of the flatted portion of the tooth, which is turned up edgewise for that purpose. The edge blows prevent the flatted portion from becoming too wide.

Pains are taken to leave a sharp corner of 90 degrees where the lines T and U cross each other, and this point is depended upon to locate the tooth accurately when placed upon the rake head after having received a welding heat. The centering is done by the pointed portion of the tooth engaging the slot T, Fig. 5.

A tooth in position is shown at U, the flatted portion of the steel lapping over the top of the rake head to be forged down smooth and flat to the condition at junction with the head shown by tooth R. In the welding, of course, the soft steel rake head receives the greatest degree of heat, the steel teeth being heated barely to a yellow.

But the thin, flatted portion of the tooth very readily takes up heat from the hotter rake head so that the weld is made with comparatively slight heating of the steel, and it is almost impossible to distinguish the lines of union between the rake head and any of the teeth.

During the welding, and almost as soon as the tooth has been "stuck" by the first blow or two, the hot tooth is dropped into hole P in the tooth swage, Fig. 3, and a couple of blows upon the top edge of the rake head serve to close any opening which might exist between the tooth and under side of rake head, where there must be a butt weld. The blows upon the top of the rake head, while

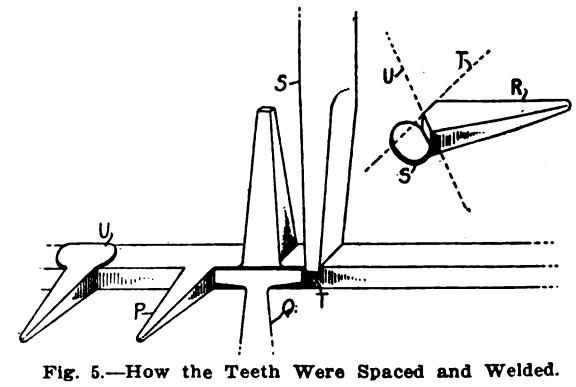


Fig. 5.—How the Teeth Were Spaced and Welded.

the tooth is in the swage, take care of the butt part of the weld and make it solid.

As soon as a tooth has been well blended into the head, the balance of the heat is used for swaging or decreasing the thickness of the rake head between the tooth just welded and the place where the next tooth is to be fastened in place. This is quite plainly shown

Digitized by Google

at U, Fig. 5, where the rake head is seen to be thinner than at T.

In Fig. 1, this is also plainly shown, and thus it is understood that the reduction in thickness of the rake head shown from A to C is not an even taper, but the reduction is in a series of steps between the teeth. The smith is very careful to get the same thickness on each side of the tang or shank, but he does not use any callipers or gauge, forging the required thickness by the eye alone.

Speeding Down the Power Hammer.

In a shop where they did "anything and everything" the writer noticed a fine looking power hammer standing idle, with dust and cobwebs all over the hammer, its belts, which were in place and fine condition, seemingly almost new. Indeed, it developed after a few questions that the hammer had not been operated two hours altogether since it was installed nearly two years before!

The hammer was driven by an electric motor, which was belted to a 24-inch pulley on an overhead counter shaft located directly over the hammer. A 12-inch pulley on the counter carried a belt which hung under the hammer pulley directly underneath.

An ordinary wooden pulley had been used to drive the hammer and a sawn-out wooden flange, screwed to either side of that pulley, prevented the hammer belt from sliding off the pulley whenever the foot-actuated tightening pulley was released from against the hammer belt.

The smith was prevailed upon to start the power hammer, using a bit of wood for it to work upon. Then the trouble with the hammer was at once apparent; it ran too fast—so fast indeed that it was almost impossible to turn a piece of work while under the hammer, and making anything like exact forging an impossibility.

Even when the foot treadle was slacked and the hammer ran slow, the shaft speed was so great that all the workman's attention need be given to his foot and the treadle, and the work could not be handled satisfactorily while the operator was standing gingerly on one foot.

A Cure for the Trouble.

Making the hammer run slower was obviously the proper cure for the trouble, and there were two ways to do this. One way was to put a smaller flanged pulley on the counter shaft to drive the hammer in place of the 12-inch pulley. The other way was to place a larger pulley on the other end of the countershaft to receive the belt from the electric motor.

The countershaft was supported upon timbering below the shop roof and there was sufficient room to put on a 36-inch pulley in place of the 24-inch pulley there located. To change the small pulley would necessitate the making over again the endless belt which drove the hammer, so it was proposed to use a larger pulley in place of the 24-inch one upon the motor end of the countershaft.

It was figured that an 8-inch pulley in place of the 12-inch would drive the hammer at about two-thirds its present speed. To obtain the same decrease of speed by increasing the pulley which received the motor belt was a problem which troubled the smith for some time.

He figured that if a decrease in the drive pulley of 4 inches would cut down the hammer speed one-third, that an increase of 4 inches in the diameter of the 24-inch motor-belt pulley would have the same effect (which it would not do). Finally, the smith was brought to see that the 24-inch pulley must needs be increased to 36 inches, in order to cut down the hammer speed one-third.

He was made to see it by his thinking that reducing the drive pulley one-third in diameter—from 12 inches to 18 inches—would do the business and then thinking back to increasing the diameter of the driven pulley under the motor belt one-third also, but taking the greater diameter to calculate the one-third from, instead of taking the present diameter of the pulley.

In that, the smith was right, but he took *a mighty* 'round-about way of getting there. Had he stopped to think that as reducing the driver one-third reduced the hammer speed in the same ratio, then he could have said to himself: "Increasing the driver pulley a third will do the business, and as the present pulley, 24 inches in diameter, is two-thirds of the required diameter, then a pulley 36 inches in diameter in place of the 24-inch pulley should drive the hammer at two-thirds its present speed"—and it did.

After a bit of a hunt in the back of the shop, the smith rolled out a big wooden pulley, 36 inches in diameter, with a flat 12-inch face. This pulley was placed upon the shaft in place of the narrow 24-inch pulley, which was removed. It was found impossible to move the wide face pulley over far enough so the motor belt could run in the center of the wide pulley face, and it was found that the motor belt was inclined to wander around on the wide face and not track very well on the motor pulley as a consequence.

To cure this trouble, a ball of twine was secured, good heavy twine about one-sixteenth of an inch in diameter, and a band of the twine about two inches wide was wound upon the face of the 36-inch pulley where it was desired that the center of the motor belt should run.

The twine was wound close together, the ends fastened by tucking them under, then the twine was given a coat of hot glue and allowed to dry over night. In the morning the motor belt was put in place and found to run true and where it was wanted. The hammer also worked nicely, and at its reduced speed the smith was soon able to do the finest kind of work with it, where heretofore, for two years, he had done the work by hand.

Next day, when his helper left to take a position at the naval station nearby, the smith said: "Good-bye, Tom, you were a good striker, but I've got a better one here right now!"



Valve Clearance in Ford.

From S. A. Shaw, Illinois.—Will someone send me a sketch or tell me how to adjust the valve clearance in a Ford car. What I want most is some sort of a fitting that I can put either on the valve stem or on the tappet so that I won't have to pull the valves out each time I want to make an adjustment.

Quieting Overhead Valves.

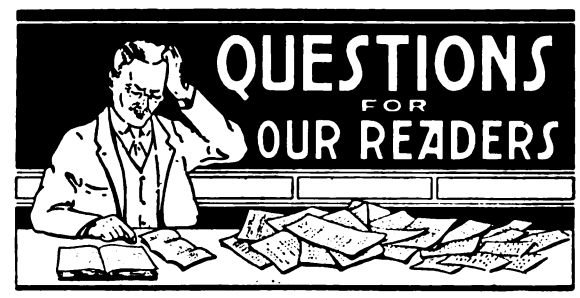
From R. A. Harrington, Texas.—If any of the readers of the Blacksmith & Wheelwright have found a way to quiet the overhead valve mechanism on an I head engine such as the Chevrolet or Buick, I wish they would let me know.

Some time ago I saw an article in one of the automobile magazines telling how a reader had used fibre washers or fibre cups on the valve stems. At the time I saw it, I was not interested. I frequently have to repair overhead valve engines and would like this information.

Facing for Cone Clutch.

From R. A. White, New York.—Will someone tell me how to cut the leather for the racing on a cone clutch? That is, supposing the diameter of the cone clutch is twelve inches? How could I find the shape of the leather facing?

German.—An extinct species of genus biped that flourished in the year 1914, that *laid waste* the country, that *broke* down fruit trees, that *plundered* churches, that *burned* hospitals, that *bayonetted* children, that *killed* old women, that *crucified* men, that was wiped from the face of the earth in 1919 by LIBERTY.



This department is intended for the use of our readers. In it we publish all questions which our readers desire to be answered and we invite all of our readers to answer as many questions as they can. You yourself may be in difficulty at some time and need help.

As an instance of how valuable this department may be, we want to quote that of a Georgia reader. You will remember that last month we published a letter from one of our readers in Georgia who wanted some blacksmith to help him out by giving him a position. At the present time in the office we have six replies to this letter. All of these letters have come in within the past two days and we have sent the names and addresses of all of these writers to the blacksmith who was in difficulties. It was a peculiar case and we are glad that our magazine has helped him. Perhaps we can do as much for you also. Therefore do not hesitate to send us any of your questions.

Foundered Horse.

From Albert Baker, Wisconsin.—I wish that some of my brother blacksmiths would tell me if it is possible for anyone to shoe a horse that has been foundered in such a way as to cure or help cure the horse. The case I have in mind is of long standing and if any of my brothers have had experience along this line, I wish they would let me know.

Shall We Advance Prices?

From a Village Smith in Canadian Northwest.—Is the charge for laying share points not much under the value now and has it not been so for some time past?

Consider the prices for new shares in the West, from five to six dollars for a new share. Is not a well laid share with steel under share (perhaps over, as well) a better tool than a new share, in dry ground?

Welding on a point is not a job that anyone can do offhand, and to make a neat piece of work, to build up a share into a good shape, takes considerable time and experience, especially on a share that has been worn short and thick.

I wonder how many smiths have tried steam coal, especially in these days when good smithing coal is hard to get? I have tried, and am using steam coal and find it satisfactory for heat and for welding. It is a good grade of coal 13,500 B. T. U. per pound (will give the analysis if anyone wants it).

Editor's Note.—Our friend was kind enough to send us a number of good kinks and suggestions in addition to the above letter. These suggestions will be printed in an early issue of this magazine. Here is a chance for some of our readers to pay him back by sending us some more hints. He is doing his part—do yours.

We usually receive answers to questions very shortly after the magazine has been put before them. As yet, however, we do not seem to have heard from anyone regarding double tires, that is in answer to Max Maser of Texas. We are not sure whether we printed Mr. Maser's query correctly. He might have asked about Dopple tires, but we could not seem to locate such a tire. Perhaps one of our readers can help us out. If so we want to hear from him. The rest of the question is in this department of the October Blacksmith & Wheelwright.

Digitized by Google

THE BLACKSMITH & WHEELWRIGHT

The Pioneer Journal of Its Class in the World.

Member of the Audit Bureau of Circulations.

PUBLISHED MONTHLY BY

M. T. RICHARDSON COMPANY,

71-73 MURRAY STREET, NEW YORK.

POST OFFICE BOX, 654. TELEPHONE—7377-7378 Barclay.

CHICAGO OFFICE. 608 SOUTH DEARBORN STREET

Entered as second-class matter at the Post Office in New York City.

M. T. RICHARDSON, President and Treasurer
F. R. WHITTEN, Secretary
M. T. RICHARDSON, Editor
FRANK L. AVERY, Managing Editor

F. R. WHITTEN, Advertising Manager
H. F. LUDINGTON, Western Representative
GEO. A. SMITH, Eastern Representative
FRANKLIN MYERS, Art and Copy Dept.

FOREIGN AGENTS:

NEW ZEALAND
MR. R. HILL, Matlock House, Davenport, Auckland, New Zealand.

GREAT BRITAIN
ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance.....$1.00
One Copy, six months, in advance.....60 cents
Single Number.....10 cents
Canadian subscriptions.....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English Money.

Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

ADVERTISING RATES SUPPLIED ON APPLICATION.

SPECIAL NOTICE

Subscribers failing to receive their magazine regularly will favor us by giving us notification to that effect.

CHANGE OF ADDRESS

Subscribers who desire the address of their paper changed should send us the old as well as the new address.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

OUR EDITOR'S LETTER

EVERY month I receive in this office a booklet published by the Hyatt Roller Bearing Company and edited by a Mr. B. G. Koether, and as I write this letter I have in my hand the latest issue in which Mr. Koether publishes a story entitled "Over Here," and Mr. Koether says that this idea came from a little house organ called "Imprint," which is edited by Joseph McGuire.

I do not expect to improve or add to the stories written by either of these worthy gentlemen. I simply use their title as the text for my letter this month.

Some of us are very much inclined to feel that our own work is just a little more important than anything else in the wide world. Doubtless this is true, to the respective individual at least, but nothing can be of any more importance than winning the war. It is you and I, brothers, who have demanded that our battles be fought for us. You and I are responsible for the drafting of American boys and sending them across the water. It is not for those in authority at Washington that the battles are being fought. It is your battle and my battle that is being waged in Europe, and it is to your interest and my interest that our representatives are putting up a good fight to win, as assuredly they will.

Since they are our representatives, it behooves us to do our share of the fighting. We must fight with our hands, with our brains, and with our tongues every day until the kaiser is whipped and the german people are established in their rightful places as free men.

You may be a Republican or a Democrat, possibly a Socialist. But you cannot get away from the fact that your battle is being fought for you. You probably have excellent reasons why you cannot personally shoot a rifle or dig a trench. If you must stay at home, don't be a shirker. Fight with your tongue, use your money, and don't be afraid to work as many hours a day as you can, to furnish the material for the boys on the other side.

The trade of blacksmith is the oldest on earth. Let it also be the noblest. Make yourself so important that when the war is over the boys on the other side will come back and give you as much praise as you give them. We can fight over here as well as they can over there. The man who works only two hours a day is a slacker.

The Consistent Editorial Policy of This Magazine.

A FEW days ago a rather elderly gentleman dropped in to see the editor in regard to the circulation of The Blacksmith and Wheelwright. This gentleman said that out of a number of trade papers he had picked our magazine as being the one he would prefer to represent. Naturally we asked him just what he thought of the paper and its possibilities, and of course we were somewhat pleased with his answer. Let us tell you just what his impression is of our magazine.

"I have watched The Blacksmith and Wheelwright for nearly ten years now," he said, "and I find that it has followed its editorial policy more consistently than any other magazine on the market. I want to represent it because I can safely say to the blacksmith or the metal worker that here is a magazine which is published for his interest alone, a magazine which is still devoted to the good old blacksmith trade, that still gives suggestions to the blacksmith and metal worker, and that still holds the blacksmith's best interests to heart.

"As I look through other magazines, I find them all more or less devoted to automobile topics. but by actual comparison I find that The Blacksmith and Wheelwright contains 90% blacksmith and metal working material. On the other hand, I can see that the few automobile suggestions and articles have been written especially for the blacksmith who cares to work this branch of the trade.

"I feel that I can sell your magazine and keep a clear conscience, still following the golden rule of doing something for my neighbor."

This, brother blacksmiths, is the highest praise that we can wish for. We still publish this magazine for your benefit and will continue to do so. It is to your interest, therefore, that you show your enthusiasm just as plainly as did this solicitor. We cannot fan the fires of enthusiasm alone—we need your assistance—and the more letters you write us and the more praise you give our magazine to your fellow workers, the more valuable can we make this magazine to you.

Every new subscription that you send us means a better magazine for YOU. As our subscription list grows, so increases the value of the editorial and reading matter in our magazine. We have shown you that we can and do intend to do our part. We want to be your friend and want you to give us your friendship. Forget that a magazine is nothing but paper and type. Make it a partner of yourself. Write to it just as you would to your "best pal." Remember, if we pull together we can move the earth.

In Time of War Prepare Your Business for Coming Peace.

THERE is a phase in the situation of our country to-day which few business papers or magazines have taken into consideration. It is that of America's position when the war is over. America, now that she has made such elaborate preparations for war must make just as elaborate preparations for peace.

If peace were declared to-morrow, America would face just as big a problem as she did when she entered the war. There is to be a tremendous reconstruction of business. Few of our readers realize how many important manufacturing plants have been forced to cease their business. Few realize what tremendous amount of stores will be on hand at the conclusion of peace.

There is one point which every blacksmith should consider at the present time, namely, the situation of the farmer. We think it is safe to say that the prosperity of the blacksmith, especially the welfare of our readers, is directly dependent upon the farming interest. Will the farmer be a plutocrat or a beggar when the war is over? Will he earn one dollar a day or ten? We are inclined to think that the farmer will be one of the biggest business men after the war is over.

Every nation in the war is conserving as much as possible. Germany, as far as we are concerned, is out of it entirely. All of the smaller nations in Europe are suffering from hunger and we see no way in which their hunger can be appeased without the help of the American farmer. As soon as the war is over there will be a tremendous call for American food; the farmer will profit thereby, and it is fitting that the blacksmith cater to the farmer's trade, to acquaint him with the possible situation and to see that all the farmers in his locality are equipped with modern tools and proper farming implements in anticipation of the big boom which is to follow the war.

Investigation of the Fordson Tractor by Professor Yerkes.

IT is two years or more since the country was informed with a considerable flourish of trumpets that Henry Ford had solved the farm tractor problem and was putting on the market a machine at a low price which would be a boon to farmers everywhere. Of course, as usual, this valuable piece of information was given to the public by the press of the country without any cost to Ford. Mr. Ford is a veritable genius for getting advertising from the daily press and from almost the entire press of the country without having to pay for it.

The Agricultural Department decided to make an investigation of the merits of the Fordson tractor and intrusted this important duty to Professor Yerkes, one of its most expert assistants. Professor Yerkes carried out his instructions by going to the factory and watching the process of manufacture and by operating a machine in the field himself and watching the operation of other machines.

Professor Yerkes' report showed this tractor to have some imperfections and not to be quite up to what had been claimed for it. Instead of giving this report to the press in order that the farmers might not be misled in purchasing Mr. Ford's tractor, the Agricultural Department chose, it is claimed, to suppress the report for some unexplained reason. Fortunately a copy was obtained in some manner by "Farm-Machinery and Farm-Power" which has just been made public. It is said that Mr. Ford is taking measures to improve his tractor in many ways, and it seems possible that at some time or other it may fulfill the promises made for it in the first place.

Horseshoeing and Metal Working Are Based Upon Science.

NOT long ago the writer, in travelling through a small country town, noticed a blacksmith sign which read, "Scientific Horseshoeing," and upon entering the shop was surprised to find that the owner was in truth a scientific horseshoer. This old blacksmith, with whom the writer talked, knew every twist and turn of the blacksmith business. Each horse to him was a study; in fact, every blacksmith job that he did represented a particular problem.

The days of the "hit or miss" type of blacksmith are over. The modern black-

Digitized by Google

smith, in order to be modern, must know about the heat treatment of metals, the diseases of horses and the construction of modern machinery. It is for these modern men that our magazine is published. Consider, for instance, the series of articles entitled, "The Rock Drill Blacksmith." Are you following this series carefully? If not it is your misfortune. Do not think because these articles relate to rock drills that you are not interested. You surely are interested because what is applicable to rock drills, in many cases is just as applicable to the drills and tools which you use in your own shop every day of the year.

The hardening and tempering of metals is an art based upon scientific rules. Don't fail to read any articles which you see in our magazine. All of them are the result of careful study and editorial choice. The magazine is not thrown together. Each article is chosen because it gives information for the blacksmith.

Be Ready to Put Shoes on the Metal Horse When He Arrives.

IN another editorial we have called the attention of the blacksmith to the prosperity which is awaiting the farmer and just how this prosperity affects the blacksmith. The blacksmith, however, must not be content to sit and await developments. He must anticipate them, and in order to do this considerable study is necessary. We advise all of our blacksmith readers to acquaint themselves with the automobile, the truck and the tractor.

These three machines will soon replace horse drawn vehicles. The farmer cannot afford to maintain a stable of horses together with his farm implements any more than he can afford to purchase a steam roller for hauling his milk to the station in the morning. He will replace these horses with machines of more rapid locomotion.

Instead of employing two horses to plow a few acres of land he will use a tractor and turn over three times as much ground. Instead of hauling his produce to the station and paying a middleman huge commissions, he will carry his produce to market himself. On Sundays the farmer and his family will be seen in their automobile upon the roads travelling through the country and gaining their recreation in that way. Just as surely as the farmer is now running his cream separator with an electric motor or gasoline engine, just as surely will he run all of his farm machinery by means of gasoline or kerosene in the near future. Educate yourselves, brothers, and be prepared for the era of the internal combustion engine.

The Oldest Trade in the World Is That of the Blacksmith.

IN this issue we are publishing another article relative to the history of smithing by Mr. H. H. Manchester, for we feel sure that our readers have been interested in this particular subject. The photographs and cuts which we are using are taken from old tombs and from inscriptions upon the walls of tombs and ancient buildings. All of these pictures are extremely interesting because they show just how blacksmithing was done 3500 years ago.

They also go to show that among those ancient people, blacksmithing was considered one of the most important businesses. It is also interesting to trace the different advances of the art and see what kinds of machines they used. We feel safe in saying that the bow drill was perhaps the first machine used and perhaps their most important tool. We want all of our readers to follow this series through, as the articles are published from time to time, in order that they may realize the importance of the blacksmith art and its relation to civilization.



At times, we have been on the point of calling this department "the puzzle column." Everybody likes to solve puzzles and so long as it is a pleasure, let's make this pleasure show a profit. Instead of asking foolish questions like "How old is Ann?" or "Why is a Hen?" we might just as well ask about things that we want to know and obtain answers that will help us in our business.

Let's form a "Mutual Help Society," restrict it to readers of The Blacksmith and Wheelwright, and then we will have the monopoly on good ideas. See how much you will gain out of it, if you send in a letter, each one of you, we can afford to publish two pages of letters every issue for over a year. Just think of that—two pages of practical suggestions that can be applied to your trade, written by smiths in the business. Things that have been tried out and are known to be good.

GET BUSY—WRITE US THAT LETTER NOW—YOU WILL BE AMPLY REPAID.

A Trailer Car for C. P. J.

From W. S. Owen, South Dakota.—I see you have had my article about welding boiler flues in the July issue. It was all correct, except that it should have read "to strike light and quick but not hard enough to dent the flue when welding," also "get a bar of angle steel" instead of "a box of angle steel."

I see that C. P. J. of Canada wants a sketch or suggestion about how to make a two-wheeled auto trailer car, and I will try to tell him how it is done, as I have made several myself. One can get an old second-hand spring wagon or an old surrey gear for a small price most anywhere.

Cut the two best wheels of the set of four down to about three feet high as at F. If it is a half platform rig, leave the rear platform springs as they are, and set the box on top the same as usual, get a tough piece of hard wood, G, a white oak 2 by 4 will do, and fasten the back end under the axle H with a U bolt J. Cut a groove crosswise of the stick, about ¾ inch deep, and burn or dress it half round to fit snugly under the axle.

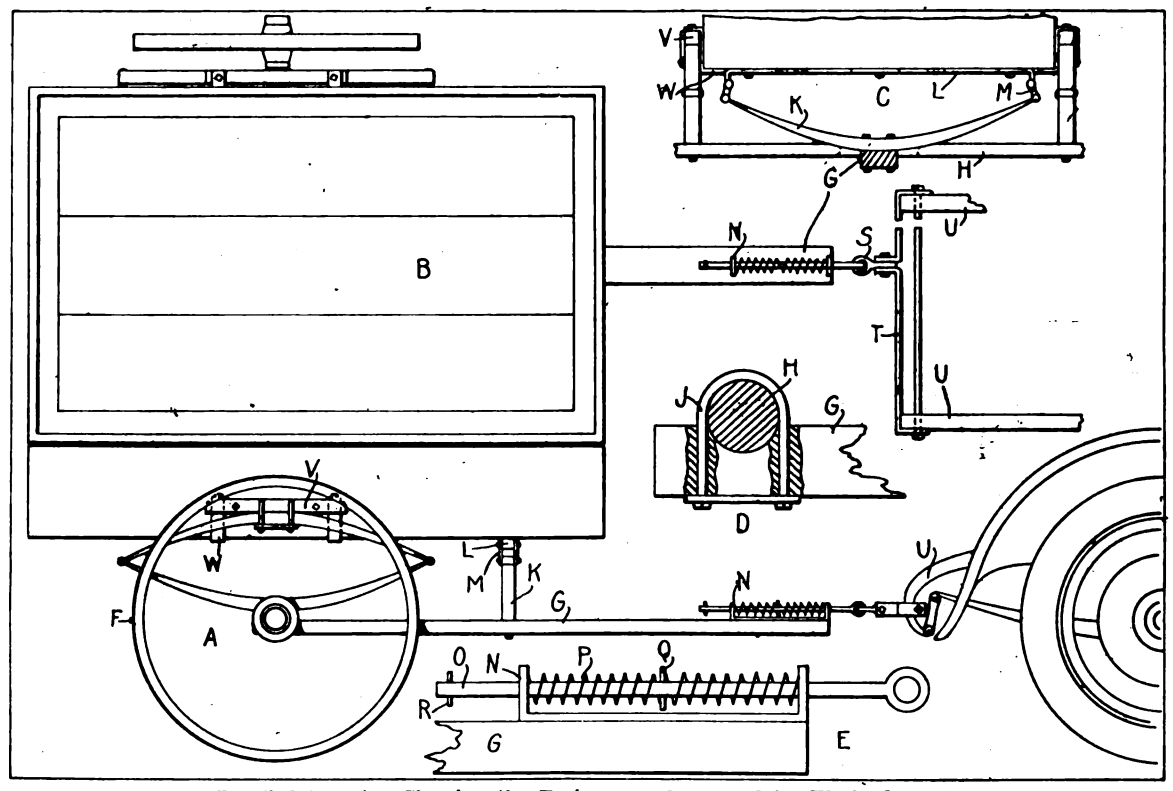
The axle is usually round at the center, and the stick should be 6 or 6½ inches long, according to the length of the box and other circumstances. Then use a half spring K and clamp it, bow downward to the tongue or reach G, about a foot back of the front end of the box and then make a cross bar, L, of steel. An old planter frame or cultivator beam will do. Bend an eye loop in each and couple to the ends of the spring with shackle M.

I make a hitch on the end of the reach as in the diagram at O. Take about 16 inches of a steel bar, N, ⅜ or ½ by 1½, and make a hole in each end, large enough for the draw bar O, ¾ round stock will do, but ⅞ or 1 inch is better.

Then bend both ends up, and get a coil spring P, of ¼ inch stock, and make it the same length as the lug, to go between the turned up ends, cut it in two in the middle and bore a hole in the center frame each end of the draw bar for a key, Q, also put a key, R, in the back end of the draw bar for safety in case the center key should cut off, which seldom happens, however. At least mine never have, and I have several in use.

Use a small clevis, S, on the front end of the draw bar, or make the front end double if you wish. Use a ⅝ pin for a draw pin and a handle or toil bar as some call them. Use a small key in the outer end of the draw pin, as the vibration will turn the bar, or toil bar off. If you don't do this, always fasten the cross or draw bar T to the chassis spring U of the car if possible, for if you hitch to the axle the vibration is much greater and has more effect on the trailer.

If you use an old surrey make the front end the same as described, but set the two rear springs crosswise of the axle as close to the wheel hubs as you can, and put a short wood cap, V, on the tops of the springs. Make two hanger bars from old wagon tires, if you have nothing better.



Detailed Drawing Showing the Trailer Car Suggested by W. S. Owen.

Answers to Many Old Questions.

From M. L. Kossey, Texas.—Here is an answer for Stanley Perkins of Ohio and for J. A. Winters of New York.

How to harden files: Fill a cast iron or any suitable bucket with lead and heat it until it is melted, then plunge the files in it with their handles up. This will heat the files to a uniform heat their entire length and

Digitized by Google

they will not warp as easily as if they were heated any other way.

After the files have heated thoroughly they should be dipped in a large vat of salt water. I would suggest that the vat be four or five feet long. In dipping the files move them back and forth edgewise, not sidewise, or they will warp. The files should be removed while they are still sizzling and if they should be warped they should be clamped in a vise or other clamps so that they can be bent straight.

They cannot be straightened all at once, but must be bent slowly. While they are in the vise or clamps sprinkle water over them as they are being straightened and leave them until they are cool.

If you find that the lead has a tendency to stick to the files, sprinkle them with prussiate of potash, which will prevent the lead from sticking to them. Here is another way for hardening files and twist drills or any other cast-steel articles.

Place equal parts of prussiate of potash and common salt in an iron pot over the fire and heat until the mixture boils and turns a cherry red. Place the tool to be hardened in the mixture until it is heated to a red also. You may leave it in the solution all day if you wish, for the longer it stays the better the result.

When you take the tool from the mixture cool it in linseed oil, being sure to keep it in a vertical position. The temper need not be drawn in files, but taps and dies should be tempered to a dark straw color.

Always remember that prussiate of potash is poison and handle it with care.

For kneesprung or knuckler horses of long standing there can be nothing done, but the trouble may be relieved by shoeing with long shoes and high heel calks. For cases of two or three months' standing, bathe the check ligaments in cold water often and saturate with a good liniment, turn the horse out to pasture for a time.

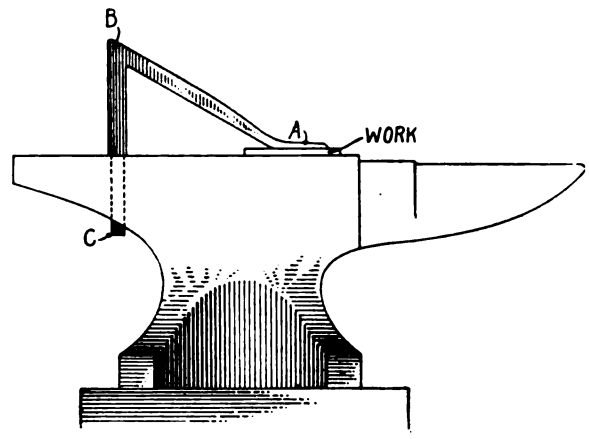
A partial answer for F. R. Wineberger of New York: My experience teaches me that chloride of zinc and alcohol is best for a soldering flux for two reasons—it sticks better and it will not rust the material. Wood, grain or denatured alcohol can be used, though denatured is cheaper than grain and does not affect the eyes like wood alcohol.

To mix the fluid, dissolve all the chloride of zinc you can in the alcohol. In using, apply just the same as muriatic (hydrochloric) acid to the surface.

A Cheap Helper.

From G. Brenner, Texas.—I am enclosing a sketch of a device for holding anything on the anvil provided one hasn't any helper. I made mine out of an old buggy axle. Obtain an old axle that will fit the hardy hole and draw it to a point at the end number 1. Then bend it to the shape shown in the sketch. I use two of these for different lengths and sizes but this depends upon the size of anvil.

When the device is in place, with the work under number 1, give the bend number 2 a



tap with the hammer. The rod will slip through the hardy hole and take up the slack between the point and the work, and then bind in the hardy hole; it will hold like a bulldog.

Some time ago someone wanted to know how to solder cast iron. With the following I have soldered everything except aluminum and it works every time. Take about eight ounces of muriatic acid (hydrochloric) and divide it into two parts, use the first part for cleaning the work. The second part should be filled with zinc, that is, drop in a piece of pure zinc and let it stand until the acid will not dissolve any more, then pour off the clean liquid and put in about as much borax as can be put on a dime, also put in the same amount of salammoniac.

Use this second liquid for soldering fluid. The main thing is to have a well tinned iron, perfectly clean. Be sure that the stock to be soldered is also cleaned.

With my best wishes to all the blacksmith and wheelwright readers.

A Letter from California.

From William Graham, California.—I haven't seen anything from this neck of the woods in your valuable paper for some time.

First of all, please find enclosed check for another year's subscription. Business is fairly good here now; but on account of the increased cost in material, we have had to advance the prices of shoeing and all kinds of work. The new price for shoeing for sizes 0, 1, 2 is $2.00 per horse; 3 and 4, $2.25; 5 and 6, $2.50; resetting, $1.25 up to No. 3. Nos. 4, 5 and 6, $1.50 for four shoes.

I noticed in the April number that Mr. Tenney of Ontario, Canada, wants to know a remedy for a horse that interferes or strikes close to the hoof. I have had considerable experience with this same trouble and the way of shoeing an animal that strikes in this manner is to work the outside of the foot down as low as possible so when the weight comes on the foot it will tend to throw the ankle out and the other foot will pass clear.

I have shod a good many in this manner and never failed to stop the horse from knocking after the first or second shoeing.

In the June number, J. A. Winters of New York wants to hear from someone of the readers relative to shoeing a knee sprung horse. My way is to raise the heel with a calk and have a low toe. This will tend to ease the tendon. Usually the horse has corns if he is knee sprung as corns cause the tendons to draw. Pare the corns well out and melt pine tar (corona or wool-fat) in with a poker or burning iron.

I have cored a good many corns and contracted heels by melting pine tar in the cav-



SPARKS AND SHAVINGS



Standard Horse and Mule Shoes.

The Standard brand of horse and mule shoes is favorably known throughout the country, being sold by leading dealers from Maine to California. These shoes are made by the Standard Horse Shoe Co., 131 State street, Boston, and readers who are interested should write direct to this Company for their new catalog No. 7, which will be furnished free of charge to our readers.

Northwestern Horse Nails.

Every horseshoer knows that in shoeing horses it is very important to use good nails. The Northwestern Horse Nails made by the Union Horse Nail Company of Chicago, Ill., are made of the best quality material. These nails are guaranteed perfect in form and finish, and they will hold the shoe firmly on the horse's foot.

The re-enforced point makes this nail an easy one to drive and a safe one to use. Readers who are not familiar with Northwestern nails should write direct to the manufacturers for full particulars.

Giant Grip Shoes and Calks.

The season of snow and ice is close at hand, and horseshoers will now be called on by their customers for winter shoes and calks. The Giant Grip Horse Shoe Co. of Oshkosh, Wis., are manufacturers of the original dry calk, and if any of our readers are not fully familiar with Giant Grip Horseshoes and Calks, they should write at once to this Company for full information which will be promptly furnished to any of our readers on application.

Digitized by Google

STERLING
HOOF PADS

Sterling Pads, with fibre compound back, vulcanized to the rubber heel, in one solid piece, are best for the horse's hoofs and best for the shoer's trade.

They are waterproof, cannot get soggy, or lose their shape.

They are tougher than leather and wear better.

Your jobber can supply you.
Patented and made only by

STERLING TIRE CORPORATION
Rutherford, New Jersey

Sterling Tires are known everywhere as high grade, dependable tires—90% of all in use are on commercial vehicles where service is hardest and where mileage records are accurately kept. Large commercial concerns running hundreds of cars stick to Sterling because of the low cost per mile.

Digitized by Google

ity at each shoeing in from one to three applications and it has never failed.

I hope this will be of some benefit to some of the readers, also benefit some of the faithful horses that have corns, caused by some careless shoer or careless driver, who left the shoes on too long without resetting. If this letter doesn't get into the waste basket I will write some more.

Editor's note.—A letter like this never finds its home in the waste basket, it's too interesting—keep them coming.

A Letter From Northern Montana.

From R. R. Tichenor.—Well here we are again after a long time, but not from the old stand, for when I last wrote you I was in Minnesota. At present I am writing from northern Montana, 70 miles from the nearest railroad and only three miles from the Canadian line; just about as far north as I can get without leaving the good old U. S. A., but not so far away that the good old Blacksmith and Wheelwright still finds me, and I am surely glad to receive it.

Some time ago I saw a question from someone who wanted to know how to build a smokestack for a forge. A stack that would take all of the smoke. In all of my experience I have only seen one that would do this. It was built of brick, 4 by 7, and extended up through a two-story building. Evidently they didn't have brick enough to finish it, for the last 12 feet was made of boards, the size of the outside of the chimney. The opening was triangular in shape, 12 inches on a side, and it would take all of the smoke from the fire as well as from some other fires as well.

There was another chimney, on the next fire, built just the same size in every way except that it was made of brick to the top, but it wouldn't take all of the smoke. I have never seen one since, unless it was fitted with a suction fan, that would work satisfactorily.

In the April number I notice that N. H. Browning wants to know how to place the tools in his new shop and has his plan all laid out. I will not agree with him in his arrangement, as some of his tools are too far from the fires, at least the trip-hammer is, and an iron would get cold before he could get from the fire to the hammer.

I would suggest that he place the fire nearer to the center of the shop, then place the hammer between the two anvils so as to be handy to both.

I was in a shop not long ago where they had a lot of power tools. All of the machines were placed along the center of the shop and every power tool was handy to get at and work around. But one thing I have found and that is, I want all my tools as near the fire as I can get them, but still have room to work and so save time and walking.

Have any of my brother smiths ever used a hand-power machine to sharpen plow lays that was advertised some time last year in The Blacksmith and Wheelwright? It was made on the same plan as the "Just Rite" plow sharpener. If they know of it, will they send me the address through The Blacksmith and Wheelwright? I have lots of plow work here, but do not feel able to put in a power plant yet.

A DEAF-MUTE IN CAMP.

One of the most unique army experiences that has come from any of our various military training camps is the one that has just been reported of Hinton Wilson, a rubber worker, employed by the Goodyear Tire and Rubber Company, Akron, Ohio, who for a month was detained at Camp Sherman, suspected of shamming deafness to avoid conscription.

Wilson is one of about 500 deaf mutes doing their bit in the Goodyear factory, working on war materials that are helping to equip our armies in France. This company has long encouraged mutes to enter its employ, for despite their physical handicap they have proven themselves as good workmen as their more fortunate brothers.

"I was registered in Atlanta," Wilson said after his release, using sign language, "but requested a transfer where I was working. One night I found a squad of husky khaki-clad lads awaiting my return from work, who became incensed at my inability to answer their questions, and unceremoniously hauled me before the examining surgeon. I was pronounced physically sound and the next morning was hustled off to camp, where the boys, taking their cue from the officers, regarded me as a contemptible slacker.

"Fortunately a deaf brother of one of the boys paid a visit to the camp and after talking with me in sign language assured my comrades that I was deaf. Their attitude toward me immediately changed and they treated me royally thereafter, doing everything possible to make things pleasant for me.

"They waked me at reveille and usually connived to get me in the second rank at drills, so that my mistakes could not be so readily observed by the officer, and that I might have the advantage of imitating the movements of the men in the front rank. But occasionally I landed in the front rank, and I suppose I am fortunate that I could not hear the bawlings out I received from the officer when I marched blithely forward while the rest of the company executed a 'right about face.'

"But the exacting service of my military experience came when I was drawn for sentry duty one pitch dark night. For three hour the entire german army might have passed within a few feet of my post without my knowledge of it.

"An indefinite rumor ultimately spread about the camp that there was a deaf man in one of the companies, and a lieutenant was detailed to investigate. His investigations finally led him to me and I was given a long and rigid examination by the physicians, who, after a half hour's argument finally agreed that I was not faking. I was discharged because of physical disability, paid $24.68 for my military services and sent home.

"But I was sorry to go. Army life is great and I'd love to get a hun."

August 20, 1918.

HOLD YOUR LIBERTY BONDS.

The effort to separate Liberty Bond holders not familiar with stock and bond values from their Liberty Bonds has taken a new turn. The manipulators instead of offering to buy the bonds at inadequate prices offer in exchange for them the stocks and bonds of various wildcat corporations, whose face value is large but whose actual value is little or nothing.

The safest investment in the world is a Liberty Bond. For a patriotic American, Liberty Bonds are the best investment in the world. It is not only a wise thing to hold them, it is a patriotic thing to do. The soldier that takes a trench and then voluntarily gives it up is not to be compared with one who takes a trench and holds it against the enemy. An American who buys a Liberty Bond and then sells it is not so good an American as one who buys a bond and holds it. This does not apply, however, to one who sells his bond because of real necessity; there is legitimate trading in Liberty Bonds which the Treasury recognizes.

It was a wise and patriotic old colored American who refused to sell his $100 Liberty Bond for $96 because he would not give up the United States' promise (his bond) to pay him $100 with interest for the United States promise (currency) to pay him $96, and who refused to sell the same bond for $102, because, he said, that the $102 must be counterfeit or else the would-be purchaser would not be willing to give it for only $100. It is safe to say that there are no gold bricks or wildcat securities among that American's assets.

KEEP BOOKS CAREFULLY.

With the introduction of the new revenue act in Congress comes the fact that many businesses, which never before have been taxed, will now be called upon to furnish their part of the revenue necessary to carry on the war against barbarism.

In many cases, taxes will be one of the largest items of expense. It is of the utmost importance, therefore, that every concern in business, large or small, whether corporation or individual, shall maintain an exact record of receipts and expenses and keep accurate accounts.

Because of the large amounts to be collected, the Bureau of Internal Revenue will be compelled to check the income tax returns filed by taxpayers more closely than heretofore. The retail merchant who is able to place before the Internal Revenue Inspector book records showing exactly how he arrived at his statement of net income will greatly facilitate the Government's task of collecting the war revenues and save himself annoyance and expense.

No special system of accounts is prescribed by the Internal Revenue Bureau, but the books should show in detail inventories, purchases, sales, capital investments, depreciation, and similar items required in making up the income tax return. Every merchant should study the income tax law and regulations and see to it that his accounts are kept in a manner that will enable him to determine his net income for taxation purposes.

Aside from the necessity of keeping systematic accounts in order to comply with the Government's requirements, every progressive merchant should adopt an approved accounting system for the good of his own business. In no other way can he further his financial interests more effectively. It has been proven time and time again that accurate accounts are absolutely essential to success in business. The merchant who has a good accounting system is able to eliminate waste and unnecessary expense and can so control his purchases and his credits as to greatly lessen the chance of failure. The inventory, which cannot be taken without some form of accounts, is the compass of a business. Without it the direction in which the business is heading, either for success or failure, cannot be determined.

In the complexities of modern business costs must be calculated with certainty in order to determine what the selling price of an article should be in order to yield a reasonable profit. This is impossible without books of account.

The profits of a business or the losses of a business cannot be determined without book records; and now that the Nation requires every citizen to contribute to the war budget within his means and income, the returns required by the Government under the revenue laws cannot be made with any degree of accuracy without books of account and annual inventories.

The bad debt loss of the Nation, which runs into large figures annually, is due in large measure to inexperience and inability. If merchants would keep even the simplest books of account the bad debt wastage would be reduced materially, for inability and inexperience are usually marked by the absence of an accounting system.

Owing to the withdrawal of man power from industry it is essential that every business man be more frugal and exert himself more effectively to conduct his business efficiently. Extra effort put forth in carrying on the business so as to increase volume at less expense, will decrease the chance of failure, increase the earnings of the merchant as a reward for his effort, and enable him to share more liberally in the governmental financial program made necessary for the successful prosecution of the war.

The man who knows the exact condition of his business from day to day has an immeasurable advantage over the individual who has no records upon which to base his operations. It is the duty of every citizen, especially in these war times, to keep in such close touch with his business through record keeping and otherwise as to maintain the greatest efficiency and render to his Government every cent due in taxes.

Digitized by Google

Agents Wanted for Bailey Ball Thrusts.

Many blacksmiths under present trying war conditions are looking out for new sources of income, and readers will undoubtedly be interested in an offer to blacksmiths which is made by Geo. D. Bailey Co., 4506 N. Ravenswood Ave., Chicago, Ill. This Company manufactures the celebrated Bailey Ball Thrust Bearing which is intended for replacing the plain washers which are used by the manufacturers on the left side of the Ford and Chevrolet 490 differentials.

By using Bailey Ball Thrusts the car owner can eliminate all trace of sliding or grinding contact, thereby minimizing friction. The manufacturers guarantee the Bailey installation does away with the danger of noisy or broken gears due to ordinary washer construction.

The retail price of the Bailey Ball Thrust Bearing is $3.75, but this specialty can be offered to blacksmiths on a basis showing an excellent profit. The Bailey Ball Thrusts are extensively advertised in such general mediums as the Saturday Evening Post, and of course, this would greatly assist any blacksmith in selling the product.

Practically every jobber in the United States and Canada carries this Bearing in stock, and blacksmiths everywhere find it little or no trouble to sell this desirable specialty to car owners. For further particulars readers should write to the Geo. D. Bailey Co. at the address mentioned above.

A Good Shoe for Blacksmiths.

It is an unsual thing to advertise shoes for the human foot in a blacksmith's publication, but most of our readers are located in farming sections where it is very important to have durable shoes which will keep out moisture and cold, and at the same time fit the foot easily. Leonard-Morton & Co., Department 1262, Chicago, is making a special offer to our readers, which in these days of high shoe prices ought to be very interesting.

A coupon is attached to their advertisement, and readers are asked to fill out this coupon and send it direct to this Company, when they will deliver a pair of their reliable shoes without any obligation on the part of the reader to purchase unless fully satisfied with the shoes after inspecting them. The Leonard-Morton shoes are very flexible and easy on the feet. They are made by a special process which leaves all the life in the leather and gives it wonderful wear-resisting quality. The best of leather is used in the construction of this shoe. In spite of all these advantages the retail price of this shoe is only $3.85 per pair, and you are not expected to send this amount to the manufacturers unless after looking at the shoes you are entirely satisfied with them.

Sleigh Knees and Bob Sleighs.

Many readers of "The Blacksmith & Wheelwright" especially blacksmiths located in the lumber districts have a large demand during the winter season for Bob Sleighs and Sleigh Knees. Sherwood Hall Co., Ltd., of Grand Rapids, Mich., manufactures for the trade an unusually complete line of these goods which includes the well-known Valley City Bob Sleighs—these being especially designed for pleasure, delivery, express, or grocery wagons, or in fact any work where a light strong sleigh is needed.

These Bobs are made in three sizes for 1⅛, 1¼ and 1½ inch shoes. The same manufacturers also make the Success Oscillating Sleigh Knees, and Brown's Oscillating Sleigh Knees. The Success Knees are particularly adapted for farm, road, and lumbering Bobs, and they are made in three sizes for 1½, 1¾, 2, 2½, 3 and 3½ inch. runners. The Brown Oscillating Sleigh Knees are made in sizes for 1¼, 1½, 1¾, 2, 2½, 3 and 3½ inch. For further particulars readers who are interested should write direct to the manufacturers.

The Kerrihard Power Hammer.

Every modern blacksmith's shop should be equipped with a good trip hammer. The Kerrihard Power Hammer is a thoroughly reliable machine which is reasonable in price and constructed of the best materials. This Hammer will do the work of any blacksmith's shop in a first class manner, and it is so durable, that it will wear indefinitely. Readers who are interested should write for full information to The Kerrihard Company, Kerrihard Station, Red Oak, Iowa.

An Interesting Catalog Free.

Many readers of this magazine are taking up automobile repair work and the sale of automobile accessories, and there are many who have not yet attempted this branch of trade, who are planning to go into it in the near future. All such readers will be interested in a new catalog of 500 pages which has recently been brought out by the Beckley-Ralston Co., 1801-1815 Michigan Ave., Chicago, Ill.

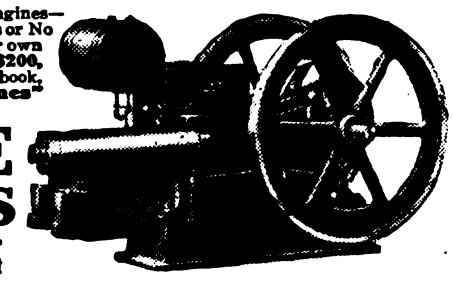
This Company is one of the largest dealing in supplies for automobiles, trucks and tractors; also tools and equipment for garages and repair shops. Even if you do not expect to purchase any automobile tools or supplies at the present time, you will find this catalog a valuable book of reference, and we hope that all of our readers who have not yet written for this catalog will do so. In writing to the Beckley-Ralston Co., you should mention the fact that you want a copy of their catalog No. 82.

Direct to You—Factory Prices

BURN KEROSENE—BIG SAVING—BETTER ENGINES



Lowest factory terms on Engines—2 to 30 H-P. Cash, Payments or No Money Down—Write your own order and save $15 to $200, as explained in my new book, "How to Judge Engines"—sent FREE, postpaid.



WITTE ENGINES
Produce Power at Lowest Cost

Built in the largest Exclusive Engine factory, selling direct. I build nothing else—back every engine I make with a good 5-Year Guarantee as to quality, durability, fuel requirements and workmanship. You take no chances. **I guarantee** safe delivery—make prompt shipment, all sizes: Stationary, Portable or Saw Rig. Money back if not satisfied on my new 90-Day Engine Offer. Write for new book to-day, and latest factory prices.—ED. H. WITTE, Pres.

32 YEARS SUCCESS

WITTE ENGINE WORKS
2446 Oakland Ave. Kansas City, Mo.
2446 Empire Bldg. Pittsburgh, Pa.

"I'LL TAKE CARE OF THE WAR YOU BOYS WHO CAN'T GO—MUST TEND TO BIZNESS"



F.M.

and there's no better way of attending to business than to stock up on

GIANT GRIP SHOES, CALKS, and TOOLS.

With MEN, business will go right along just the same as ever—molly-coddles don't count.

Giant Grip Calks you'll find to be a separation of the real from the apparent—the permanent Genuine Calk from the ordinary.

There is no effective substitute for that long and practical experience which is father of safe and conservative initiative. Many years of Shoe, Calk, and Tool making enables us to surely maintain certain advantages over others.

Don't let Progress catch you walking backward!—Write us to-day for literature.

GIANT GRIP HORSE SHOE CO.

Manufacturers of the original Drive Calk.

OSHKOSH, WISCONSIN

Advertising Rates in The Blacksmith and Wheelwright made known on application

Digitized by Google

Jefferson Coils.

The Automobile Ignition Coil situation has, in the past, been a serious problem for jobbers, dealers, and service stations, owing to the multiplicity of types on the market. Many jobbers and dealers have had to pass up the coil field almost entirely because of the large and varied stock of Coils that would be necessary to take care of all requirements.

The Jefferson Electric Manufacturing Company of Chicago have recently placed on the market a line of Battery Replacement Coils and Fittings which are sufficiently flexible to displace any type of Coil on battery equipped cars. The extreme flexibility of Jefferson Coils is obtained from several features, which include the Fittings, Adjustable Caps, Terminals and Mounting Arrangements.

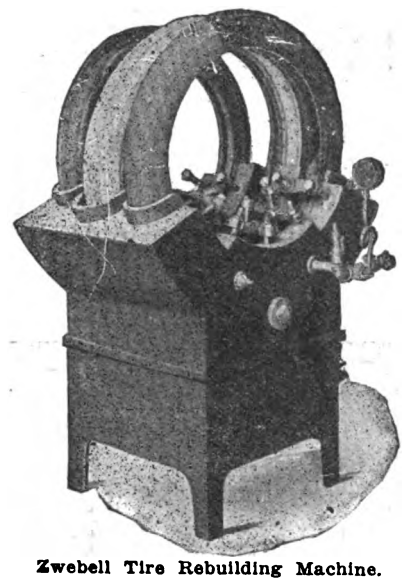
With a small stock of Jefferson Coils, any service station, garage, or repair shop will be prepared for any emergency. Heretofore it has been necessary to lay up a car for perhaps several days while a new Coil was being obtained. Now, however, any car can be placed in service within a few minutes. It is only necessary to remove the old Coil and connect the Jefferson.

Starting conditions require a Coil that will produce a hot, intense spark when the battery is at the lowest ebb. Jefferson Coils are guaranteed to take care of this extreme condition.

To aid jobbers, dealers, service stations, and garage men, the Jefferson Electric Manufacturing Company have compiled a folder containing complete and authentic data covering all standard Battery Ignition Systems. This folder lists all makes of cars from 1912 to the present date, and gives the year, model, type of ignition, and style of Jefferson Coil to be used for replacement. This folder will be sent free of charge to any dealer, garage, service station, or jobber. Request should be addressed to the Jefferson Electric Manufacturing Company, Congress and Green Streets, Chicago.

Zwebell Tire Rebuilding Machine.

Never in the history of the tire business has the demand for rebuilt tires been as great as it is today. Urgent requests are made to the tire users to conserve their tires and eliminate the waste that in the past has run into enormous figures.



Zwebell Tire Rebuilding Machine.

It is a known fact that a large percentage of carcasses outwear the original tread and if retreaded are good for many miles of service. Owing to government regulation, eliminating a large number of the tire sizes now in use, will create a further demand for rebuilt tires that cannot be obtained from the manufacturer. With this demand is opened a large market for tire rebuilding and the up-to-date repairman or garageman will anticipate it by installing tire rebuilding machines.

The Zwebell Retreader and Tire Rebuilding Machine, as the cut shows, is a block type casting, capable of accommodating three large tires. The one-third circle cavities, with a cross section of 3½, 4¼ and 5¼ inches, respectively, will take care of any size tire from 28x3 to 38x5½ inches. The cavities are deep enough to cure the tire over the beads when desired. The boiler is self-contained and uses either gas or kerosene as fuel to generate steam.

The ends of the cavities are provided with semi-curing flanges, to guard against any breaks in the cure. The raised centers of the side of the cavities are so constructed that with the use of air bags and standard bead molds, a section can be cured in the same manner as in regular sectional molds in rib, or with a pad in either plain or non-skid design. Full particulars and description of this machine can be obtained by writing the manufacturers, Zwebell Brothers Co., Milwaukee, Wis.

Absorbine for Dew Poison.

Quoting from a letter recently received from L. C. Anderson of Mayville, Ky.: "I have used your Absorbine for several years and have received quite a lot of benefit from same. I cured one very badly dew-poisoned ankle, and restored new hair to an old scar by using Absorbine."

This is an excellent preparation for Bog Spavins, Thoroughpin, Capped Hock, Big Knee and Swellings of all kinds. Absorbine at druggists, $2.00 a bottle, or sent express prepaid upon receipt of price. W. F. Young, P. D. F., 55 Temple street, Springfield, Mass.

The Modern Motor Car.

A book which the trade has been looking for for some time is now being published by Laird & Lee, Inc., Publishers, Dept. A D R., Chicago, Ill. and entitled "The Modern Motor Car." It contains 536 pages and is illustrated with 225 cuts.

It has been written from a practical standpoint and takes up in detail the construction and repair of every automobile part. Electrical systems, "that mysterious part of the car," are gone into in great detail. The storage battery is fully described and hints for its upkeep and repair given.

As a book of condensed information and practical mechanical textbook it stands with the best. It is concise and to the point and we can safely recommend it to our readers.

Index to Advertisers

Aetna Nut Co., horseshoe calks....Front cover
Akron-Selle Co., gears....300
American Calk Co., calks....Front cover
American Technical Society, books....279
Anti-Borax Compound Co., welding compounds....4th cover
Armstrong Mfg. Co., bolt dies....300
Armstrong-Blum Mfg. Co., punches and shears....Front cover
Barcus Mfg. Co., horse stocks....277
Barnett, G. & H., Co., files and rasps, Front cover
Beckley-Ralston Co., supplies....278
Bertschy-Bermo Co., welding plants....297
Bicknell Mfg. & Supply Co., punches and shears....280
Birch Motor Cars, motor cars....300
Bradley, C. C., & Son, shaft coupler, 3d cover
Buchanan, C. G., Chemical Co., industrial chemicals....4th cover
Buffalo Forge Co., blacksmiths' tools....279
Burden Iron Works, horseshoes....3d cover
Butterfield & Co., taps, dies and screw plates....280
Campbell Iron Co., supplies....300
Canedy-Otto Mfg. Co., blacksmiths' tools, 2d cover
Capewell Horse Nail Co., horse nails, Front cover
Champion Blower & Forge Co., blowers....275
Champion Tool Co., blacksmiths' tools....276
Childs, S. D., & Co., steel stamps, Front cover
Columbus Forge & Iron Co., anvils..3d cover
Columbian Hardware Co., vises....299
Cortland Welding Compound Co., welding compounds....277
Cray Bros., blacksmiths' tools....299
Crescent Machine Co., woodworking machinery....297
Diamond Calk Horseshoe Co., horseshoes..298
Edwards, C. D., Mfg. Co., shears..Front cover
Electric Blower Co., blowers....278
Electric Wheel Co., wheels....4th cover
Empire Mfg. Co., wheels....300
Felton, Sibley & Co., paints....273
Firestone Tire & Rubber Co., tires....278
Fisher & Norris, anvils and vises....280
Franklin Steel Works, toe calks....4th cover
Giant Grip Horseshoe Co., horseshoes....295
Gogel Mfg. Co., tire heaters....300
Greenfield Tap & Die Corporation, screw plates and blacksmiths' machinery....300
Gwilliam Co., ball bearings....4th cover
Hall Co., Sherwood, sleigh knees....300
Hart Mfg. Co., stocks and dies....4th cover
Harvey Spring & Forging Co., auto springs....279
Hay-Budden Mfg. Co., anvils....4th cover
Heller Bros., horse rasps, tools, etc....280
House Cold Tire Setter Co., tire setters, hollow and spoke augers....4th cover
Jenner, H. W. T., patents....297
Kerrihard Co., hammers....280
Leonard-Morton & Co., shoes....297
Linde Air Products Co., oxygen....280
L. S. P. Calking Machine Co., calking machines....277
Macgowan & Finigan Cordage Co., hammers....Front cover
Mayer Bros. Co., hammers....273
Ness, Geo. M., Jr., steel stamps....Front cover
Neverslip Works, The, horseshoe calks, 2d cover
Nicholson File Co., files and rasps....273
Oneida National Chuck Co., chucks, Front cover
Parker, C. L., attorney....4th cover
Parks Ball Bearing Machine Co., woodworking machinery....280
Peck, Stow & Wilcox, pincers....300
Phoenix Horseshoe Co., horseshoes and toe calks....274
Porter, H. K., bolt clipper....4th cover
Prentiss Vise Co., vises....4th cover
Rosewater Electric Co., blowers....299
Sampson & Murdock, directories....300
Shaler, C. A., Co., vulcanizers....277
Sheldon Axle & Spring Co., axles....276
Standard Horse Nail Co., horseshoe nails, 4th cover
Standard Horseshoe Co., horseshoes, 3d cover
Star Mfg. Co., agricultural implements....297
Sterling Tire Corp., hoof pads....293
Stokes Bros. Mfg. Co., rasps....Front cover
Superior Oxy-Acetylene Machine Co., welding outfits....Front cover
Thompson Tuyere Iron Co., tuyere iron, 4th cover
Union Horse Nail Co., horse nails....
Western Newspaper Association, books....273
West Tire Setter Co., tire setters, hammers....299
Whisler Mfg. Co., nut splitters, jointer heads....300 and front cover
Witte Engine Works, engines....295
Young, W. F., veterinary remedies....300

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co....297

Anvils
Columbus Forge & Iron Co....3d cover
Fisher & Norris....280
Hay-Budden Mfg. Co....4th cover

Attorneys
Parker, C. L....4th cover

Automobile Springs
Harvey Spring & Forging Co....279

Axles
Sheldon Axle & Spring Co....276

Ball Bearings
Gwilliam Co....4th cover

Blacksmiths' Machinery
Greenfield Tap & Die Corporation....300

Blacksmiths' Tools
Buffalo Forge Co....279
Butterfield & Co....280
Canedy-Otto Mfg. Co....2d cover
Champion Blower & Forge Co....275
Champion Tool Co....276
Cray Bros. 299
Heller Bros. Co....280
Nicholson File Co....273
Peck, Stow & Wilcox Co....300

Blowers
Buffalo Forge Co....279
Champion Blower & Forge Co....275
Champion Tool Co....276
Electric Blower Co....278
Rosewater Electric Co....299

Bolt Dies
Armstrong Mfg. Co....300

Bolt and Rivet Clippers
Porter, H. K....4th cover

Books
American Technical Society....279
Western Newspaper Association....273

Calking Machines
L. S. P. Calking Machine Co....277

Calks, Horseshoe
Aetna Nut Co....Front cover
American Calk Co....Front cover
Diamond Calk Horseshoe Co....298

Calks, Toe
Franklin Steel Works....4th cover

Chemicals (Industrial)
Buchanan, C. G., Chemical Co....4th cover

Chisels
Champion Tool Co....276
Peck, Stow & Wilcox Co....300

Chucks
Buffalo Forge Co....279
Oneida National Chuck Co....Front cover

Directories
Sampson & Murdock Co....300

Disc Sharpeners
Mayer Bros. Co....273

Shears
Bicknell Mfg. & Supply Co....280
Edwards, C. D., Mfg. Co....Front cover

Shoes
Leonard-Morton & Co....297

Sleigh Knees
Hall Co., Sherwood....300

Spoke Augers
House Cold Tire Setter Co....4th cover

Steel Stamps
Childs, S. D., & Co....Front cover
Ness, George M., Jr....Front cover

Stocks and Dies
Butterfield & Co....280
Champion Blower & Forge Co....275
Hart Mfg. Co....4th cover

Supplies
Campbell Iron Co....300
Beckley-Ralston Co....278

Swages
Champion Blower & Forge Co....275

Tires
Firestone Tire & Rubber Co....278

Tire Bending Machines
Buffalo Forge Co....279
Champion Blower & Forge Co....275

Tire Heaters
Gogel Mfg. Co....300

Tire Setters
Buffalo Forge Co....279
House Cold Tire Setter Co....4th cover
West Tire Setter Co....299

Tire Shrinkers
Buffalo Forge Co....279
Champion Blower & Forge Co....275

Tongs
Champion Tool Co....276

Tool Grinders
Phoenix Horseshoe Co....274

Trucks
Akron-Selle Co. 300

Tuyere Irons
Buffalo Forge Co....279
Champion Blower & Forge Co....275
Thompson Tuyere Iron Co....4th cover

Veterinary Remedies
Young, W. F....300

Vises
Butterfield & Co....280
Columbian Hardware Co....299
Fisher & Norris....280
Prentiss Vise Co....4th cover

Vulcanizers
Shaler, C. A., Co....277

Wagons
Akron-Selle Co. 300

Welding Compounds
Anti-Borax Compound Co....4th cover
Cortland Welding Compound Co....277

Welding Outfit
Superior Oxy-Acetylene Machine Co., Front cover

Welding Plant
Bertschy-Bermo Co. 297

Welding Supplies
Linde Air Products Co....280

Wheel Dishers
House Cold Tire Setter Co....4th cover

Wheels
Electric Wheel Co....4th cover
Empire Mfg. Co....300

Woodworking Machinery
Buffalo Forge Co....279
Crescent Machine Co....297
Parks Ball Bearing Machine Co....280

Wrenches
Champion Tool Co....276

Wrenches (Knife Handle and Pipe)
Peck, Stow & Wilcox Co....300

Drills
Buffalo Forge Co....279
Champion Blower & Forge Co....275

Engines
Witte Engine Works....295

Farriers' Tools
Barnett, G. & H., Co....Front cover
Champion Tool Co....276
Heller Bros. Co....280
Peck, Stow & Wilcox Co....300

Files and Rasps
Barnett, G. & H., Co....Front cover
Nicholson File Co....273
Stokes Bros. Mfg. Co....Front cover

Forges
Buffalo Forge Co....279
Champion Blower & Forge Co....275

Gasoline Engines
Witte Engine Works....295

Gears
Akron-Selle Co. 300

Hammers
Champion Tool Co....276
Kerrihard Co. 280
Macgowan & Finigan Cordage Co, Front cover
Mayer Bros. Co....273
Peck, Stow & Wilcox Co....300
West Tire Setter Co....299

Hollow Augers
House Cold Tire Setter Co....4th cover

Hoof Pads
Sterling Tire Corp....293

Hoof Parers
Champion Tool Co....276

Hoof Nippers
Champion Tool Co....276

Hoof Shears
Champion Tool Co....276

Horseshoes
Burden Iron Works....3d cover
Diamond Calk Horseshoe Co....298
Giant Grip Horseshoe Co....295
Phoenix Horseshoe Co....274

Horseshoe Calks
Diamond Calk Horseshoe Co....274
Neverslip Works, The....2d cover

Horseshoe Nails
Capewell Horse Nail Co....Front cover
Standard Horse Nail Co....4th cover
Union Horse Nail Co....

Horse Stocks
Barcus Mfg. Co....277

Kerosene Engines
Witte Engine Works....295

Motor Cars
Birch Motor Cars....300

Nut Splitters
Whisler Mfg. Co....300 and front cover

Oxygen
Linde Air Products Co....280

Paints and Varnishes
Felton, Sibley & Co....273

Patents
Jenner, H. W. T....297
Parker, C. L....4th cover

Pincers
Peck, Stow & Wilcox Co....300

Punches
Bicknell Mfg. & Supply Co....280
Champion Blower & Forge Co....275

Punches and Shears
Peck, Stow & Wilcox Co....300

Screw Plates
Butterfield & Co....280
Champion Blower & Forge Co....275
Greenfield Tap & Die Corporation....300

Shaft Coupling
Bradley, C. C., & Son....3d cover

Digitized by Google

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

will be inserted under this head at 3 cents a word, including the address, for each insertion, payable in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York.

PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT.

Patents

PATENTS FOR INVENTIONS.

H. W. T. JENNER, patent attorney and mechanical expert, 622 F Street, Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trade-marks registered.

For Sale

FOR SALE.

In a good locality, blacksmith shop, stock, tools and all. Garage in connection. Can rent building if desired. For information write OLE SLOTTO, Fillmore, N. D.

FOR SALE.

Thriving horseshoeing business, in village of 1,500 inhabitants, only shop in village. Fully equipped. Electric lights. A money-making stand. Reason for selling, poor health. Address F. E. REYNOLDS, Katonah, N. Y., Westchester Co.

FOR SALE.

24 inch Planer and Matcher, $175; 8 inch Four-side Sticker and 50 pairs of Knives, $200. BICKNELL MFG. & SUPPLY CO., Janesville, Wis.

STOCKS FOR SALE.

Second-hand Barkus horse stocks for sale. Two side arms, hobbles and harness complete, in perfect working order; $55 cash. Have gone into auto business and have no further use for horse stocks. Apply PERRIN TIRE & VUL. CO., 417 West Seventh, Little Rock, Ark.

FOR SALE.

No. 3 West Tire Setter and Pump. Sets tires up to 1 x 4 inches, 5 feet diameter. Belted Tire Bender. Boxer and Tenoner. All in good condition. Address GEORGE A. REED & SON, Gloucester, Mass.

Personal

PERSONAL.

TOBACCO HABIT may be easily overcome. Quit the terrible injury and expense. I'll gladly send necessary information. G. S. STOKES, Mohawk, Florida.

Tires

DOUBLE TREAD TIRES

GUARANTEED

SPECIAL OFFER TO AGENTS. Write for Catalogue

Get our special price on new tires

M. LIBEN & CO.

205-AK West 48th St. New York City

DOUBLE TREAD TIRES.

We carry a full line of new and used tires and tubes. GINSBERG & BERKOWITZ, 236 West 48th St., New York City.

Wanted

WANTED.

Second hand House Cold Tire Setter, with punch and shear, or with shear. Must be cheap. J. L. SCOTT, 4048 Laclede avenue, St. Louis, Mo.

WANTED.

Good all-around blacksmith. Young married man preferred. Top wages for right man. Address M. W. ABTS, Morrill, Nebr.

WANTED.

To buy a good blacksmith stand with from ten to forty acres of land, with some fruit. Address with particulars to L. L., box 33, Prairie View, Ill.

WANTED.

To hear from owner of good blacksmith shop for sale. C. C. SHEPARD, Minneapolis, Minn.

WANTED.

Three wagon and auto repair blacksmith, also 3 helpers; steady work; good wages. WEST COAST STEEL CO., Tacoma, Wash.

Tires

BUY EARLY AND SAVE MONEY

Double Tread Tires and Tubes

GUARANTEED

Come to the Tire Clearing House—here are prices—clear cut and plain as daylight. We buy wholesale the best "try out" Tires—and you get the benefit—you want truthful tires, and truth is never crushed to earth if given a square deal—real truth is puncture proof—

SO ARE OUR TIRES.

Size	Plain	Non-Skid	Tubes
28x3	$4.40	$4.95	$2.00
30x3	5.50	6.05	2.00
30x3½	6.60	7.15	2.50
32x3½	7.15	7.70	2.75
34x3½	8.25	8.80	3.00
30x4	7.70	8.25	2.75
32x4	8.80	9.35	3.00
33x4	8.80	9.90	3.50
34x4	8.80	9.90	3.50
35x4	9.90	11.00	3.60

Get your order in quick for goods listed here—by all means get in touch with us for further information about our special process—it means money in your pocket. Get in right—write today—yes—today.

Look up rating in Dunn's or Bradstreet's.

Size	Plain	Non-Skid	Tubes
36x4	$9.90	$11.00	$3.60
32x4½	9.90	11.00	3.75
34x4½	11.00	12.10	4.00
35x4½	11.00	12.10	4.10
36x4½	11.00	12.10	4.25
37x4½	12.10	13.20	4.35
34x5	11.00	12.10	4.50
35x5	13.20	14.30	5.00
36x5	13.20	14.30	5.00
37x5	13.75	14.85	5.00

For (non-skid) sizes up to 32x4, 50c extra; all other sizes $1.00 extra.
For rebuilding your old tires we charge you 60% of the above prices.

B. LIBEN & COMPANY

261-A West 54th Street NEW YORK CITY 112-A East 110th Street

THE HOME OF DOUBLE TREAD TIRES

Ford Owner's Booklet.

A new booklet, just off the press, goes thoroughly into the question of transmission action of Fords. It tells how a smoother working Ford can be had, simply by taking proper thought in the purchase of transmission lining. The causes of the chattering and vibration which attends the transmission action in the Ford are analyzed, and the method of overcoming them clearly shown.

One of the features of the booklet, which is named "The Story of Cork Insert," is views of the factory where Cork Insert Transmission Lining is prepared. The big machines are shown which punch 24,000 sets of linings in an 8 hour working day. Also the rooms of girls who are in the act of setting the corks into the linings, are shown. One girl can set 10,000 corks in a day.

Another department of interest is the pages which give the experiences of Ford owners in the use of Cork Insert. After reading of the long mileage secured and the smoothness and quietness of operation, it is not difficult to understand why Cork Insert Transmission Lining has come into more extensive use during its first year on the market than any other automobile accessory ever offered the public.

A copy of the booklet, "The Story of Cork Insert," will be mailed gladly to any reader of this journal, who will address request to Advance Automobile Accessories Corp., Dept. J5-1, 56 E. Randolph St., Chicago.

Steven s Catalog.

Stevens & Company of 375 Broadway, New York City, have just issued a new catalog of their line of products which should be in the hands of every automobile accessory buyer. Stevens Products are well known throughout the industry and consists of a wide range of automobile accessories. Write for the catalog; it's free.

Don't Send a Penny

These Len-Mort work and outdoor shoes are such wonderful value that we gladly send them, **no money down.** You will find them so well-made and so stylish and such a big money saving bargain that you will surely keep them. So don't hesitate. Just fill out and mail the coupon. We will send a pair of your size. No need for you to pay higher prices when you can buy direct from us—and know what you are getting before you pay even a penny. Why pay out $5.00 and $6.00 for shoes not near so good? Act now. Mail the coupon today while this special offer holds good.

Great Shoe Offer



We can't tell you enough about these shoes here. This shoe is built to meet the demand of an outdoor city workers' shoe as well as for the modern farmer. Send and see for yourself what they are. Built on stylish lace Blucher last. The special tanning process makes the leather proof against the acid in milk, manure, soil, gasoline, etc. They outwear 3 ordinary pairs of shoes. Your choice of wide, medium or narrow. Very flexible, soft and easy on the feet. Made by a special process which leaves all the "life" in the leather and gives it wonderful wear-resisting quality. Double leather soles and heels. Dirt and waterproof tongue. Heavy chrome leather tops. Just slip them on and see if they are not the most comfortable, easiest, most wonderful shoes you ever wore

Pay only $3.85 on arrival. If after careful examination you don't find them all you expect, send them back and we will return your money. No obligation on you at all. This is at our risk, not yours.

Send →

Only the coupon—no money. That brings these splendid shoes **prepaid.** You are to be the judge of quality, style and value. Keep them only if satisfactory in every way. Be sure to give size and width. Mail the coupon now.

Leonard-Morton & Co.
Dept. 1208 Chicago

Leonard-Morton & Co.
Dept. 1208 Chicago

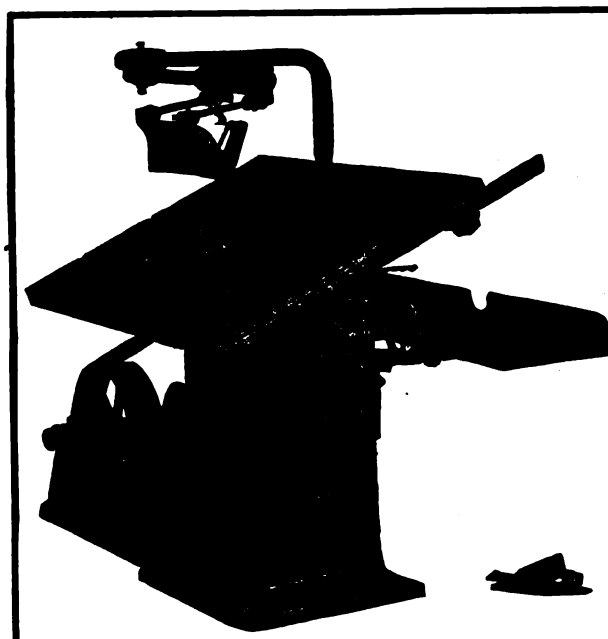
Send the Len-Mort Shoes prepaid. I will pay $3.85 on arrival, and examine them carefully. If I am not satisfied, will send them back and you will refund my money.

Size..... Width.....

Name.....

Age..... Married or single.....

Address.....



CRESCENT Wood Working Machines

will always satisfy those particular users who want the highest quality at reasonable price.

Send today for catalog of band saws, saw tables, shapers, jointers, variety wood workers, planers, planers and matchers, swing saws, cut off table, disk grinder, borers, hollow chisel mortiser, Universal wood workers.

THE CRESCENT MACHINE CO.
203 Main Street
LEETONIA, OHIO, U.S.A.

STAR STEEL SHAPES

PLOWSHARES	LANDSIDE PLATES	PLOW POINTS
LISTERSHARES	LANDSIDE POINTS	SEEDER POINTS
MOLDBOARDS	SHOVEL POINTS	SUBSOILERS
CULTIVATOR SHOVELS		DRILL POINTS
Soft Center	Solid Cast	Crucible Steel

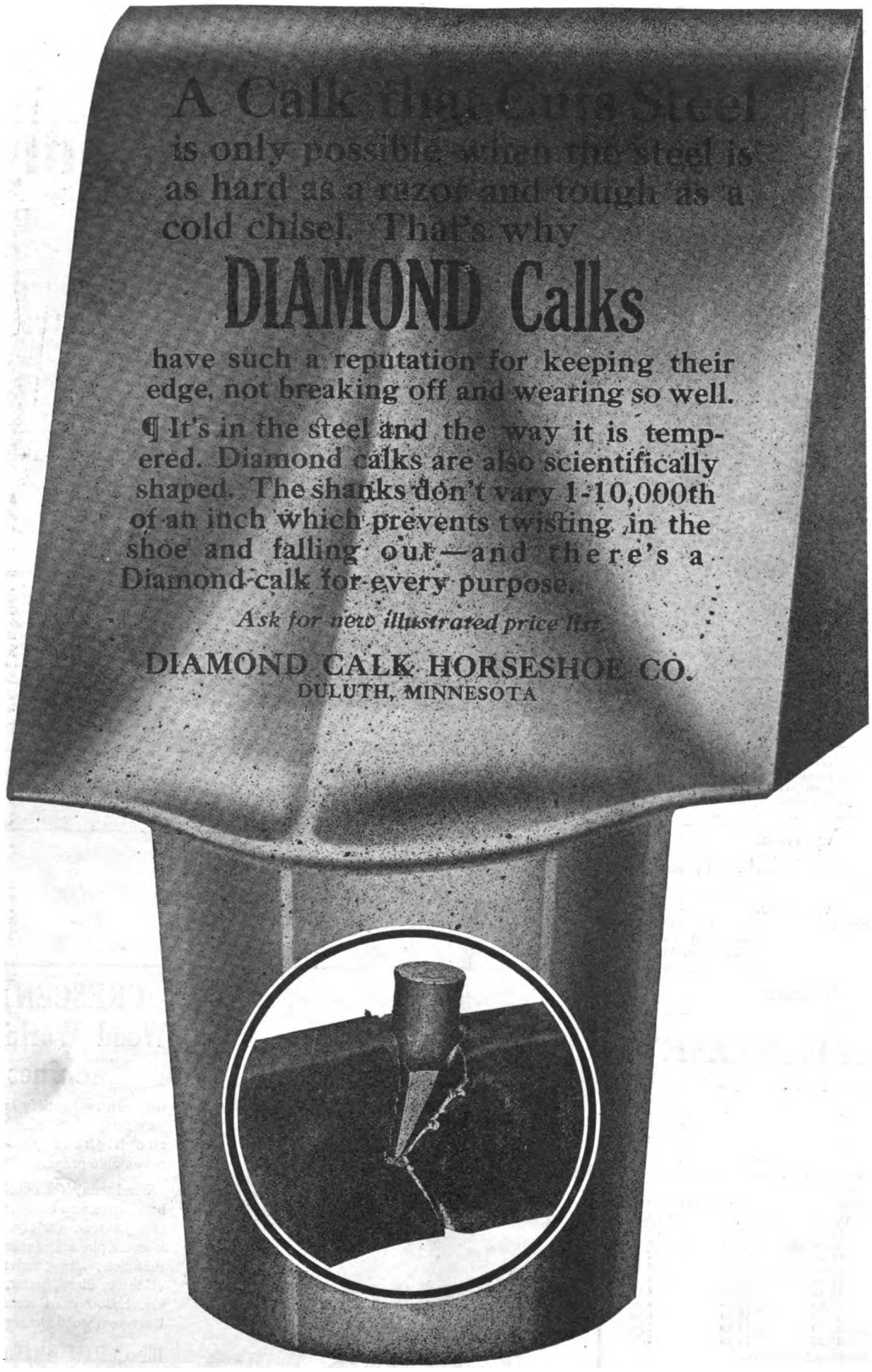
STAR MANUFACTURING CO., Carpentersville, Ill.

WELDING PLANTS, $25.00 to $300.00

Designed for all purposes. Small cash payment; balance, three to six months. Every mechanic and shop should have one.

BERTSCHY-BERMO CO. OMAHA, U. S. A.

Digitized by Google



Johnson's Freeze Proof.

The sharp fall mornings remind us that winter is fast approaching and the enterprising dealer will begin to lay in his store of winter accessories, for very shortly automobilists will begin to demand winter equipment.

Now is the time to open a campaign for the sale of radiator non-freezing solutions and one product that is attracting universal attention is manufactured by S. C. Johnson & Son, Racine, Wis., termed "Johnson's Freeze Proof."

This product, like all of Johnson's products, has been carefully tried out by actual experiment. It is claimed that Freeze Proof has no chemical effect upon metal or rubber, that it is non-acid and that if used according to directions there is absolutely no danger of a radiator freezing.

Freeze Proof is bound to be very popular this winter, for the very reason that an extensive advertising campaign is being carried on through popular magazines and widely circulated publications like the Saturday Evening Post, Cosmopolitan, and the American Magazine. The dealers are offered a very attractive proposition and the price is so low that it offers a ready sale to all motorists.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, t CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

OF THE BLACKSMITH AND WHEELWRIGHT, published monthly at New York, N. Y., for October 1st, 1918.

STATE of New York } ss.
COUNTY of New York }

Before me, a notary public in and for the State and county aforesaid, personally appeared F. R. Whitten, who having been duly sworn according to law, deposes and says that he is the business manager of The Blacksmith and Wheelwright, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

NAME OF—

Publisher—M. T. Richardson Company, 71 Murray Street, New York City, N. Y.

Editor—M. T. Richardson, 71 Murray Street, New York City, N. Y.

Managing Editor—M. T. Richardson, 71 Murray Street, New York City, N. Y.

Business Managers—M. T. Richardson, 71 Murray Street, New York City, N. Y.; F. R. Whitten, 41 Pinehurst Avenue, New York City, N. Y.

2. That the owners are:

M. T. Richardson Company, 71 Murray Street, New York City, N. Y.

STOCKHOLDERS—M. T. Richardson, 71 Murray Street, New York City, N. Y.
A. J. Richardson, Ridgewood, N. J.
Mrs. A. Louise Girardeau, Jr., Monticello, Fla.
Mrs. Mildred Ulmer, New Rochelle, N. Y.
Mrs. H. L. Johnston, New Rochelle, N. Y.
W. F. Etherington, 341 Fifth Ave., New York City, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding one per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

M. T. RICHARDSON CO., Publishers,
The Blacksmith & Wheelwright.
F. R. WHITTEN, Business Manager.

Sworn to and subscribed before me this 26th day of September, 1918.

SEAL

ROBERT F. W. SCHMIDT
Notary Public.
(My commission expires March 30th, 1919.)

946 Pages instead of 824 **1918—SEVENTH EDITION** 3362 Illustrations instead of 2000

$3.82 prepaid **DYKE'S AUTO ENCYCLOPEDIA** $3.82 prepaid

Entirely re-written, hundreds of illustrations and many new subjects added. Practically a new book. A non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 90 Instructions—Simplified and Practical.

3362 Illustrations—the kind you understand at a glance.

2 Supplements, part printed in two colors, treating on the construction, operation, repairing and adjusting of the FORD and PACKARD—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.

778 illustrations and 279 pages on Electric Ignition, Electric Starters and Generators, etc.

81 pages and 79 illustrations on the Delco system alone.

60 pages and 254 illustrations on Adjustments, Tests, etc., of leading Electric Systems.

184 pages and 1189 illustrations on Repairing.

Oxy-Acetylene welding. Axle, Differential and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.

27 pages and 186 illustrations on Tires and Tire Repairing.

44 pages and 119 illustrations on Carburetion.

89 pages and 291 illustrations on Engines and Parts.

16 pages on Digest of Troubles.

6000 lines to the Index. This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. Index begins on colored paper, easy to refer to.

Dictionary is also included, which gives the meaning of motoring terms.

Inserts: There are five—printed in colors. New features you never before saw or heard of in one of the inserts.

Additions to the Seventh Edition:

TRUCKS, TRACTORS, MOTORCYCLES, AIRPLANES AND AIRPLANE ENGINES

HOW TO BECOME AN EXPERT AUTOMOBILE MECHANICIAN

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion subject so thoroughly, you can adjust any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

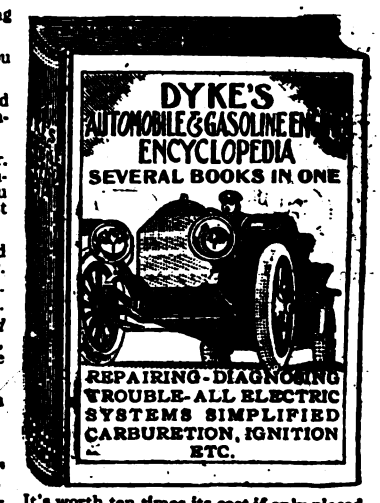
You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical Automobile book in America. Price $3.82, prepaid.

Address all orders to

THE BLACKSMITH & WHEELWRIGHT
73 MURRAY STREET NEW YORK



It's worth ten times its cost if only placed on the shelf and used as a reference.

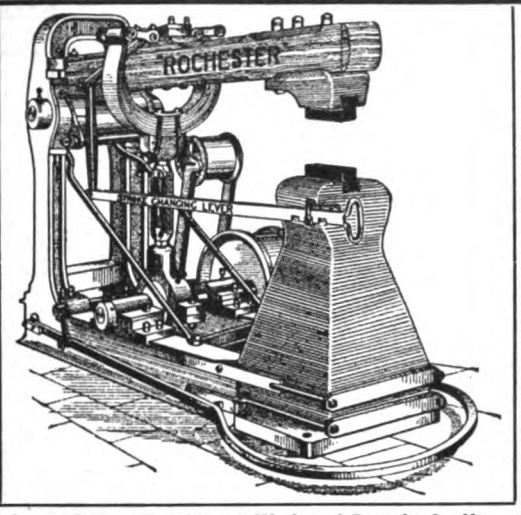
Digitized by Google

ARE YOU LOOKING OUT FOR NO. 1 ?

IF SO YOU ARE INTERESTED IN

THE ROCHESTER HELVE HAMMER

is adjustable for length of stroke while running. The long stroke provides for handling larger work than other hammers of the same head sizes. The Hickory Helves give springy forging blows, combining the advantages of forging and drop hammer.



THE ROCHESTER WEST TIRE SETTER

WEST HYDRAULIC SHELL BANDING MACHINES

Saves Energy. Does Quicker and More Satisfactory Work and Pays for Itself.

SEND A CARD TO THIS ADDRESS FOR OUR CATALOGUE AND PRICES

WEST TIRE SETTER CO.
ROCHESTER, NEW YORK



Free 512 PAGES OF BARGAINS

POST PAID

WE WANT TO SEND YOU THIS 512 PAGE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

Tells how you can work up a profitable auto supply and repair business.

Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories
1117 W. 11th Street, Cleveland, Ohio, U. S. A.



JUST PUBLISHED

AUTOMOBILE WELDING

WITH THE OXY-ACETYLENE FLAME

By M. KEITH DUNHAM

167 Pages. Price $1.00 Fully Illustrated

Sent Postpaid to Any Part of the World.

This is the only complete book on the "Why" and "How" of Welding.

EXPLAINS in a simple manner apparatus to be used, its care, and how to construct necessary shop equipment. Proceeds then to the actual welding of all automobile parts, in a manner understandable by everyone.

Gives principles never to be forgotten. Aluminum, cast iron, steel, copper, brass, bronze and malleable iron are fully treated, as well as a clear explanation of the proper manner to burn the carbon out of the combustion head.

AUTOMOBILE OWNERS, GARAGE AND SERVICE STATIONS, BLACKSMITHS AND MACHINE SHOPS, as well as industries using the oxy-acetylene flame, will find this book of the utmost value, since the perplexing problems arising when metal is heated to a melting point are fully explained and the proper methods to overcome them shown.

CONTENTS

CHAPTER I.—APPARATUS KNOWLEDGE.
Oxygen Supply—Care of Oxygen Cylinder—Acetylene Generator—Care of Generator—Regulators—Care of Regulators—Creeping Regulators—Gauges—Care of Gauges—Welding Torch—Care of Welding Torch—Effects of Heat—Hose and Goggles.

CHAPTER II.—SHOP EQUIPMENT AND INITIAL PROCEDURE.
Preheating Agencies—Welding Table—Location of Welding Outfit—Starting the Welding Outfit—Adjustment of Flame—Principle of Welding—General Welding Knowledge—Welding Rods and Fluxes—Choice of Tip—Expansion and Contraction.

CHAPTER III.—CAST IRON.
Simple Welding—How to Hold the Flame—Hard Cast Iron—Pin Holes and Blow Holes—Lug on Cylinder—Water Outlet—Cylinder Welding—Compression Head—Finishing and Testing—Scored Cylinders—Cylinder Parts—Fly Wheels—Pistons—Crank Cases—Babbitted Bearings—Valve Guides—Preserving Threads—Conclusion of Cast Iron.

CHAPTER IV.—ALUMINUM.
Use of—Welding Knowledge—Puddle System—Flux System—Comparison of Systems—Welding Rod—Preparation of the Weld—Inlet Manifold—Arm of Crank Case—Welding the Arm Without Taking Out the Motor—Break in the Body of Case Welding Cold—Wrong Method of Setting Up—Lug or Boss Welding—Preheating the Case—Gas Preheating Flame—One Side or Both—Collapse of Weld—Broken Bearings—Direction of Welding—Shrinkage Cracks—Missing Parts—Finishing—Die Mould Castings—Body—Other Parts.

CHAPTER V.—STEEL
Welding Knowledge—What the Flame Does to Steel—The Welding Rod—Simple Welding—Position of Flame—Reinforcing the Weld—Frame Welding—Lengthening the Chassis—Tube Housings—Worn Parts—Gear Welding—Case Hardening—Light Metal Welding—Gasoline Tank—Welding Adjacent to Rivets—Shaft Welding—Construction of Parts.

CHAPTER VI.—MALLEABLE IRON COPPER, BRASS, BRONZE.
How to Detect Malleable Iron—Brazing Malleable Iron—Rear Housing—Reinforcing the Braze—Brazing Tube to Housing—Building Up Worn Parts—Copper—Brass and Bronze—Silver Soldering.

CHAPTER VII.—CARBON BURNING AND OTHER USES OF OXYGEN AND ACETYLENE.
Principle of Carbon Burning—Method of Operation—Lead Burning—Soldering—Case Hardening—Heating Uses.

CHAPTER VIII.—HOW TO FIGURE COST OF WELDING.
Oxygen Consumption—Dissolved Acetylene Consumption—Torch Consumption Test—Acetylene Generator Consumption—Cost Card—Conclusion.

ADDRESS ALL ORDERS TO

M. T. RICHARDSON COMPANY, 71-73 Murray St., NEW YORK

THE

SCREW-CUTTING LATHE

How to select, set up, adjust and operate

By JAMES F. HOBART, M. E.

THIS book is a concise and exhaustive treatise on everything pertaining to the SCREW-CUTTING LATHE, including costs, erection, operation and adaptability. It is written by one who thoroughly understands his subject in all its details, and is so copiously illustrated that everything in it will be readily understood.

It will be found invaluable to those desiring to know just how a Screw-Cutting Lathe should be run.

There are *92 illustrations,* and the book is substantially bound in cloth. *Price, $2.00.* A copy will be sent postage prepaid to any address on receipt of price.

M. T. RICHARDSON CO.
PUBLISHERS
71-73 Murray St., New York



Columbian

Vises and Anvils

Malleable Iron, Series 600

Standard Weldless One-Piece Anvil

Forged Steel, Solid Box Leg Vise, Series "X"

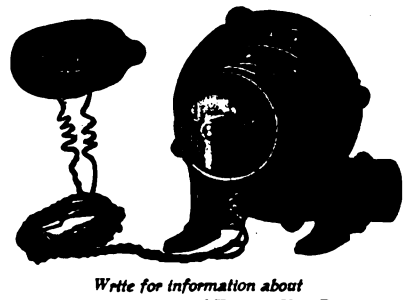
The Columbian Hardware Co.
Manufacturers Cleveland, Ohio

The ROTO ELECTRIC BLOWER ONLY $30.00

SAVE TIME! SAVE MONEY!

It is your patriotic duty to save. Labor is in great demand. Machinery must take its place. Are you still blowing your forge by hand? Do you know that this time is WASTED? Install a ROTO ELECTRIC BLOWER and SAVE this time. It lets your hands free for other work. You will then say, like hundreds of our customers,

I wouldn't sell my ROTO for $100.00 if I couldn't get another.



Buy direct from the makers and save from $10 to $15, the middleman's profit. The Aeronautic Department of the United States Navy uses the ROTO. You can rely on it. Mail the coupon today and try out this time and money saver.

SEND THE COUPON. DO IT NOW.

Write for information about our special cash price of Twenty-Nine Dollars

THE ROSEWATER ELECTRIC CO.
5516 KINSMAN ROAD, CLEVELAND, OHIO

Send me by.....An AIR COOLED ROTO BLOWER with one year's guarantee, complete with cord, plug and Speed Regulator. I will return it to you at the end of 30 days, if it does not give me entire satisfaction, and if I keep it, I will pay you $30.00 at the end of 30 days.

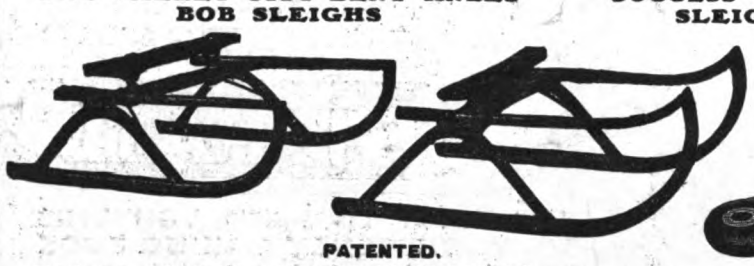
Name.....Address.....

Current.....Voltage.....Cycles.....

Your Electric Light or Power Company Will Give You This Information.

Digitized by Google

THE VALLEY CITY BENT KNEES BOB SLEIGHS



PATENTED.

For pleasure, delivery, express, grocery, or, in fact, any work where a light, strong sleigh is needed.
The strongest, neatest and best Bobs made in the world, in three sizes, for 1⅛, 1¼ and 1½ shoes. These Bobs are all ironed except draw irons and shoes.

Write for further particulars and Price List.

SUCCESS OSCILLATING SLEIGH KNEES



PATENTED.

BEST IN THE WORLD.

TRY SAMPLE SET.

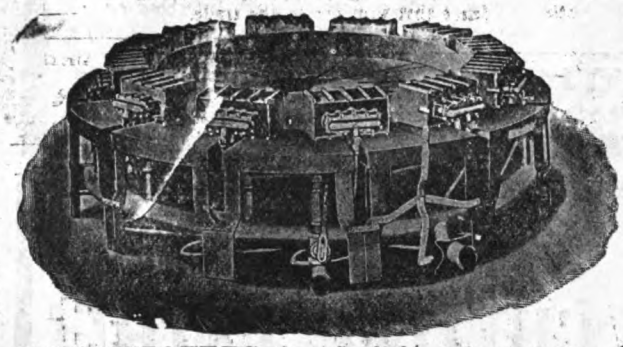
For farm, road, and lumbering Bobs. Made in sizes 1⅛, 1¾, 2, 2½, 3 and 3½ runners.

BROWN'S OSCILLATING SLEIGH KNEES

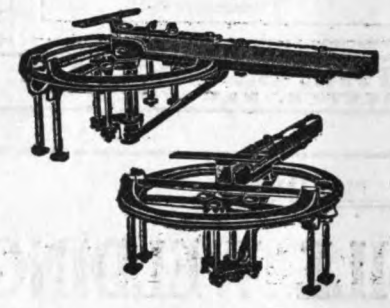


These knees need no recommendation, having been on the market a number of years. They give perfect satisfaction. Sizes, 1¼, 1½, 1¾, 2, 2½, 3, 3½.

SHERWOOD HALL CO., Ltd., Manufacturers, Grand Rapids, Mich.







TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.

OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.

Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE COGEL MFG. CO., TOLEDO, OHIO.

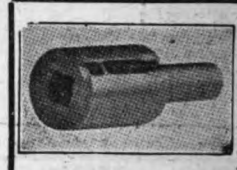
ABSORBINE STOPS LAMENESS



from a Bone Spavin, Ring Bone, Splint, Curb, Side Bone, or similar troubles and gets horse going sound. It acts mildly but quickly and good results are lasting. **Does not blister or remove the hair** and horse can be worked. Page 17 in pamphlet with each bottle tells how. $2.50 a bottle delivered. **Horse Book 9 R free.**

ABSORBINE, JR., the antiseptic liniment for mankind, reduces Painful Swellings, Enlarged Glands, Wens, Bruises, Varicose Veins; heals Sores. Allays Pain. Will tell you more if you write. **$1.25 a bottle at dealers** or delivered. Liberal trial bottle for 10c stamps.

W. F. YOUNG, P. D. F., 55 Temple St., Springfield, Mass.



THE only successful Chuck to hold square taper shank wood bits and drills so you can use them in your drill press. See the spring. It keeps the drills from dropping out of the chuck. Made right. Priced right. If your dealers won't supply you we can.

WHISLER MFG. CO., Gibson, Iowa

What is it worth to you to have a correct list of over 300,000 Business Firms in New England?
You may have just such a list for only $7.50
Write the Sampson & Murdock Co.
246 Summer St., Boston, Mass.
and ask for the New England Business Directory

"GEARS AND WAGONS"

Selle Gears Forty years of success has placed **"Selle Gears"** and Wagons in the hands of the largest wagon users in the world. Express and Transfer Companies, Department Stores, etc., specify **"Selle Gears"** and will take no other after once tried. **230 Page Catalog Free.**

THE AKRON-SELLE CO. Akron, Ohio

THE ARMSTRONG MFG. COMPANY
BRIDGEPORT CONN., U.S.A.
NEW YORK OFFICE 248 CANAL STREET

like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.

"Makers of the Genuine ARMSTRONG Stocks and Dies."

EMPIRE STEEL WHEELS

Plain or Grooved Tire To Fit Any Wagon.

FARM TRUCKS
All Standard Types

Write today for Proposition to Blacksmiths

EMPIRE MFG. CO.
P. O. B. 208
QUINCY, ILL

The Campbell Iron Company

WHOLESALE SUPPLIES

Still carry a complete stock of Wagon, Blacksmith Materials, Farrier Supplies, as well as Tools, Hardware Specialties, and Duplicate Parts for Fords.
Write for New General Catalogue.
817 Cass Avenue St. Louis, Mo.

Get This Car

And The AGENCY For Your Territory
Drive a new 1919 Model Birch Motor Car. Pay for it out of your commissions and make big money on sales. Special offer now. Write quick for Big Free Book and full information. Address Ralph Birchard, Pres.
BIRCH MOTOR CARS, Dept. 1145 **81 E. Madison St., Chicago**

Screw Plates GTD



AUTO REPAIR WORK PAYS

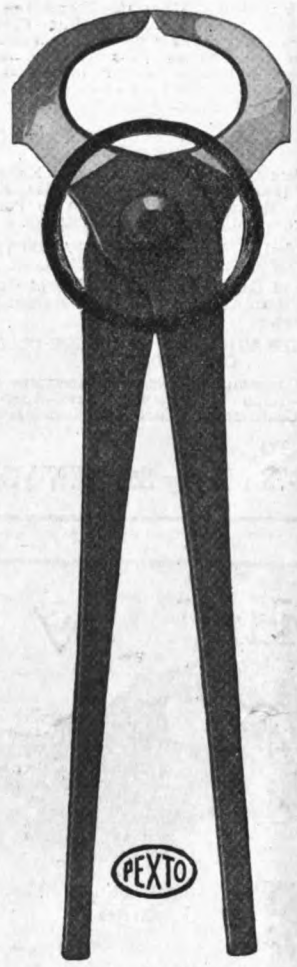
and the blacksmith who has a set of taps and dies is not only prepared to do the thousand and one jobs found in the day's work but he is prepared to take on auto and tractor repair work as well.

COMBINATION SCREW PLATES

contain taps and dies for cutting both U. S. S. and S. A. E. (Automobile) standard threads.

Every Tool Guaranteed. ***Send for Catalog.***

GREENFIELD TAP AND DIE CORPORATION
GREENFIELD, MASSACHUSETTS, U. S. A.
NEW YORK, 28 WARREN ST. -:- CHICAGO, 13 SOUTH CLINTON ST.
DETROIT OFFICE, 74 CONGRESS ST., W.
Canadian Plant, WELLS BROS. CO. of CANADA, LTD., GALT, ONTARIO



The Secret's in the Circle

Put into a pair of Blacksmith's Shoeing Pincers the finest of steel, balance them with painstaking care, design the jaws with the utmost precision and you may still be a long way from making a thoroughly satisfactory tool.

How a pair of Shoeing Pincers performs depends largely upon how accurately the jaws are centered and fitted together.

Pexto Pincers not only meet all other requirements but also this exceedingly important one. That's why they always open easily and open wide. There's no binding or sticking with Pexto Pincers.

One hundred years of tool-making experience are back of every Pexto Blacksmith's Tool. Ask for them by name. If your dealer can't supply you, write us.

The Peck, Stow & Wilcox Co.

Manufacturers Mechanics' Hand Tools, Tinsmiths' and Sheet Metal Workers' Tools and Machines, Builders' and General Hardware.

Southington, Conn. Cleveland, O.

Address all correspondence to 209 W. Center Street, Southington, Conn.

PEXTO
BLACKSMITHS' TOOLS

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

THE NEW YORK PUBLIC LIBRARY

ESTABLISHED 1880 — The Pioneer Journal of its Class

THE BLACKSMITH & WHEELWRIGHT

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U S. Patent Office.

Entered as Second-class Matter March 4, 1880, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Published Monthly.

Vol. LXXVIII. No. 6 — NEW YORK, DECEMBER, 1918 — TERMS: One Dollar a Year. Foreign, $1.50. (6s. 3d.)

Drive "The Capewell" Nail—



the nail which can be driven easiest. It is the safest and most economical nail to drive and is in all respects the most satisfactory.

Used for many years by the leading horseshoers in the vast majority of shops of the United States.

Whether you buy them by the box or the ton Capewell Nails will prove the best investment for you.

Not the Cheapest nail regardless of quality but the world's best at a fair price. Order The Capewell.

The Capewell Horse Nail Co.
Hartford, Conn., U. S. A.

BRANCHES:
New York, Buffalo, Philadelphia, Baltimore, New Orleans, Cincinnati, St. Louis, Detroit, Chicago, Denver, Portland, San Francisco, Toronto

Largest Makers of Horse Nails in the World.



CHASE
DREDNAUT
Motor
Topping

"Defies Time and the Elements"

Write for Particulars — L. C. CHASE & CO., BOSTON — NEW YORK DETROIT SAN FRANCISCO CHICAGO — Write for Samples.

SEND US YOUR NAME and Address and you'll get information worth while regarding this splendid Shear and Punch.



THE MARVEL
A Double Lever Machine.
One man does all the machine is capable of and he faces his work all the time.

ARMSTRONG-BLUM MFG. CO.
340 N. FRANCISCO AVE., CHICAGO, ILL.

STEEL STAMPS
LETTERS and FIGURES
For Marking Your Tools and Your Product
NAME PLATES OF ALL KINDS
S. D. CHILDS & CO.
DEPT. 2
136 S. CLARK ST. CHICAGO

THE TEETH IN
BLACK DIAMOND RASPS
ARE MINGLED
So as to Cut Clean and Free and Leave no Furrows in the Work

Twelve Medals of Award by Jurors



At International Expositions

C. & H. BARNETT COMPANY
Black Diamond File Works, PHILADELPHIA, PA.
Owned and Operated by NICHOLSON FILE CO.
Copy of Catalog sent Free to any interested file users upon application.

EMPIRE STEEL WHEELS



Plain or Grooved Tire To Fit Any Wagon.

FARM TRUCKS
All Standard Types

Write today for Proposition to Blacksmiths

EMPIRE MFG. CO.
P. O. B. 208
QUINCY, ILL.



HORSESHOES
In Stock
Ask for Stock List



ROWE CALKS
Screw and Drive
ROWE CALK & CHAIN CO.
Plantsville, Conn.

AETNA STEEL TOE CALKS
Made by THE AETNA NUT CO., Southington, Conn.
BLACK HORSE BRAND

BEST SHAPE
BEST SPUR
TO DRIVE
BEST STEEL



TOE AND HEEL CALKS

SOLD BY ALL DEALERS

Stokes Bros.' Improved Horse Rasps
Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A.

STEEL STAMPS
BURNING BRANDS
RUBBER STAMPS
STENCILS
GEO. M. NESS, JR.
61 FULTON ST. NEW YORK
Send for price list.



SUREGRIP CALKS
American Calk Co.
DETROIT, - - MICH., MIC

Digitized by Google

FREE

TO BLACKSMITHS

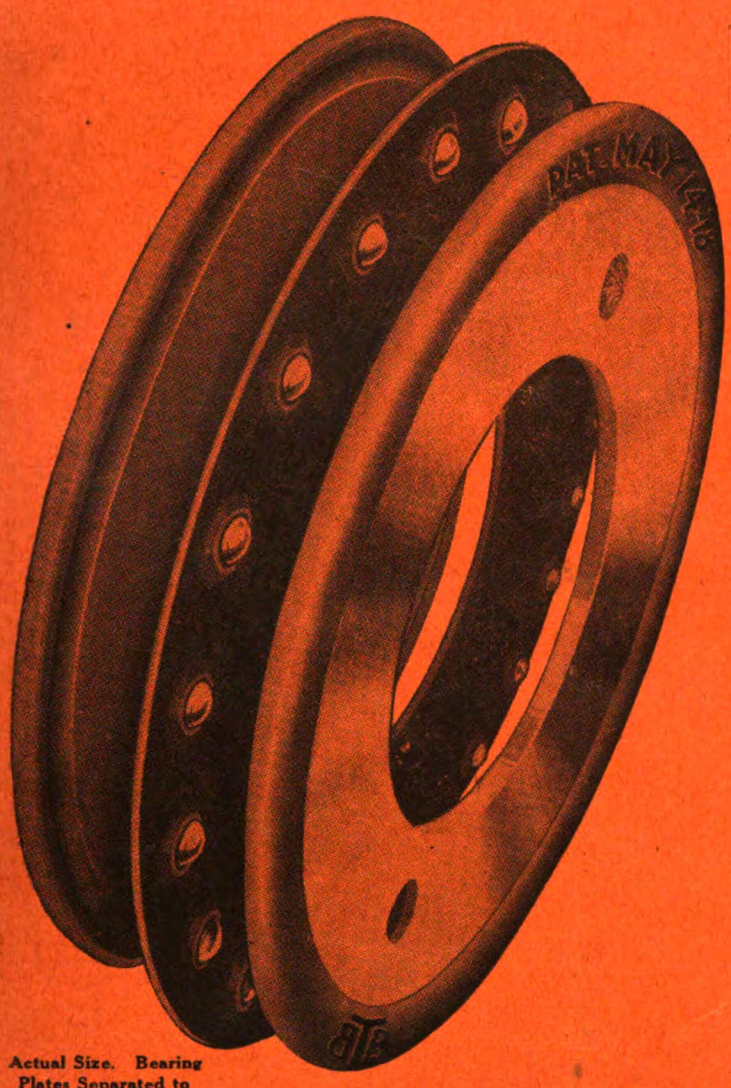
Fill in and mail the coupon opposite and we will send with our compliments a Thrust Washer Gauge for your mechanics—an indispensable shop tool to enable you to tell instantly, before installing, whether or not thrust washers are of correct thickness. Mail the coupon.

Name .....

Address .....

Please send free of charge ( ) gauges.

Geo. D. Bailey Co.
4506 Ravenswood Ave.
Chicago, Ill.



Actual Size. Bearing Plates Separated to Show Ball Retainer.

BAILEY BALL THRUST BEARINGS

Replace Worn Thrust Washers on Fords and Chevrolet 490s

Thrust washers at left of differential have a sliding, friction producing contact—therefore wear thin and cause drive gear and pinion to get out of mesh—resulting in broken gears.

—but the Bailey Ball Thrust bearing with its rolling, frictionless contact, does not wear—hence keeps gears meshed, preventing rear axle trouble and noise. Install Bailey Ball Thrust bearings instead of washers.

Plain washers having a friction creating, sliding contact, instead of a frictionless rolling contact as in a ball bearing, wear with these results:

1- The ring gear and pinion get away from the proper mesh and allow a contact of the teeth at the weakest point. Result is broken gears.

2- The lack of proper meshing of gears causes humming or noise in the axle. Bailey keeps gears meshed—hence no noise or breaks.

3- The friction of plain washers heats the oil and grease to such an extent that the lubrication qualities are destroyed.

4- The fine metal ground away in the wear of plain washers is bound to get into the bearings and hasten the deterioration of such parts.

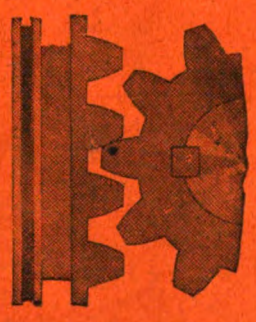
5- When you get the heaviest thrust you get most friction—and friction means loss of power. The Bailey eliminates friction.

6- The Bailey Ball Thrust bearing having highest grade frictionless steel balls must affect a cut in fuel consumption.



With Bailey Ball Thrust

Gear properly meshed—ball bearing stands up under pressure and holds the gears snug. Drive is exerted firmly on strong part of two teeth instead of on one, no noise, no lost power, no jerky "backlash" and no stripping or breaking of gears.



With the Ordinary Washer

Gears partly out of mesh because washers at left side have worn thin due to gear thrust. This results in drive being taken on one tooth only, and on weak part of that tooth—resulting in loss of power, noisy gears, jerky "backlash" and stripping of gears.

The Bailey Ball Thrust is heavily advertised in the Saturday Evening Post and other national magazines. The field for blacksmiths to enjoy profitable returns is unlimited. Practically every jobber in the U. S. and Canada carries this bearing in stock. Blacksmiths everywhere find it little or no trouble to sell car-owners Bailey Ball Thrusts. Don't wait until all Ford owners in your locality have installed Baileys. Get this business now. Wintry weather means harder wear and tear on cars. Write your jobber or us for discounts.

Price, $3.75

MANUFACTURED BY

GEO. D. BAILEY CO.

4506 Ravenswood Avenue CHICAGO, ILL.

SALES DEPARTMENT:

THE BAILEY-DRAKE CO.

1120 S. Michigan Ave. Chicago, Ill.

BRANCHES:

San Francisco Seattle Kansas City Minneapolis Dallas

BAILEY BALL THRUST

Digitized by Google

"F-S" PAINTS



There is a Very Decided Demand for "F-S" Products.

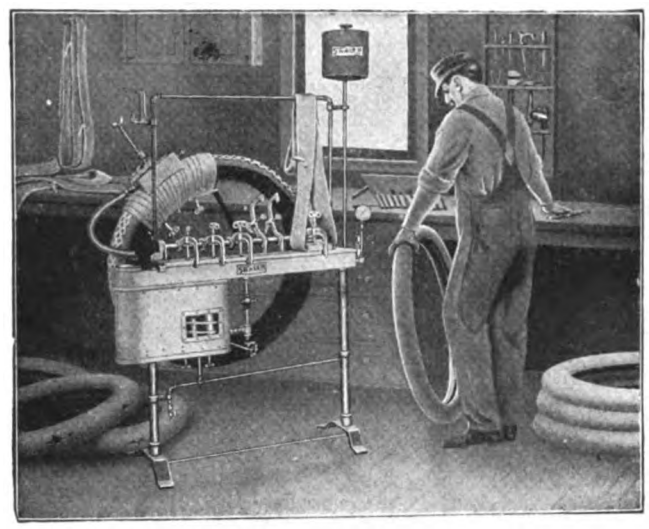
Your skillful painting with "F-S" Coach, Carriage and Automobile Paints will create a decided demand for the work. It will look fine and wear.

FELTON, SIBLEY & CO., Inc.

Manufacturers of Colors, Paints, Varnishes since 1863

136-140 North Fourth Street, Philadelphia

(156)



Make Money Repairing Tires

The high cost and limited supply of tires makes it necessary for motorists to conserve their casings and tubes—to get the maximum mileage. Present conditions offer tire repair men a big opportunity to make money.

Experienced help is not necessary. A boy can learn how to make perfect tire repairs in 30 minutes. Every car owner in your town is a possible customer. Jobs are plentiful, because tires blow out and puncture every day. Motorists are ready to pay liberal prices for repairing punctures, blow-outs, cuts, tears, rim cracks, etc.

SHALER SHOP VULCANIZER

will do as much and as perfect work as the large, expensive vulcanizing outfits which cost from $250 to $500. The price of this Complete Steam Vulcanizing Plant—heated with either gas or gasoline—is remarkably low—$70 subject to Trade Discounts. Outfit shown above is Type N. P. R.—No. 41—other models heated by steam or electricity are described in our catalog.

Write for Catalog

which explains every detail about the SHALER Repair Shop Vulcanizers, the principle of the approved SHALER Wrapped-Tread method of mending casings, and tells about our "Money-Back" Guarantee. Don't delay, write at once.

C. A. Shaler Company

1808 Fourth Avenue **Waupun, Wis., U. S. A.**

(Oldest and Largest Manufacturers of Vulcanizers)

Extract from page 324 of the June, 1917, issue of The Horseshoers' Journal.

Horseshoeing business in Albany opened very quietly this spring. In fact, we still feel the harmful effect that the drive calks has done the business, but strikes in the building line has also effected trade, a large number of horses owned by contractors are remaining unshod, and are still carrying (to May 10th) their winter shoes of drive calk variety.

CHARLES W. KIRK.

ARE YOU *in this boat?*



John Wiseman Says to Bill from Missouri:

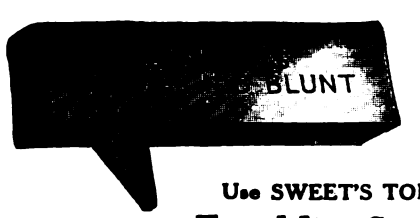


"It's time for a lot of you fellows to wake up. Ram your hand down into your pocket and see if the cash jingles with the merry sound as of yore.

"If not, why not?

"There's a Reason, of course. And that reason is that you've been using calks that the owner can replace himself. Naturally his horses come less frequently to your shop. You have less business—less cash to jingle in your jeans.

"Do you get the idea?"



Every set of welded calks you put on helps to keep your shop full because the horses must be brought to you to have the worn calks replaced. And the users are satisfied users, too.

Use SWEET'S TOE CALKS—"The Cold Cut Dreadnaught."

Franklin Steel Works, JOLIET, ILL. CAMBRIDGE, MASS. HAMILTON, ONTARIO.

No. 2.



ADVANCE OF THE GRAND ARMY

NAPOLEON'S name fills more pages in the world's solemn history than that of any other mortal. The advance of the Grand Army into Russia is the turning point of his career and marks the beginning of his downfall. Mighty armies are once again marching over the same battlefields where Napoleon fought a hundred years ago. All the causes of this mighty struggle may be learned from the pages of history. The one complete, accurate, authoritative and reliable history, containing the rise and fall of every empire, kingdom, principality and power, is the world famed publication,

Ridpath's History of the World

Dr. Ridpath is universally recognized as America's greatest historian. Other men have written histories of one nation or period; Gibbon of Rome, Macaulay of England, Guizot of France, but it remained for Dr. Ridpath to write a history of the **entire World** from the earliest civilization down to the present. We offer the latest edition, 4000 pages, 2000 illustrations, brand new, down to date, beautifully bound in half morocco.

At a Great Sacrifice in Price

We will **name** our **special low price** and **easy terms** of payment only to Blacksmith and Wheelwright readers and in direct letters to all who mail the coupon printed on the lower corner of this advertisement. **Tear off the coupon,** write your name and address plainly and **mail now.** Our **plan of sale** enables you to buy by saving only about ten cents a day for the ensuing year. Mail the coupon now before you forget it. The sample pages are free.

32 Page Booklet Free

We will mail you 32 free sample pages without obligation on your part to buy. These will give you some idea of the splendid illustrations and the wonderfully beautiful style in which the history is written. You can purchase this great history at the **lowest price ever offered** and pay for it in **small sums monthly** if you prefer.

Six Thousand Years of History

Ridpath takes you back to the dawn of history long before the Pyramids of Egypt were built; down through the romantic troubled times of Chaldea's grandeur and Assyria's magnificence; of Babylonia's wealth and luxury; of Greek and Roman splendor; of Mohammedan culture and refinement; to the dawn of yesterday. He covers **every race, every nation, every time** and holds you spellbound by his wonderful eloquence. **Mail the coupon.**

Western Newspaper Association



FOLD HERE, TEAR OUT, SIGN AND MAIL

10 18 FREE COUPON

Western Newspaper Association
H. E. Sever, Pres.
140 So. Dearborn St.,
Chicago, Ill.

Please mail 32 free sample pages of Ridpath's History of the World, containing photogravures of Napoleon, Cæsar and other great characters in history, and write me all particulars of your special offer to The Blacksmith and Wheelwright readers.

Name .....

Address .....

CHICAGO — Mail this Coupon

Digitized by Google

STERLING
HOOF PADS and PROTECTORS

Made with our patented composition fibre, are not offered as a substitute for leather because they cost less, but because they are better. They last longer, do not swell, shrink, or get soggy. They are better for the horse's hoofs and give absolute satisfaction to the shoer's most particular trade.

Sterling Pads and Protectors

are sold only through the regular jobbing trade, but to any horseshoer who has not tried them we will send a single sample pair at about half price.

Send 50 cents and the name of your dealer, or jobber, and we will mail you one pair of No. 4-5 or 6 pads.

Send 10 cents and we will mail one pair of 4-5 or 6 protectors.

STERLING TIRE CORPORATION
Rutherford, New Jersey

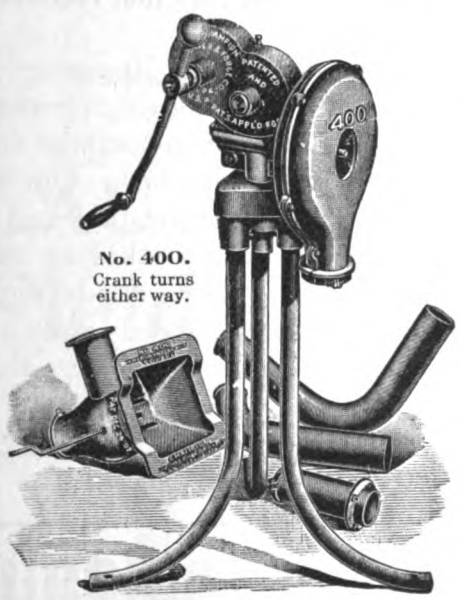
Sterling Tires
are the highest grade, longest wearing automobile tires. They are guaranteed 5,000 and 6,000 miles, and average very much more. Over 90% of them are in use on commercial cars where service is hardest and where accurately kept records prove that they cost less per mile than others. We have a very attractive dealer's proposition.

Digitized by Google

THE FAMOUS CHAMPION BLACKSMITH TOOLS

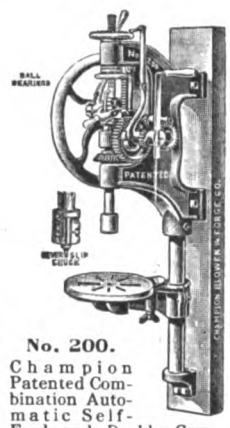
CHAMPION BLACKSMITH TOOLS HELPED TO WIN THE WAR



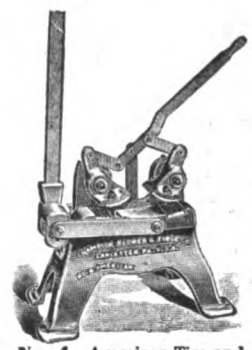


No. 400. Crank turns either way.

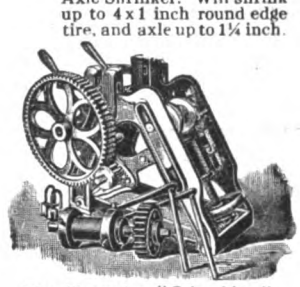
FAMOUS 400



No. 200. Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



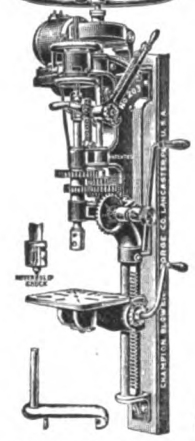
No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



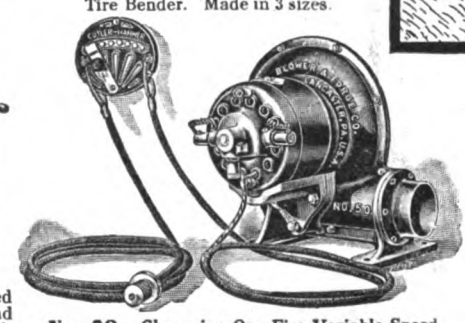
The Champion "Columbian" Tire Bender. Made in 3 sizes.



No. 408. Steel Blacksmith's Forge.



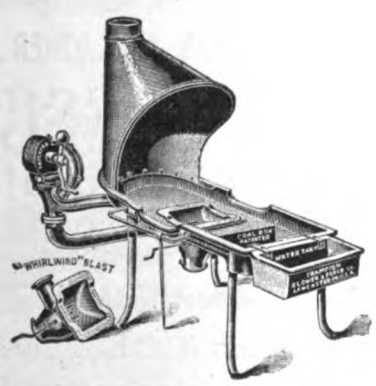
No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.



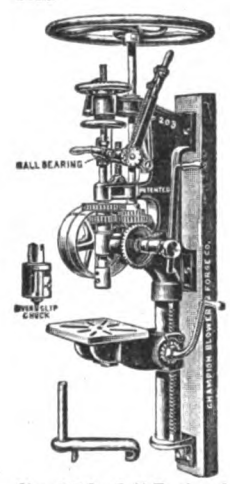
No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower.

Don't Fail to Get Our 1918 Catalog

Before purchasing a Hand Blower Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



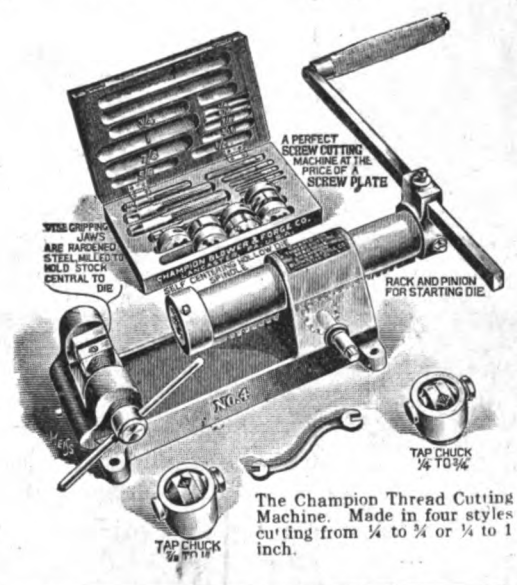
No, 433. Cast Iron Blacksmith's Forge



No. 203. Self-Feed and Double Compound Lever Feed Drill.



Hercules Patented Power Hammer. Weight of ram, 65 pounds.



The Champion Thread Cutting Machine. Made in four styles cutting from ¼ to ¾ or ¼ to 1 inch.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

Digitized by Google

INDIAN CHIEF
Black-smiths' VISES Horse-shoers'



BOKER CUTLERY & HARDWARE CO., Inc.
Sole Sales Agents
101-103 Duane Street, New York City

Solid Box — Solid steel drop forged jaws faced with crucible tool steel. Improved screw of one piece of forged steel. Built right, throughout.

THE COLUMBUS FORGE & IRON CO., COLUMBUS, OHIO.

C. C. BRADLEY & SON, Inc., Syracuse, N.Y.

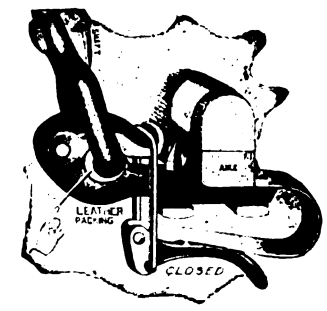
MANUFACTURERS OF

THE BRADLEY BALL BEARING SHAFT COUPLING



OPEN

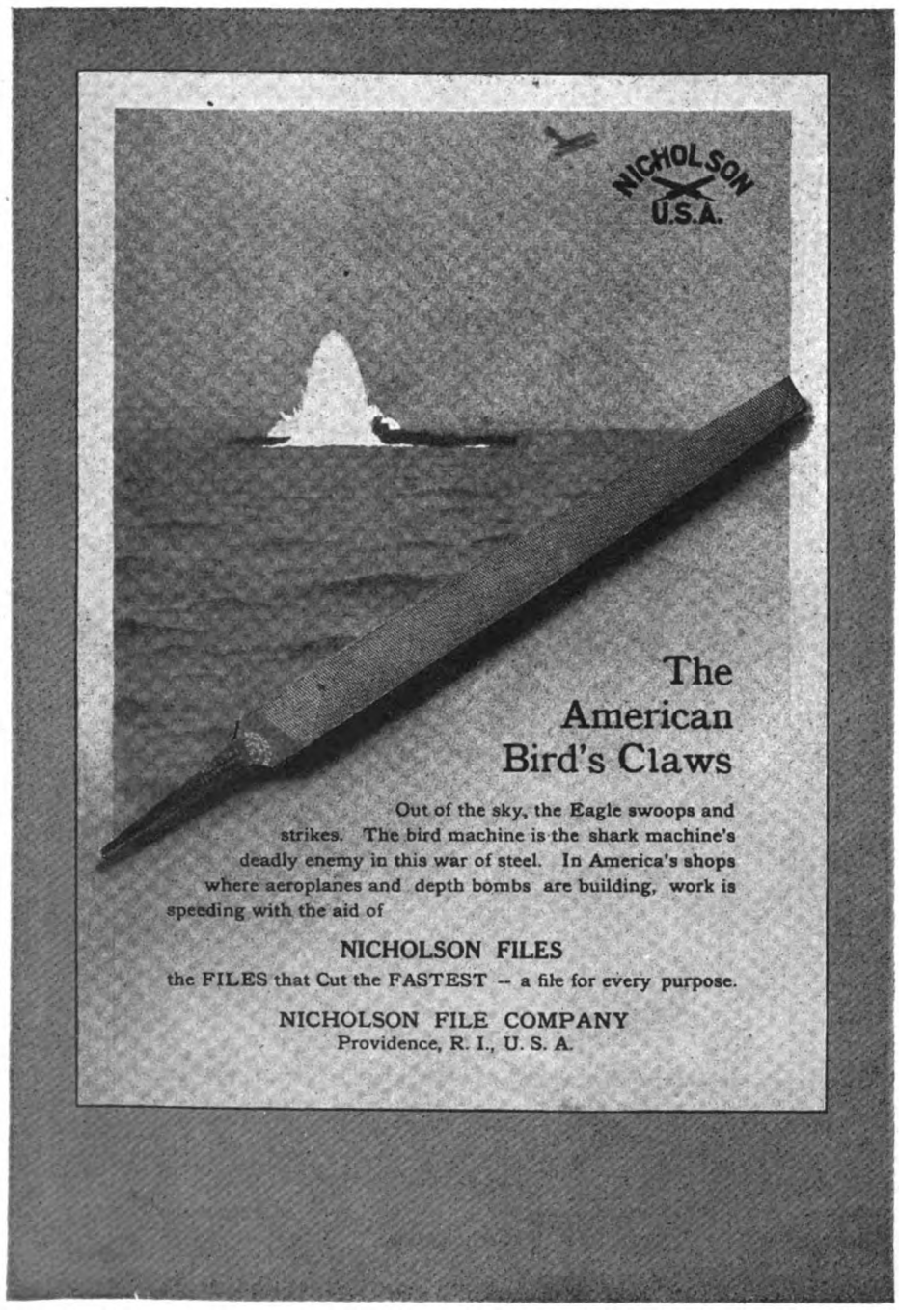
ALL STEEL
ALL RIGHT
ALL THE TIME



CLOSED

Quick as a wink. Silent as the grave. Change from Shafts to Pole in 10 Seconds. One hand the only tool required.

The Bradley has been on the market 20 years. There are more than a million pairs in use and giving perfect satisfaction. They are made of STEEL drop forgings and will outwear any vehicle to which they are attached. Our Spherical Leather Bushing or Packing is self-lubricating and wears indefinitely. The SPRING automatically takes up all wear until packing is worn out. A new packing can be put in by anyone, its cost is a few cents, all the wear comes on the packing. The Bradley Shaft Coupling is the best that can be had regardless of price.



The American Bird's Claws

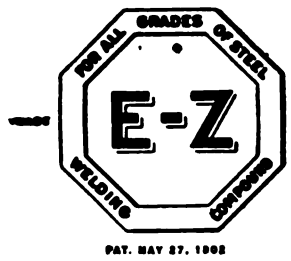
Out of the sky, the Eagle swoops and strikes. The bird machine is the shark machine's deadly enemy in this war of steel. In America's shops where aeroplanes and depth bombs are building, work is speeding with the aid of

NICHOLSON FILES

the FILES that Cut the FASTEST -- a file for every purpose.

NICHOLSON FILE COMPANY
Providence, R. I., U. S. A.

"E-Z" WELDING COMPOUND



PAT. MAY 27, 1902

is the best **BECAUSE**

It works Equally good on all Kinds of steel.

It welds at **lower heat** than any other.

It **sticks** to metal at a **very low** heat.

It leaves **no scale.**

USE IT ONCE AND YOU WILL ALWAYS WANT IT

Crescent Welding Compound

MAKES SMOOTHER WELDS THAN ANY OTHER

It is fine for plow work or where parts are fastened together before welding, or for making split welds, finishing heats, or for welding under dies, etc., etc.

CRESCENT WELDING COMPOUND TRADE MARK

It insures smooth finish and perfect welds on Toe Calks.

"Money back" from any jobber if "E-Z" or Crescent does not give perfect results.

We will send samples free of charge.

MADE ONLY BY

Anti-Borax Compound Co.

FT. WAYNE, IND.

Digitized by Google

SEND FOR THIS FREE BOOK—

which shows the blacksmith how to get into the business of building motor trucks.



WE'RE not going to tell the story here—it's too big and too important. But in "The New Way To Sell Truck Units" you'll find the whole plan worked out in detail—exactly what to do and how to do it—even down to the financing.

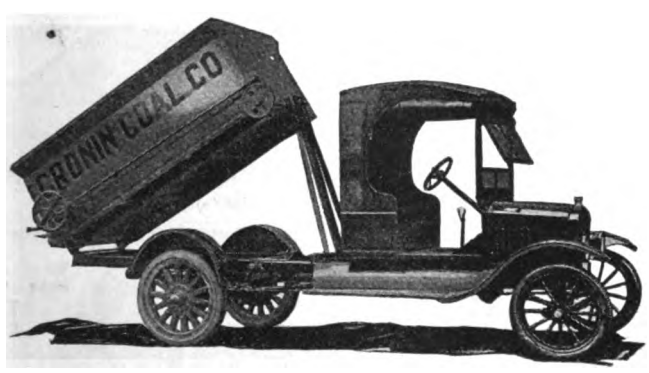
This book is built on facts—it tells what a hundred other men have done—how they have built big, successful businesses around the Lauton Truck Unit. It will open your eyes.

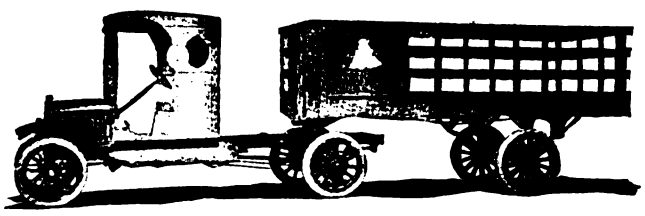
Thousands of dealers have sold truck attachments of various kinds. Many have made large profits. But in 99% of the cases the dealer has had the wrong slant on the unit proposition.

This book will give you a new vision, a new conception of the money making possibilities of the right kind of truck unit, backed by the right kind of practical sales methods.

LAUTON TRUCK UNITS Open Up A New Field of Profit for the Blacksmith.







THE Lauton Unit opens up a wider opportunity for profit than any other truck making attachment. That's why the Lauton plan is possible.

You couldn't take the Lauton plan and some other attachment and make a success of the combination.

But with the Lauton Truck Unit, with its advanced engineering, its adaptability, its sterling quality, you have a foundation on which to build for big profits and permanent business.

We can sell all the Lauton Truck Units we can make—no doubt about that. And you can sell all the Lauton Units we deliver to you, even without the help of the Lauton plan.

But with the plan you do a bigger business, you sell on a better basis and you build for the future. We in turn get a dealer organization that is successful and permanent and that is what we want. We are thinking of next year and 1920, and 1921.

What to sell is your immediate problem. The Lauton Truck Unit selling plan is an immediate answer. It's the answer you've been looking for because it brings real volume of sales. It isn't a plan to help you merely exist—it's a plan for a big, new business as large as, or even larger than you have ever had.

There's only one sensible course open to you as a good business man—to get the facts down to the last detail. Whether you are in a big city or a little one, or in a rural community, the Lauton sales plan is practical and profitable.

Experienced, energetic, successful passenger car and motor truck dealers, blacksmiths and tractor men are desired as Lauton dealers. In writing please state briefly your present business, if you are now selling truck attachments, and any other facts indicative of your standing in the community.

Write now—while the matter is fresh in your mind.

THE LAUTON TRUCK COMPANY

General Sales Office, 562 Grand River Avenue, Detroit, Mich.

FACTORY AT YONGSTOWN, OHIO.

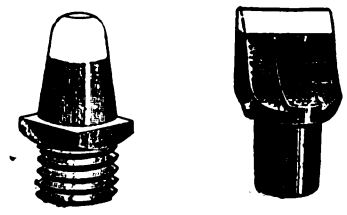
Digitized by Google

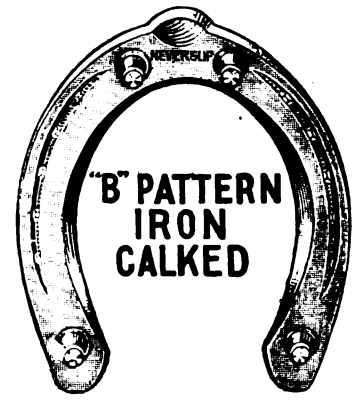


Get Ready
For Icy, Sleety Weather

RED TIP CALKS — HORSE AND MULE SHOES







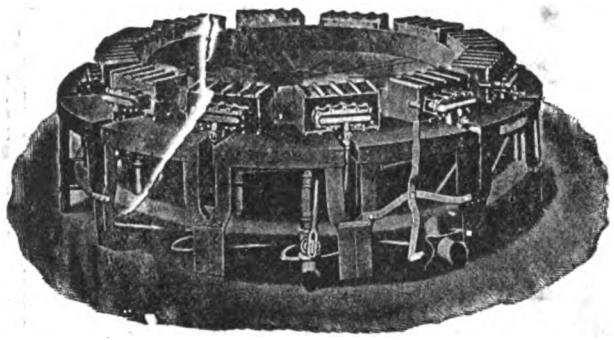
Order Now

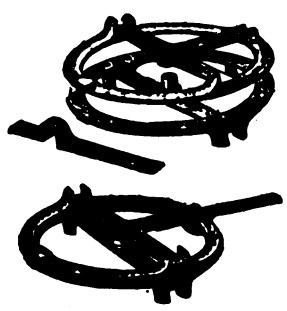
REMEMBER THE NEVERSLIP

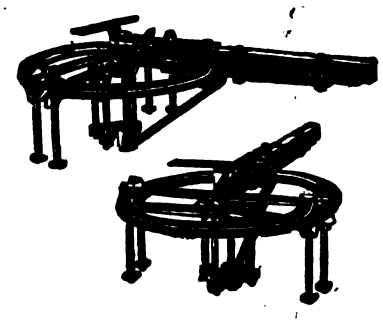
Line embraces all styles of Screw Calks, Iron, Steel and Extra Light Steel Shoes, Drilled or Calked; Drive Calks, Sharp or Blunt, Driving, Draft and Mule Shoes, and all necessary tools.

THE ONLY COMPLETE LINE

THE NEVERSLIP WORKS New Brunswick, N. J.







TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.

OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.

Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE COCEL MFC. CO., TOLEDO, OHIO.

Edwards Shears

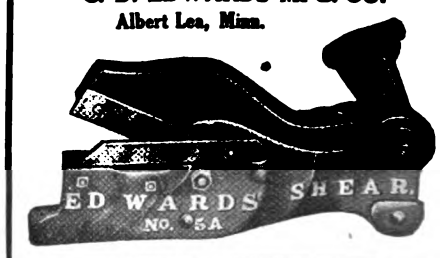
For twenty-four years the Two Leading Low Priced Shears in the U. S., representing the Greatest Value for the Least Money.

No. 5, weighs 200 lbs., cuts 4x¼ inch soft steel.
No. 10, weighs 430 lbs., cuts 4x¾ inch soft steel.

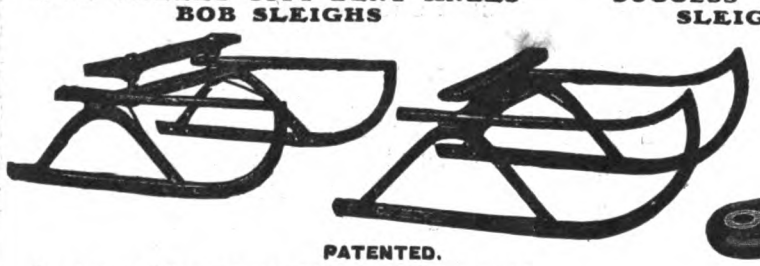
At their price you should have had one long ago. Order one from the first iron man that calls on you. They All Sell Them.

Write for descriptive circular and prices.

C. D. EDWARDS MFG. CO.
Albert Lea, Minn.



THE VALLEY CITY BENT KNEES BOB SLEIGHS



PATENTED.

For pleasure, delivery, express, grocery, or, in fact, any work where a light, strong sleigh is needed.

The strongest, neatest and best Bobs made in the world, in three sizes, for 1¼, 1¼ and 1½ shoes. These Bobs are all ironed except draw irons and shoes.

Write for further particulars and Price List.

SUCCESS OSCILLATING SLEIGH KNEES



PATENTED.

BEST IN THE WORLD.

TRY SAMPLE SET.

For farm, road, and lumbering Bobs. Made in sizes 1¼, 1¾, 2, 2½, 3 and 3½ runners.

BROWN'S OSCILLATING SLEIGH KNEES



These knees need no recommendation, having been on the market a number of years. They give perfect satisfaction. Sizes, 1¼, 1½, 1¾, 2, 2½, 3, 3½.

SHERWOOD HALL CO., Ltd., Manufacturers, Grand Rapids, Mich.

We Make **STEEL WHEELS**
To Fit Any Axle
Plain or Grooved Tire

Steel or Hickory Axles
Any Size
A Full Line of Wood and Steel

Farm Trucks
With Steel or Wood Wheels

Write for Large Catalog and Prices



Our Grooved Tire

ELECTRIC WHEEL CO.
Box N, Quincy, Ill.

WELDING PLANTS, $25.00 to $300.00

Designed for all purposes. Small cash payment; balance, three to six months. Every mechanic and shop should have one.

BERTSCHY-BERMO CO. OMAHA, U. S. A.

ATTENTION, BLACKSMITHS!

BE SURE IT'S A SUPERIOR Welding and Cutting Outfit you purchase. ACETYLENE GENERATORS. Welding Supplies. Price Popular. Service Immediate. Quality Superior. Write for catalog and price list. Agents wanted.

SUPERIOR OXY-ACETYLENE MACHINE CO.
Manufacturers of Everything for the Welder
HAMILTON, OHIO



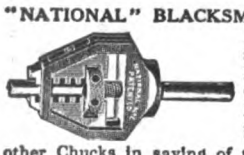
ABSORBINE
TRADE MARK REG. U.S. PAT. OFF.

Reduces Bursal Enlargements, Thickened, Swollen Tissues, Curbs, Filled Tendons, Soreness from Bruises or Strains; stops Spavin Lameness, allays pain. Does not blister, remove the hair or lay up the horse. $2.50 a bottle at druggists or delivered. Book 1 R free.

ABSORBINE, JR., for mankind—an antiseptic liniment for bruises, cuts, wounds, strains, painful, swollen veins or glands. It heals and soothes. $1.25 a bottle at druggists or postpaid. Will tell you more if you write. Made in the U. S. A. by

W. F. YOUNG, P. D. F., 55 Temple St., Springfield, Mass.

"NATIONAL" BLACKSMITHS' DRILL CHUCK



Made especially for Blacksmithing and Carriage Work.

Positive, durable, strongest, self-cleaning, always works, quickest to change Drills, casts no shadow, will save its cost over other Chucks in saving of time. BUY THE BEST. Money refunded if not as represented. Ask your jobber for it, or send direct for prices and circular.

ONEIDA NATIONAL CHUCK CO., Oneida, N. Y.

PATENTS

C. L. PARKER
Ex-Member Examining Corps, U. S. Patent Office
Attorney-at-Law and Solicitor of Patents

American and foreign Patents secured. Trade marks registered. Searches made to determine patentability, validity and infringement. Patent suits conducted. Pamphlet of instructions sent upon request.

McGill Building WASHINGTON, D. C.

THE WOOD WORKER'S FRIEND



Wood stock and lumber are high. With our Jointer Heads you can buy rough lumber of any kind and dress it to suit your job. Saves time, money and lumber. Would this be any object to you? If so, get circulars and prices. Sold on 30 days' trial. Mfd. by

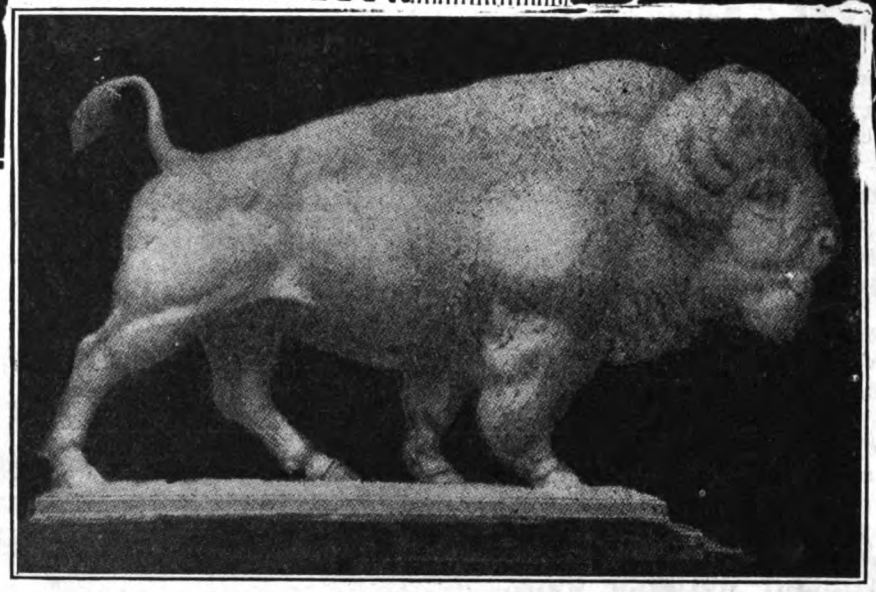
Whisler Mfg. Co., Gibson, Iowa

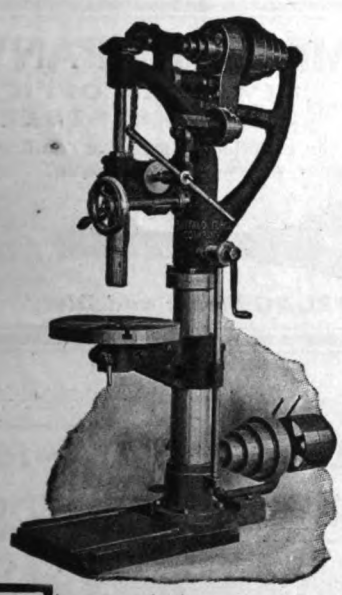
Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

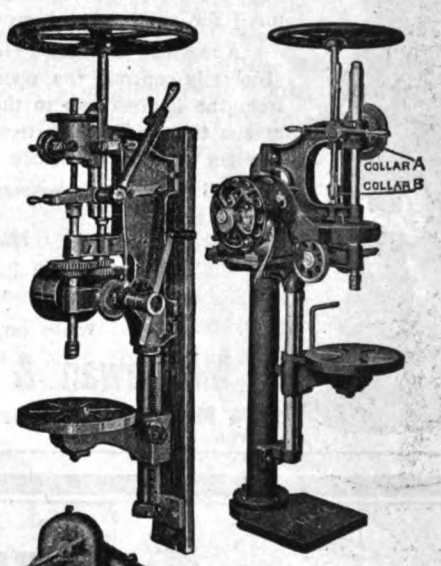
Digitized by Google

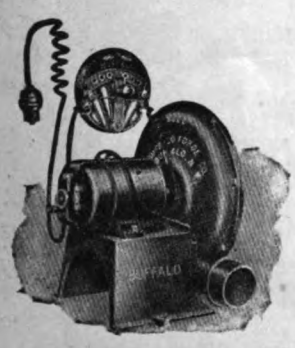
THAT'S THE SIGN OF THE BEST BLACKSMITH SHOP EQUIPMENT MADE













Modern Shop Efficiency

Blacksmiths and Garagemen are determined to have the best that may be had in Blacksmith Shop Equipment.

The work of the modern shop demands modern efficient tools—tools that will stand up under severe service.

Forges; electric blowers; drills—floor and post type; shears—for cutting angles, bars and sheets—and of every size from the little bench type hand power shear to the heaviest power shear made—these are the tools you should know about.

Write Dept. 6 for Catalog

Buffalo Forge Company - Buffalo, N. Y.

"Buffalo"

Digitized by Google

LINDE OXYGEN

From Coast to Coast 65 Producing Plants and Distributing Stations provide an unlimited supply of Linde Oxygen for users everywhere.

LINDE SERVICE means no investment except for oxygen actually received—no expensive overhead or upkeep charges.

Linde Oxygen may be obtained from any of the following Linde Plants and Distributing Stations where a large suppply of charged 100 to 200 cu. ft. cylinders is kept on hand constantly to insure immediate shipments.

Mail or telephone your order to THE LINDE AIR PRODUCTS CO., at the nearest point. Shipments will be made on day order is received.

PRODUCING PLANTS AND WAREHOUSES

Alabama
*Birmingham
10th Ave. & 28th St.
California
*Emeryville, Oakland
*Los Angeles
1416 Mission Road
Colorado
*Denver
S. B'way & Exposition Ave.
Connecticut
Hartford
1095 Main Street
District of Columbia
Washington
9th & Maryland Ave., S. W.
Georgia
*Alanta
Plyant St & Southern R. R.
Savannah
OgeecheeCanal, So. of BaySt.
Illinois
*Chicago
3633 Wall Street
East St. Louis
6th & Walnut Ave.
Peoria
721-731 So. Washington St.
Indiana
*East Chicago
S.E.Cor. Kennedy & 145th St.
Fort Wayne
414 E. Columbia Street
*Indianapolis
2819 Roosevelt Ave.
Iowa
Davenport
118 Harrison Street
Des Moines
117 W. 5th Street
Kansas
Wichita
Rock Island Ave. & 2nd St.
Kentucky
Louisville
126 East Main St.
Louisiana
New Orleans
861 Fulton Street
Maryland
*Baltimore
25th & Montebello Ave.
Massachusetts
Cambridge
25 Waverly Street
Springfield
Napier Street
*Worcester
961 Southbridge St.
Michigan
*Detroit
St. Aubin Ave. & Newton St.
Grand Rapids
Pearl Street by the Bridge
Minnesota
Duluth
Seventh Ave., West
*Minneapolis
1809 Hennepin Ave.
Missouri
*North Kansas City
14th & Charlotte St.
*St. Louis
4218 Forest Park Blvd.
Nebraska
Omaha
1007 Jones Street
New Jersey
*Elizabeth
Linden Ave.
Newark
354 Plane Street
New York
Albany
Montgomery & Colonie Sts.
*Brooklyn
475 Driggs Ave.
*Buffalo
155-183 Chandler St.
*Utica
Walnut & Schuyler Sts.
Ohio
*Cleveland
802 East 72nd Street
*Cincinnati
Stanton & Mellish Aves.
Columbus
310 Dublin Ave.
Dayton
521 E. First Street
Lima
338 East High Street
Ohio
Toledo
441 South Erie Street
*Youngstown
601-621 Jones Street
Oklahoma
Oklahoma City
27 E. Grand Ave.
Tulsa
1 North Boulder St
Oregon
Portland
15th & Hoyt Streets
Pennsylvania
Erie
1502 Sassafras Street
*Norristown
*No. Philadelphia
18th & Cambria Streets
Pittsburgh
16th & Pike Streets
*Trafford
Tennessee
Chattanooga
212-238 King Street
Memphis
203 Washington St.
Texas
*Dallas
Harwood and Coombs St.
Houston
Cedar & Baker Sts.
San Antonio
512 Dolorosa St.
Utah
Salt Lake City
112 West Second St., South
Virginia
Richmond
1709 E. Carey Street
Washington
*Seattle
Henrietta St. & 8th Ave., So.
Spokane
121-123 S. Madison St.
Wisconsin
Manitowoc
810 Quay Street
*Milwaukee
38th St. & Nationa. Ave.

(Star) * Designates Plants.

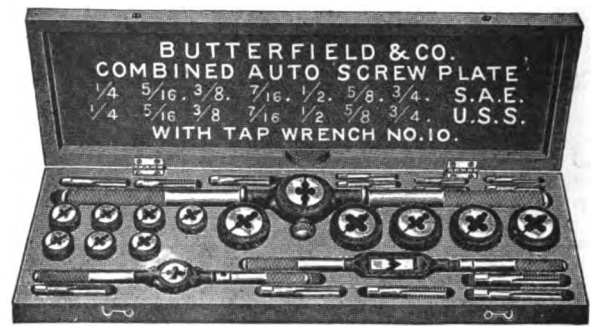
Other Plants and Distributing Stations are planned for other industrial centers throughout the country and will be established as fast as and wherever the local demand for oxygen warrants.

THE LINDE AIR PRODUCTS COMPANY

Largest Producers of Pure Oxygen in America

Forty-Second St. Building NEW YORK

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assertment

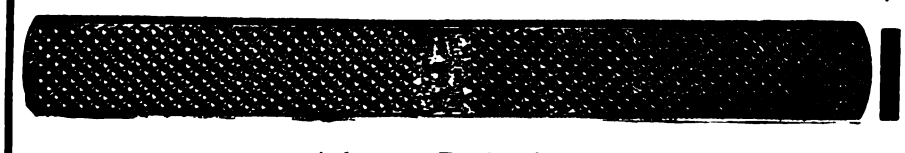
No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.
New York Store: 126 Chambers Street

The Horse Rasp of Quality



Ask your Dealer for the

IMPROVED HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, **"Slim," "Light," "Slim Light"** and **"Fine Cut."** Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial. New catalogue mailed free on application.

HELLER BROTHERS CO. *Established in 1836* **Newark, N. J.**

The Perfect Power Hammer



Note the difference in construction over other makes:

Extra Long Guides, insuring a direct movement of the ram without any side motion, which causes guides and springs to break on other Hammers.

The only Hammer made with a disk attachment with special anvil for sharpening harrow and plow disks.

A recently invented **Friction Clutch** fitted with **Ball Bearings,** absolutely controls the operation of the Hammer by foot pressure from the lightest tap to the heaviest blow. This ease of operation makes the Hammer particularly well adapted for plow work, as you can get as light a stroke as you desire.

Will ship to any responsible party on approval. If not as represented, no sale.

Made in two sizes:

3 inch square, 40 lb. ram—shipping weight, 1,150 lbs.
4 " " 80 " " " " 1,800 "

Write any jobber for prices, or

Macgowan & Finigan Cordage Co.,

204 North Third St., ST. LOUIS, MO

THE ARMSTRONG MFG. COMPANY

BRIDGEPORT CONN., U.S.A.
NEW YORK OFFICE 248 CANAL STREET

like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



"Makers of the Genuine ARMSTRONG Stocks and Dies."



FERRO CASE

For Case-Hardening

Is Something You Have Been Looking For

A NON-poisonous chemical that is used by sprinkling upon the red-hot steel, or in a cyanide melting furnace, same as cyanide has formerly been used.

Consumers, large and small, have used Ferro Case for years. So will you, after a trial.

Today is the Time to Write for Prices and Your Dealer's Name Will be Appreciated.

C. G. BUCHANAN CHEMICAL CO.

Makers of Industrial Chemicals and the only makers of Ferro Case

120 East Pearl Street - - - - Cincinnati, Ohio

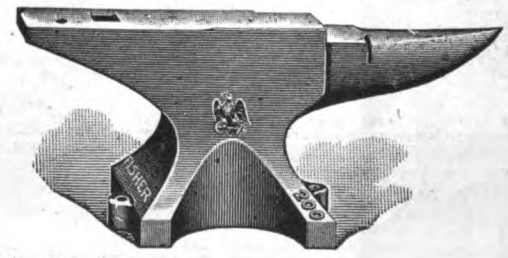
1843 # EAGLE ANVILS 1918

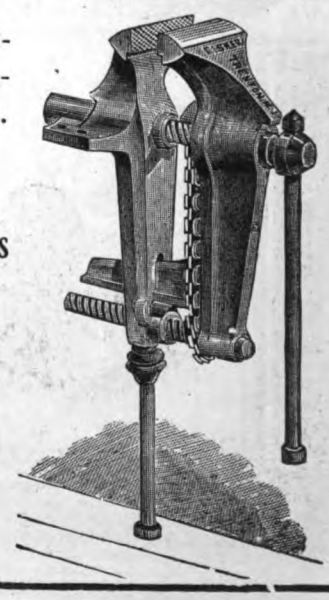
AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE
BLACKSMITH AND WHEELWRIGHT

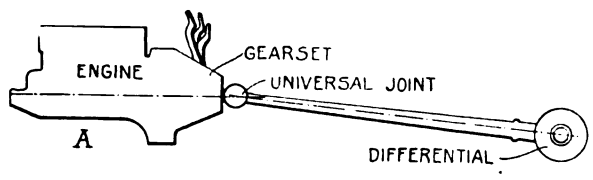
Vol. LXXVIII. No. 6. NEW YORK, DECEMBER, 1918. TERMS ONE DOLLAR A YEAR

Design, Construction, Operation and Repair of Automobiles and Motor Vehicles

Part XI—Why a Universal Joint Is Necessary, Its Construction, the Reason For Torque and Radius Rods, and the Differential

Practically every one, who has never thought the matter over, has an idea that the most important part of an automobile is the engine, and to a certain extent this is true, but there are many things between the engine and the rear axle. As far as we have gone, power has been transmitted from the engine through the clutch and the gear-set, and if this unit is attached to the engine or located amidships, as far as we are concerned, the power has been transmitted in a straight line.

The power plant, consisting of the engine, the clutch and the gear-set, is usually located high upon the frame of the car, and is never in line with the center of the rear axle. Therefore, we must adopt some means whereby we can alter the direction of the



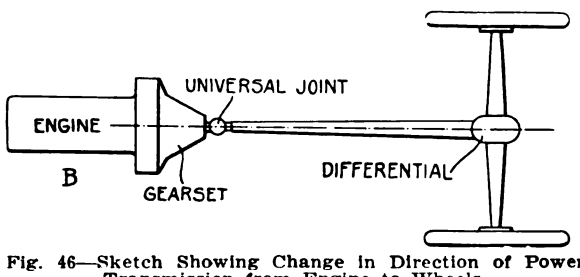


Fig. 46—Sketch Showing Change in Direction of Power Transmission from Engine to Wheels.

power from a line parallel with the ground as shown in figure 46 at A, to the center of the rear axle.

The connecting shaft or the connecting link between the transmission gear-set and the rear axle is usually termed the propeller shaft, and as there is a sharp bend in the power line at the rear of the gear-set at that point, some sort of a double hinge must be provided. This device is termed, in automobile vernacular, as a universal joint. It is really as we have described it—a double hinge. There are many forms of universal joints.

In figure 47 are shown two types of universal joints. The second, at B, is known as the cross and ring type, and is very simple in construction. It consists of two Y-shaped members—one of which fastenes directly to the gear-set shaft—the other to the propeller shaft. These are placed with the tops of the Y's together, and the points of the Y's 90 degrees apart. The points of the Y's are held in place by a ring usually made in halves, either riveted or bolted together.

The type of joint shown at A is even more simple than that shown at B. In this case the ring is left out, and the Y-shaped members fit directly upon the cross, which is termed the spider. As a general rule, joints of this type are fitted with bronze bushings, so that in case of wear they may be repaired very easily without taking the joint from the car.

In figure 48 are shown two more types of universals. The one shown at A is nothing more or less than a slide in which a T-shaped member is fitted. The casting, which is circular in form, is bolted to the driving shaft of the gear-set and entirely surrounds the joint. Across the diameter of this casting are cut two grooves, and into these grooves is fitted a T-shaped forging which connects directly to the propeller shaft. Both studs at the top of the T are fitted with small round balls so that this joint may be repaired rather than be removed in case of wear.

A joint illustrated in figure 48 at B is very popular among the car manufacturers. It is a combination of a number of types, and is simple in construction but very efficient. There are three parts to it—the circular member is bolted to the transmission shaft, the cross fits into it at two points and leaves the other two points upon which are mounted the Y-shaped member which attaches to the propeller shaft. These universal joints may be found at any point where there is a change in the direction of power transmission.

One or More Universals.

In many cases where gear-sets are located amidships, that is, separate from the engine, one or more universal joints may be interposed between the engine and the gear-set. Between the gear-set and the rear axle may be found one or two universal joints. If there are two, one is placed at the rear of the gear-set, while the other is placed at the opposite end of the propeller shaft where it is connected to the pinion gear in the differential.

One should realize that the universal joint carries all of the power from the engine: It is a moving member, and each hinge moves back and forth at every revolution of the shaft. Consequently, it requires a great deal of lubrication. It cannot be left open because it will soon collect dust and grit and be destroyed.

There are two general methods of protecting the joint from dirt. The first is to enclose it with a boot of leather, while the second is to build round it a thin sheet-iron housing. This boot or case must be kept oil-tight, or the lubricant will leak from it. Therefore, in replacing the universal joint always be sure that the housing is tightly fitted in its place. Wherever there is a change in the line of power transmission, there is bound to be a certain amount of whip, as it is termed, unless the joints and bearings are absolutely tight. For this reason a worn universal joint or a joint that is not tightly fitted to the shaft will cause considerable racking of the car and engine.

Not only is there a change of direction in the power line downward, but in order to transfer the power to the wheels in the ordinary automobile there is a change in the differential of the power at right angle, as shown in figure 46 at B. This change at right angles means that the rear axle is always subjected to a twisting motion in two directions.

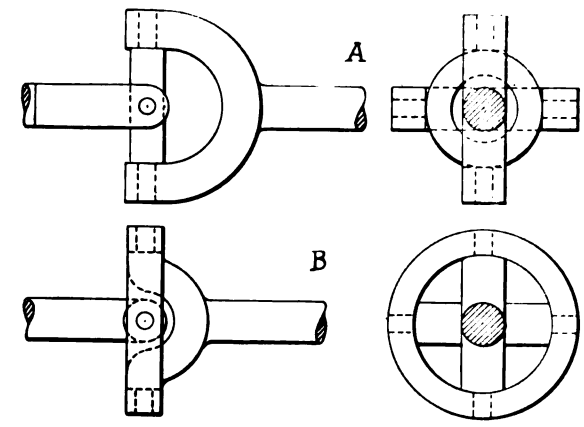


Fig. 47—Two Types of Universal Joints.

First there is a tendency to twist the car over to one side, that is, to lift one wheel from the ground. The springs of the car take care of this tendency. The other tendency, however, is to twist the rear axle upward at the front and downward at the rear—just the reverse of the power required to twist the wheels and carry the car forward. For this reason some means must be adopted for anchoring the rear axle housing so that it will not strain the springs in a direction in which they cannot take up the shock properly. For this purpose rods called "torque rods" are used. Another term applied to these same rods is "radius rods." These rods are firmly fastened to the rear axle housing, and anchored as far forward on the car as practical. Since the change of power direction is at the universal joint directly behind the gear-set, the radius, or torque rods are fastened to the ball housing around the universal joint.

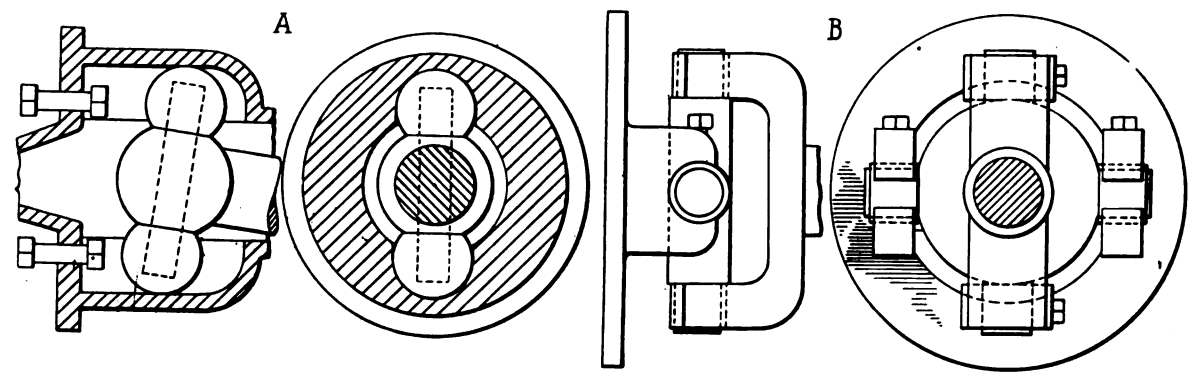


Fig. 48—Two Commonly Used Types of Universals.

Not all cars, however, are fitted with such rods. In many cases, the propeller shaft is enclosed by a housing which swings upon the rear of the gear-set with the center of the universal joint as its center. This housing is designed heavy enough so as to take up this torque.

Digitized by Google

Reason for the Differential.

One seldom realizes how many problems are involved in constructing a rear axle and transmitting the power from the engine to the wheels. Aside from the problems which we have just mentioned, there is one more little natural law that means a great deal to the automobile manufacturer and costs a lot of money to overcome. This problem would be obviated if an automobile were always driven in a straight line. Unfortu-

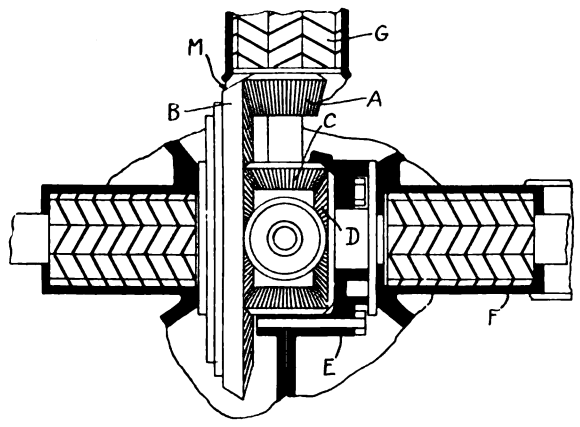


Fig. 49—Sketch Showing Differential Parts

nately, however, all of our roads are not straight. Occasionally the automobilist finds it necessary to turn his car around, or to turn a corner. This means that the outside wheel on the corner must travel a greater distance than the one on the inside.

In turning entirely around, the outside wheel (assuming that both are 30 inches in diameter), must turn about two turns more than the inside wheel. Suppose that both of the wheels were fastened together, and forced to turn at the same number of revolutions. Then one of the wheels would be dragged and, sooner or later, the tires would be destroyed.

In addition to transfering the power to the wheels then, we must find some means of arranging the axle so that one wheel can run faster than the other if necessary. At the same time, however, we must so arrange the wheels that when the car is being driven straight ahead one wheel will not do all of the driving.

This is accomplished by means of what is termed a "differential"; a simple little device when one understands it, but a difficult thing to understand. In figure 49 is illustrated the ordinary type of differential. At A is shown the driving pinion which is fastened directly to the propeller shaft from the gear-set. This pinion A meshes with the large driven gear, usually termed the "master gear," B. Now, B is not fastened directly to either of the axles which drive the wheels, but to the device termed the "differential." It is riveted or bolted to the differential housing E, therefore E rotates as long as the gears are in mesh and the pinion A is being driven.

Differential Gears.

Inside this differential housing are a number of gears, three, or in some cases four, one of which is shown at C, which are mount-

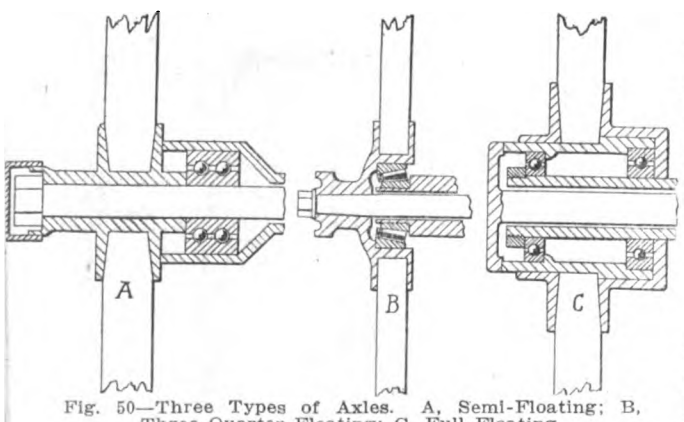


Fig. 50—Three Types of Axles. A, Semi-Floating; B, Three-Quarter Floating; C, Full Floating.

ed upon the differential spider. This differential spider is firmly fastened to the differential housing, and of course rotates with the master gear B. These "differential pinions," as they are termed, shown at C, mesh with the differential gears D and there are two of these differential gears D, each of which is keyed to one of the driving axles attached to the wheels.

Suppose you were to lift one of the rear wheels from the ground. Let us assume that you lift the right wheel free, start the engine, and mesh the high speed gears in the gear-set. The pinion A starts to revolve immediately, driving the master gear B which in turn carries around with it the differential housing E together with the differential spider. The differential gear at the left, which corresponds to D, being mounted upon the axle of the wheel which is held stationary, does not revolve, but since the housing E revolves, the pinion gear C rolls around upon the differential gear and this motion is transmitted to the gear D, therefore the free wheel revolves. The same thing would happen if you were to jack up the left wheel, except that, in this case, the differential gear D would remain stationary, and the differential pinion C would drive the left differential gear, and the left wheel would revolve.

Power Goes to Least Resistance.

In other words, power is transmitted to the wheel which is doing the least work. Now if both wheels are on the ground, the differential pinion C transmits the power equally to both differential gears, and the car moves forward in a straight line.

As another experiment, let us see what happens if we remove both rear wheels from the ground, and hold the pinion A stationary. We can do this by throwing in the high speed and engaging the clutch. The engine will then offer enough load so as to prevent the gear A from revolving. Then supposing we turn one of the wheels, the right one for instance, clock-wise. The differential gear D will revolve and necessarily turn the differential pinion C. This gear will drive the other differential gear which corresponds to D on the other axle, and the left wheel will revolve in the opposite direction.

The differential gears C and D only revolve while the car is turning a corner. On a straight road they are practically stationary. The whole housing E, however, revolves as long as the car is moving, therefore some means must be provided for carrying this housing and preventing friction. This is done by means of bearings as shown at F. Another bearing is provided for the pinion drive gear at G.

In our next installment we will take up the different types of bearings. In the present article we simply call attention to their locations.

Gears Must Be Properly Adjusted.

Every blacksmith knows that two gears cannot run quietly unless they are properly meshed, and of course this same statement holds true regarding the driving pinion A and the master gear B. In practically all of the medium and high priced cars two sets of adjustments are provided. The first adjustment allows one to move the pinion A forward and backward, and so mesh it lightly or deeply with the master gear B.

The second series of adjustments are arranged so that B, the master gear, together with the whole differential unit, may be moved to the left or to the right, nearer, or farther away from A. The first is called the pinion gear adjustment, while the second is termed the differential adjustment. In making this adjustment, the pinion gear A must be moved towards the differential and the differential together with the master gear B moved towards the pinion until the teeth are tightly together, or "bottom," and the backs are in line as shown at M.

Line Up the Backs.

By rubbing the finger across this line, one can tell whether the backs of the teeth are correctly adjusted. If this adjustment were left in this position, the gears would grind, because they are meshed too deeply; therefore it is necessary that the pinion gear A be moved backward, but the relation of the two gears must be the same. If A is moved backward one sixty-fourth of an inch, B must be moved away from A a like distance. Therefore this is the next step in the adjustment.

Move A backward about one sixty-fourth of an inch, and B a like distance. Then fit a wooden handle to the pinion gear shaft, and turn A by hand. If the gears are still too tightly together, there will be a grinding noise and each of the gears must be moved backward a very slight amount until the grinding noise ceases.

If there is any backlash, or play in the gears, it is an indication that they are too far apart, and must be brought nearer together. If the teeth are so badly worn that backlash is had in any position, they must be replaced with new.

Under no conditions should the gears be left in the first position adjusted, that is, with the tops of the teeth of one against the bottom of the teeth of the other. This condition will result in the destruction of all of the bearings in the differential as well as the gears.

Adjusting Other Types.

In cheaper cars, particularly in the Ford, no means is provided for the adjustment of these gears, and the only way that the repairman can fix them properly, is to insert washers between the pinion A and the bearing, and between the differential housing and the bearings at each side until adjustment is correct.

There are two main types of axles in use upon automobiles, and they are grouped into two classes: "live" and "dead." Every blacksmith is familiar with the dead type of axle, because it is just this type of axle that is used on every wagon or carriage built. The dead axle is fastened to the car and carries all of the weight. It does not revolve or drive the wheels. When used upon an automobile, the wheels are driven either by chains or by a set of gears. The axle itself does not revolve.

The live type of axle is divided into two main classes, floating and semi-floating, and different manufacturers make still further divisions. In the main, however, there are really only three classes of live axles, into one of which practically all live axles fall, and these types are illustrated in figure 50. They are known as "semi-floating" as at A; "three-quarter floating," as at B; and "full floating," as at C; and one will notice that B differs very slightly from C.

As a matter of fact, B and C may be considered in the same classification.

The Semi-Floating Axle.

In a semi-floating axle, the weight of the car, which rests upon the wheel, is entirely supported by the axle and its bearings, which are located inside of the rear axle housing. At A in figure 50 is illustrated this type. The wheel is keyed to the axle, and the axle in this case rotates upon a set of double ball bearings. The outer race of this ball bearing assembly fits inside the housing, and of course supports the gear.

Conditions are reversed in the diagram C, showing the full-floating type. The rear axle housing extends inside the wheel and upon its circumference are mounted the bearings. Two ball bearings shown in the illustration serve to support the wheel. All of the weight of the car therefore is carried upon the housing itself.

The axle is used simply to drive the wheel and supports none of the weight. As a matter of fact, the weight of the axle itself is carried upon the wheels, since it is held by a driving flange to the wheel. In this full-floating type, one will notice that the wheel is supported upon both sides, two bearings being used.

(To be Continued)

(Editor's Note)—The blacksmith who is called upon to do any Ford or Chevrolet differential repair work should investigate the Bailey ball thrust bearings. A reading notice relative to these bearings will be found in this issue of the Blacksmith & Wheelwright and this reading notice as well as their advertisement makes a special offer of a thrust washer gauge with which the blacksmith can determine just how thick the washers should be at each side of the differential.

Digitized by Google

A Tire Heating Furnace

A Gas-Fuel Furnace Is Undoubtedly the Best Proposition But Not Every Blacksmith Shop Can Afford This Device

BY JAMES F. HOBART, M. E.

In the country a smith can usually manage tire-heating very well, by simply putting the tire or tires upon three bricks, placed on the ground, and then building a wood fire around and over the tires, using light wood for that purpose. As stated, this method works well in the country where there is plenty of room to build an out-of-doors fire without endangering an adjoining building, but in most city locations it is difficult to use an outside fire because of the fire hazard.

But, even in the country, the open fire is often very undesirable. A gust of wind might drive sparks a long distance and set fire to buildings or stacks after the tire-setting had been completed and the fire abandoned. Indeed, no smith should ever leave a tire-setting open fire without first making sure that every spark had been extinguished, either by means of water or by covering the remains of the fire liberally with earth.

How About Fuel?

In some localities it is hard to obtain wood suitable for tire-heating purposes except at considerable expense, and to use coal in a tire-heating furnace is something of a complex proposition. Such a heating furnace may be constructed and operated to advantage, provided there are a good many tires to be heated. But for a few tires, the time, the coal, and the wood necessary to make up a good coal fire would cost several times as much as the wood consumed in a three-brick out-of-doors fire.

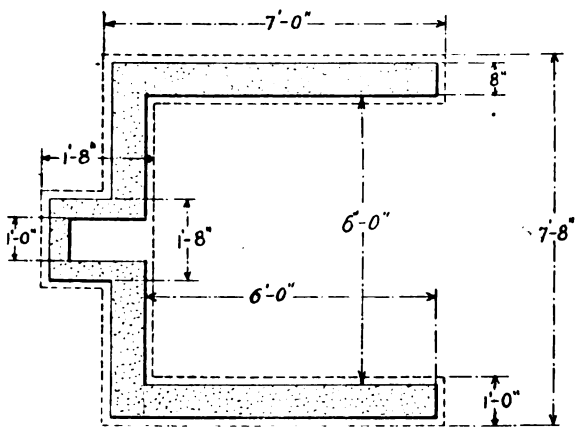


Fig. 1—Pian View of Tire Heating Furnace.

A heating furnace for using hay or straw may easily be constructed. In fact any tire-heating furnace which uses wood may be used to advantage with hay or straw, which has been twisted or compressed. While a description and an illustration of an outdoor tire-heating furnace may be found in the November, 1917, issue of The Blacksmith and Wheelwright, another set of drawings are presented herewith, by means of which the smith, should he be handy with the trowel, may himself construct a brick furnace in which tires up to 5 feet 11 inches may be heated, as the inside of the furnace is six feet square.

To be sure, the furnace may be built larger or smaller, as required by any smith who works to these drawings, but the furnace as shown, five feet high to the spring of the arch, will probably be found of a convenient size for most tire-setting stunts.

Put in a Gas Furnace.

But, Mr. Smith, before you decide to build a tire-heating furnace, let me appeal to your business horse sense and show you how you can do better—under certain conditions—than to build a tire-heating furnace for using wood as fuel. The proposition is this: Instead of building an out-of-door furnace, put a gas tire-heating rig in your shop! The gas machine for heating all sorts and kinds of tires will not cost more, if as much, as the brick or concrete out-of-door furnace shown herewith, and the cost of gas for heating a set of tires will not average more than a few cents per tire.

In the February, 1918, issue of this magazine the writer stated the cost of operating a gas tire-heating outfit and described the ease of operation, both in heating and in setting, which latter operation was done just outside of the shop, the tires being heated inside of the building.

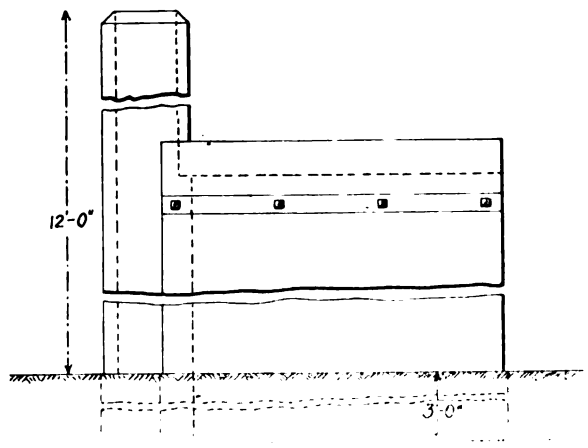


Fig. 2—Side Elevation of Furnace and Chimney.

"But," you say, "there is no gas in my town!" Never mind that. It will cost very little to put in an acetylene gas machine; then you cannot only heat tires with gas, but you can have gas lights in your shop and house, too, and perhaps sell a good bit of light to the neighbors! For gas tire-heating, no machinery will be needed in addition to the heating machine, save a blower for forcing a supply of air with the gas into the burners. A good, healthy forge blower can be made to do this work, but it is better to put in a special blower for the purpose and have it power driven, as all the machines in any shop should be driven.

Build a Good Foundation.

If you do not care to use an inside gas furnace and decide to build one outside, first make sure that the foundation is well built, deep enough to reach below the frost line. The dotted lines around and below the plan and elevations, Figs. 1, 2 and 3, show how the foundation should be put in. In the elevations it will be noted that the foundation goes down three feet below the ground line. In the Southern States less foundation will answer, but in the far north, where they have "nine months of winter and three of severe weather" each year, then it may be necessary to extend the foundations still deeper. It is necessary, especially on clay soil, to carry the foundation deeper than the line where the soil freezes, for, if we don't, our furnace may look in spring, after a hard winter, like a hun dugout after Pershing's Sammies have rushed it!

The best way to put in this foundation is to dig a trench to the required depth, according to the dotted lines in Fig. 1, then ram in concrete until the trench is full and level with the surface of the ground, or a bit higher if there is danger of water running into the furnace when it rains.

An "Open-Face" Chimney.

Note the chimney arrangement, which is built as a part of the walls of the furnace, and as shown by Fig. 1, also by Fig. 3, the chimney flue is open directly from ground to roof, right into the furnace. If desired, the Smith may do any "fancy business" with the chimney and its opening into the furnace which he chooses to pay for and to build, but the method shown is good and the cheapest.

The top of this chimney, it will be noted, is plain and free from all ornamental finish. And who can truly say that the chimney as shown is not as good looking as if it had a hundred bricks built into a bulging display at or just below the top? The heavy, fancy tops with which chimneys used to be loaded are out of fashion now-a-days (for which we are all duly thankful).

If desired, this furnace may be built of concrete throughout instead of brick, as shown by the drawings. Should concrete be used, the walls may be made, and especially the roof, a little thinner than eight inches. The structure may be made of concrete blocks, but it is not recommended because of the very soft, porous nature of blocks which, being usually made by the "dry" process, are not as dense and solid as poured concrete. If the structure is to be built of concrete, set up board forms and pour the concrete in from the top in the regular way. After the walls are up, rig a form for the roof and pour that also.

When built as shown by the plans, the concrete will require no reinforcing; the angles and rods doing all that is necessary to support the roof arch, whether it be made of brick or of concrete. But, if it be desired, a flat roof can be put on, in which case the roof slab must be reinforced close to its bottom edge by steel bars properly spaced and arranged. But this matter will not be discussed in this story.

When Bricks Are Used.

When the structure is to be built with bricks, run the walls up to the required height. In the picture the walls are five feet to the arch. They may be made four or six feet high, as the smith desires. It is only a matter of fancy. But, when up to the "eaves," level the side walls and place on them pieces of 4 by 4-inch angle steel, of good weight, about a quarter of an inch thick.

Each piece should be cut 6 feet 6 inches long and four holes should be drilled, two feet apart, to receive ¾-inch bolts, which should be just long enough to show a full nut when placed through the angles as shown by Figs. 3 and 4.

Fig. 2 shows how the roof should join the chimney, and some metal flashing preferably lead, should be built into the chimney to make tight against the roof where the two adjoin.

The roof may be supported either by curved ribs which have been sawed to a radius of 6 feet 6 inches and fastened under the roof-space, or a floor may be "shored up" just level with the tops of the side walls and a circular mound of sand built up to receive the arch bricks as they are laid. The sawed circles are the best by far, and when "shored" in place, with narrow boards placed across, form an ideal "falsework" upon which to lay the arch bricks.

A Twelve-Foot Chimney.

The chimney shown by Figs. 2 and 3, is twelve feet high. It may be made taller or shorter according to the location of the furnace. Under certain conditions, no chimney at all might be permissible. In some other situation, even twelve feet might not be enough. The smith must decide the chimney height by the location.

When the structure is in a sheltered place and no higher buildings near, the smoke would, when the wind is right, pass out of the hole in the rear of the furnace if there were no chimney. But when the wind blows, especially in the wrong direction, then there

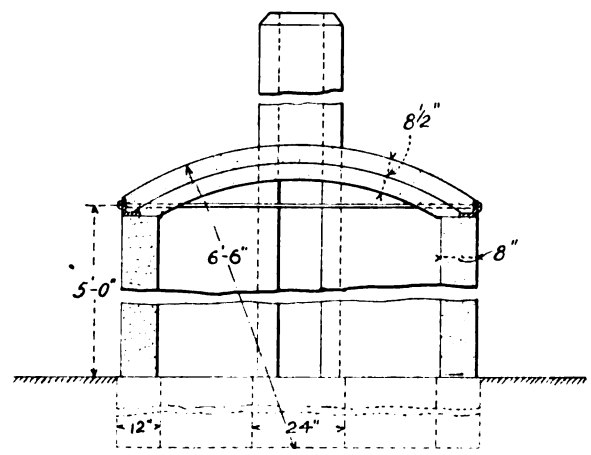


Fig. 3—Cross Section Showing Method of Bracing.

Digitized by Google

should be chimney height enough so that the smoke will pass up instead of driving back into the face of the smith or his attendants. Therefore, build the chimney high enough to do its work under existing conditions.

Fig. 3 shows the manner in which the arch, the tie rods and bolts are disposed. The edge of the arch should come fully as high as the edge of the steel angles, and if a little higher than the steel, all will be well. If it be desired to show a bit of a cornice, and thereby get rid of the smooth appearance of the outside of the furnace, then a six-inch channel may be used instead of the four-inch, and the angles may be pushed outward until they overhang the walls two or three inches, so that the inside edge of the arch comes inside of the sidewall, instead of back therefrom as shown by Figs. 3 and 4.

The rods are built right into the brickwork, pieces of the bricks being cut away as required to let the rods pass. The manner of starting the arch is shown by Fig. 4, the inner course of bricks being laid first, and kept low enough so that the outer row or course may come just even with the upper edge of each angle as shown by the engraving.

Springing the Arch.

Fig. 4 shows the manner in which the bricks of the arch are given a footing against the steel angles which carry the thrust of the arch. The lower course does not "die-out" against the top of the wall, but nearly two inches of that course bears directly against a "header" course, which consists of bricks placed end-up, cut-off and bearing against the corner of the angle, and trimmed

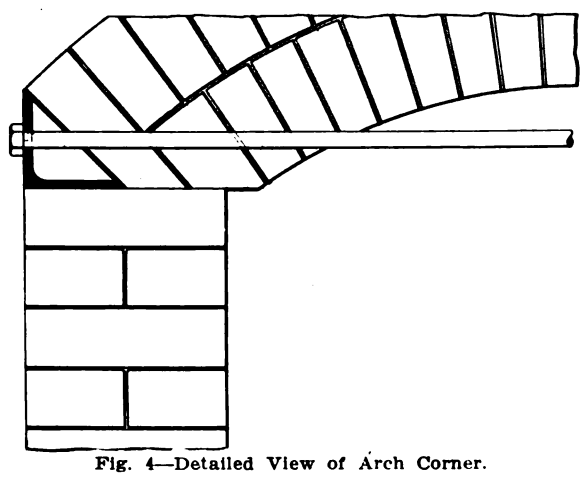


Fig. 4—Detailed View of Arch Corner.

to fit also against the inside of the lower flange.

Fig. 4 shows plainly how the outermost brick has been cut and fitted against the angle, the space in the corner of the angle being solidly filled with mortar and bits of brick so as to give the "header-course" a solid bearing. Then the lower course is begun against the header course, the inner course bricks being cut and fitted as shown. If the smith has any doubts about the solidity of the arch, he may fit in another header course and then run the two 4-inch courses.

The mortar between the bricks must take up the angularity of the arch and it is necessary that each brick be laid so as to point directly toward the center of the arch, which in this instance, is on the ground, midway between the two side walls, as shown by the radius line in Fig. 3.

Fire Bricks Not Necessary.

With walls built of well burned building bricks, this furnace will not require a fire-brick lining. If built of concrete with other than a limestone aggregate, fire brick will not be required as the bricks and concrete have fire resisting qualities of their own to withstand the light fires required for tire setting. But, should limestone be used, the walls might gradually be turned into quicklime by repeated heatings, in which case the walls would slake and run away when exposed to rain or weather dampness. Therefore, if concrete be used for the walls, see that other than limestone is used for the aggregate.

The Rock Drill Blacksmith

Part IV—Re-sharpening Old-Bits, Forging New Ones, Hardening the Steel and Other Important Details

Copyright, J. F. SPRINGER

There are two classes of work: (1) re-sharpening old bits, and (2) forging new bits from bar stock. In both cases the steel must be heated and forged. The heating for forging is done naturally for the purpose of softening the material, so that it will work easily, and to enable the steel to stand up under the hammer.

Cold forming probably could be done, but might require considerable equipment and much carefulness in handling. I do not know of any actual use of cold forming processes by any of the mines. It is the practice to forge highly heated steel under the hammer or in a machine. The highest heat given to a bar of rock drill steel is that which is given for the purpose of forging. Hardening and annealing heats are lower.

The First Heat.

The question arises, how hot should a bit be heated preparatory to forging? This question cannot be answered with just a word. A good deal has to be taken into consideration. The smith who swings the hammer for hard forging will naturally want the steel very hot, for the reason that the hotter it is, the easier it will be to forge. Rock drill steel contains a rather high percentage of carbon, about 0.80 per cent, on the average. Now, the more carbon a steel contains the harder it is, naturally, even before it is put through any hardening procedure.

When it is heated, this high carbon steel yields reluctantly to the softening effect of the heat. The blacksmith is, accordingly, tempted to push the heat pretty high in order to make the hammer-work easier. In fact, he will naturally want the heat high enough to permit him to get completely through with the forging before it drops enough to make the hammering a hard job. What will be the result? The smith will dip the bit at once into the quenching bath or he will let it cool somewhat, and then dip it. The reason he may wait a little is that he knows or has been advised that the steel should be hardened at a red heat.

Let me say at once that the high heat used in the foregoing has damaged the steel. I don't say that it is impossible to remedy it. But remedies cost time and effort, and time and effort mean a money cost. Consequently it will be well to look sharply at the matter and know exactly what we are doing.

The damage to the quality of steel begins at about medium cherry red. The higher the temperature is carried, the greater will be the damage. Steel is largely or entirely made up of grains or crystals. These grow bigger and bigger as the metal is heated from medium cherry red. And big grains are to be regarded as indicating damage to the strength of the steel. The bigger the grains the greater the damage.

Now, the smith might think that, if the grains get bigger and bigger from the heating, they could be counted on to get smaller and smaller as the steel cools off. But this is, unfortunately, not the case. Cooling the steel will not make the grains smaller. This means that cooling will not remedy the damage to the strength.

When, in the case before us a moment ago, it will do no good even if the blacksmith does wait after he gets through forging because he knows the steel is hotter than the proper hardening temperature. It would probably make no difference in the quality of the steel if, instead of waiting, he plunged the work at once into the quenching bath.

Slow Cooling.

While cooling the steel slowly in the air will not reduce the grain size and thus restore the quality, and while cooling rapidly in water will not do it either, there are, nevertheless, a couple of remedies. Forging is one of them. When the hammer strikes a blow on that steel—that is, say, at a light orange—it will have the effect of breaking up some of the big grains and thus causing them to become smaller in size.

Naturally, there will be a greater number of the smaller grains. This increase in number need not concern us. What is important is that under the hammer the grain size reduces. However, this point should be remembered: There are parts of the steel which the hammer blows do not affect, or affect only a little. How deep the effect of a hammer blow will reach depends upon a number of things: the shape of the work, the weight of the hammer, the speed of the hammer at the moment it strikes, and probably the relative amount of carbon in the steel and the temperature at the time.

Then there may be hot parts that the hammer does not strike at all. It will be gathered, perhaps, from what has now been said that the effect of forging is apt to be imperfect. The work may not get the benefit down in the interior or off on the side. But, sometimes, forging is the only remedy possible.

The forging may be done with the bare hammer, or by means of dollies or between dies in a machine. It will doubtless tend to remedy the bad effects of high heats, no matter how the forging is done. It is to be understood, however, that, even under good conditions, the grains will have the size corresponding roughly to the heat at which the smith stops forging. Perhaps this needs a little explanation.

Grain Size Increases With Heat.

It has already been said that the grains begin to grow at medium cherry red and keep growing as the heat goes up. For each stage of temperature there seems to be a corresponding grain size. If we stop heating at some particular stage, then the grains will stop growing, and the steel when cooled will have a grain size corresponding to the temperature at which the heating ceased.

Similarly with forging. As the steel is worked under the hammer, the parts properly reached by the effects of the blows will be made up of smaller and smaller grains. At whatever heat the forging stops, the grain size is to be regarded as a little larger than the size really corresponding to the temperature at which the work ceased. This means exactly the same thing as the following:

If, instead of the forging stopping at a certain heat, the steel is heated to a little beyond that heat, the same result is gotten. In short, forging that ceases before the steel cools to, say, full cherry red, leaves the steel more or less damaged. In fact, it is probably best to keep the forging going until it is time to harden.

One lesson that it is profitable to learn is, accordingly, to begin forging at as low a heat as possible. Naturally, there must be enough time allowed to do the hammer or machine work. But it is not necessary to allow much more. If the hardening is to be done at medium cherry red, then it may be, for some work, that the forging can start when the steel has been heated to a pale orange. If more time is required than this allows, a dull yellow or even a higher heat may be selected. Judgment is needed here.

Reheating the Steel.

Of course, the smith may choose a low heat for forging and get an extra amount of time by heating over again. For example, he may choose pale orange as the heat at which to start the forging. When the work has cooled to, say, a full cherry red, it may be that the forging is not yet done. The work may be put back into the heat and a pale orange gotten again. This is perhaps the best kind of thing to do when the smith

Digitized by Google

has misjudged the time and has not allowed himself enough to do the work, or when some delay has accidentally occurred.

It is to be remembered, however, that doing all the work at the low heat means forging stiff steel. Accordingly two or three heatings in the fire at low temperatures work out to the disadvantage of the smith. It is preferable, if possible, to have no mistakes or accidents, and to judge just the right amount of time required. If, on the other hand, the smith puts the forging heat too high and gives himself too much time, it will be well to keep the forging going until it is time to harden.

The Second Method.

There is a second method of reducing the size of overgrown grains. This method proceeds by a reheating. But by reheating is not meant simply giving a second heating. What is meant is heating up from a point below the temperature at which grains begin to get bigger. This temperature is medium cherry red. It has been discovered that, if a piece of steel, which has been highly heated and whose grains have been enlarged, is permitted to cool off until distinctly cooler than medium cherry red, and then heated up again to a suitable point, the grain size will be more or less perfectly reduced to normal. It is important to get a correct understanding. A piece of steel with big grains is cooled, say, to a black heat. It is then heated to a certain temperature. What is the result? The steel will be benefited—the grains will be smaller and the steel stronger.

But what is the proper heat at which to stop the reheating? The answer is that it varies with the steel. Tool steel has one point; soft steel has another; and still softer steel another. However, a very simple rule is possible. Let me explain.

Steel is attracted by horseshoe magnets. That is, cold steel and medium hot steel is attracted. Steel may, however, easily be hot enough not to be influenced by the magnet. Let the reader try this experiment. Heat a tool-steel rod at one end to a white or nearly white heat. Naturally the colors will be duller and duller as one goes from the white-hot end to the cold end. Now take a horseshoe magnet and apply it along the cooler half of the rod. Everywhere that the steel is black there will be attraction. Next, apply the magnet to the white-hot end. It will not attract the metal. Move it along to duller and duller colors. Everywhere, except in the red region, there will be no influence exerted by the magnet. The magnet cannot, in fact, be hung onto the rod in any other region. It will not attract the orange or the lighter colors. This is a remarkable thing. It happens that it is a useful thing as well.

Stop at the Proper Color.

It has been ascertained that the proper place at which to stop the reheating, in order to restore quality, is at the point, or a little above the point, at which the steel ceases to be attracted by the magnet. This rule is not good for all steels, but it is good for steels having 0.50 per cent carbon or over. Accordingly, the rock drill blacksmith has the benefit of the rule, for the reason that drill steel is ordinarily included in this class. A large percentage of drill steel contains, in fact, upwards of 0.80 per cent of carbon. The blacksmith can rely very confidently upon the rule for all the steel he may use for drill bits.

It is very fortunate that drill bits, which have just been forged at a rather high heat, can have their quality pretty well restored simply by cooling, say, to a black heat or lower, and then reheating to the point, or a little above the point, where the magnet ceases to have its power.

But this isn't the end of the good fortune. This point at or above the temperature at which steel and magnet will not cling together is also a very proper hardening point. Consequently it is not difficult to give a very proper procedure for the blacksmith working on rock drill bits.

It is this: Beat the work to some proper forging temperature, even if it is a little high, and do the forging. Then put the bit aside to cool. When it has cooled to a black heat or any lower heat, it is to be reheated up to the point, or a little above the point, where the magnet ceases to grip the steel. The work is then put into the quenching bath and hardened.

All this is pretty simple. It is not hard to carry out the main things. The blacksmith may think it is a lot of trouble to heat the work a second time. As this objection is really the chief thing that can be said against the procedure, it will be well, perhaps, for me to go somewhat further and explain that there is a good offset to this objection.

More About the Two-Heat Method.

The procedure which I have been describing may very well be called the two-heat method. There is one heat for the forging. Then there is the second heat for the restoration of quality and the hardening. The smith may think two heats mean more work. But I am not sure about that. Consider this point: When we use the two-heat method we are permitted to forge at a good high heat, because we know we are going to heat up again and restore the quality.

Now, there is a big advantage in being able to put the forging heat up a bit. The steel is softer because it is hotter. This means easy forging. And easy forging means quick forging. We save, then, in muscle and in time. What we save in muscle and time can be counted as an offset to a second heat. Indeed, I think that in cases where there is a good deal of work the higher forging heat will permit so much time to be saved that it will be more than an offset to the second heating.

Naturally, the blacksmith will not have to stand around and wait for the steel to cool after he finishes forging one of the bits. Not at all. He may very well put the forged bit aside and go to work forging another. The reason he may do this is because he does not have to be particular as to the exact temperature at which the reheating is started. He may let the work cool to the temperature of the shop, if he wishes. All he need be concerned about is whether the steel has any color left. If he is sure that the color has all gone, inside as well as outside, that is all that is really necessary.

The work may be stone cold—it doesn't matter. Consider what this means in the shop. It means that the smith may forge a lot of bits and throw them aside, one by one, as he finishes forging each one, and pay no attention to the pile until all the forging is done. Even then, all he need do is to be sure all the bits have cooled enough. They can't cool too much. The whole lot, or if more convenient, parts of the lot, may now be reheated like a single piece of work.

All Hardened at One Time.

The group may also be hardened almost as a group. In short, when the smith uses the two-heat method, he doesn't have to stick to a bit without any let-up from the time he begins to forge until he hardens it. It is a big mistake to think he has to do anything of the kind. With the two-heat method he may forge more quickly, may throw the bit aside to cool and start forging another, and at the end he may do the reheating and hardening, a lot at a time, or pretty nearly so.

The great advantage of the two-heat procedure is that the second heat penetrates into the steel and operates to restore it inside as well as outside. This is better than restoring by means of the hammer. The hammer effect doesn't reach everywhere. It may not go deep enough and it certainly doesn't help those parts of the work which are not hammered.

Reheating, on the contrary, operates in out-of-the-way parts, inside and pretty much everywhere. In short, reheating is the better method of restoring quality, because heat can be made to penetrate everywhere and anywhere. When the end of a bit is put into a fire or a furnace, the heat starts to work all around and to push to the interior. Hammering not only ordinarily fails to reach everywhere, but it may be finished before the work has cooled to the hardening redness. This leaves an interval of heat that is too high for the good of the steel. Of course, mistakes may be made with the two-heat method just the same as they may be made with the one-heat process.

But, after all is said and done, the two-heat method is to be regarded as the better of the two. And it probably needs to cost but little more—perhaps nothing more—whether in time or muscle. It is possible that the one-heat method is in use pretty much everywhere. Notwithstanding this, I still venture to recommend two heats as being the right thing and probably just as economical.

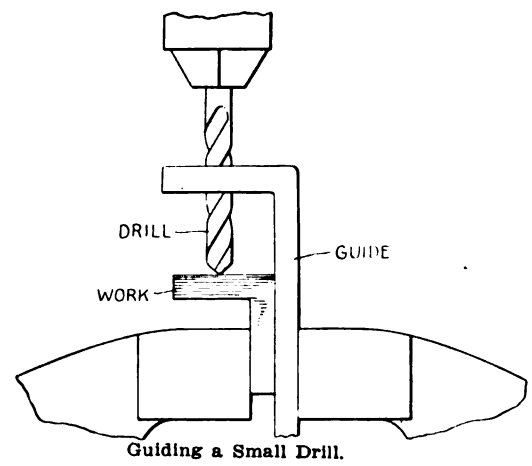
(To be Continued)

A GUIDE FOR A SMALL DRILL.

BY CHAS. E. DURYEA.

Drilling a small hole by hand power is not easy, not because of the pressure required, but because of the care needed to avoid breaking the drill. Care requires time, and drills are hard to get. Both should be conserved. The drill guide is a simple device that obviates the need for care and so permits greater speed and pressure, and this is true whether hand drill, bow drill, breast drill or bit brace is used.

Its principle is a modification of the well-known fact that a sewing needle can be driven through a copper cent if it is first driver into a cork. The cork prevents the needle from bending under the blow and breaking. Small nails, which would otherwise bend and require boring a hole for them first, can be driven safely in the same manner.



Guiding a Small Drill.

The guide is formed of a piece of steel having in one end a hole, and so shaped that this hole may be held above the work. Usually the guide and the work are gripped in the vise together and the guide can be slipped down as the hole gets deeper. Or the guide can be bent so as to permit clamping to the work. It need not be very stiff and so can be bent easily to fit other jobs. The hole need not fit the drill closely, but must prevent the drill from swinging off to one side far enough to be damaged—for no matter how steady one's nerves, it is not easy to avoid "wabbling" the drill. The effect of the guide is much that of having a very short drill.

HE SPOKE AMERICAN.

The other day in a certain headquarters town in France, a French poilu proudly greeted an American comrade with:

"You spik French?"

"Nope," answered the American, "not yet."

The poilu smiled complacently.

"Aye spik Engleesh," he said. The American grinned and the Frenchman looked about for some means to prove his boast. At that moment, a French girl, very trim and shapely in her peaked hat, long coat and high-laced boots, passed by. The Frenchman nodded his head at her, looked knowingly at the American, and said triumphantly, "Chicken!"

The American roared.

"Shake, old pal," he said. "You don't speak English; that's American."—Du Pont Magazine.

Digitized by Google

Letters From Real Americans

While Our Boys Were In France, Driving Out the Murderers, Our Manufacturers Furnished the Money and Materials For War

America has finished what she started nineteen months ago and has shown that God is with those nations who have enlisted upon the side of Humanity and Justice. She has won the good fight because she has remained UNITED. She did not win only because of the soldiers, solely because of the workers, because of much money, or just because of the supporters at home—but because all of these units worked as one.

We mourn those who died in battle; we revere our boys, who have fought so well, and we respect those thousands of willing workers without whose help we would have been unable to win.

America will never forget the fighters; you and I, brother reader, will never cease to honor the brave men who put on khaki and crossed the ocean; but how soon will we forget the manufacturer, who came forward in our hour of need, put his shoulder to the wheel and devoted, yes, perhaps ruined, his business in order that the hun might be conquered?

Are we so ungrateful that we will desert our countrymen? Are our hearts so filled with the greed for money that we will turn our backs to the products of our own loyal manufacturers and seek those goods made by men who only a few days ago were our enemies?

You, brother reader, can give the answer to these questions. Perhaps you have answered them already in your own heart. If you are a loyal American you need no argument, you will not heed the soft and wily words of the enemy, when he tries to ingratiate himself and his blood-stained goods into your heart and your homes. Let the words "Made in Germany" be written in Blood upon your brain; they are written in blood and ruins on the soil of France, on tortured Belgium and even in germany itself.

Are you a Patriot or a Traitor?

Below we give portions of letters received by us in response to an appeal, "What have you done, Mr. Manufacturer, to help win the war?" We pass the answer along to our subscribers. Read how they have helped YOU, then read what the huns have done, on the next page, then think it all over.

* * *

Barnes Drill Company.

"We are running 100% in behalf of 'Liberty and World Democracy.' In other words, our output of high-class, all geared drilling and tapping machines and extension gap lathes are being built and sold exclusively for essential purposes, and deliveries made on Priority Classification basis."

Curtis Pneumatic Machinery Company.

"We are giving preference, of course, to Government work and to calls from essential industries."

Crescent Machine Company.

"The entire output of our factory is going for Government and essential uses."

Anti-Borax Compound Company.

"We are filling large orders for welding and brazing compounds from our Government. We have lost a number of our men who have joined the colors, but are perfectly willing, and are making every sacrifice possible to help make the world safe for democracy."

Hinckley Machine Works.

"Our work in helping Uncle Sam to win consists in making parts for howitzers, and we are working 90% of our time in this line."

Heller Brothers Company.

"We are confining our work entirely to regular line of goods, which as you know are considered standard by our Government, and consequently are quite essential at this time for the proper prosecution of the war."

Weaver Manufacturing Company.

"Since the United States entered the war various Government cantonments have been using our equipment. Recently we turned over a part of our factory to ordnance work."

United States Air Compressor Co.

"Ninety per cent. of our factory has been turned over to the United States Government, building the air-compressor units to be shipped overseas."

Hudson Motor Specialties Co.

"Some months ago we donated to the Quartermaster's Department, for use in connection with the Ford Ambulance Service abroad, 100 Hudson Crank Case Repair Arms."

Joseph N. Smith & Co.

"Our factory is operating on approximately 80% Government work and our facilities have so far adapted themselves to the manufacture of parts for the Government that we have not had to revamp the factory."

Du Pont Fabrikoid Company.

"We are not permitted to speak of many ways in which the Du Pont Fabrikoid Co. is co-operating with the War Department, but we can say that we have been supplying Fabrikoid as a substitute for leather for upholstery in practically every place where the Government has need of an upholstery material."

The Reflex Ignition Co.

"Our Government orders, which are being done on a sub-contract basis, constitute approximately 60% of our plant, and we are planning to keep more than 50% of our machines on Government work during the period of the war."

Cortland Welding Compound Company.

"We are furnishing large quantities of 'Climax,' 'Cherry Heat' and other brands of welding compound to various branches and departments of the Government, a large percentage of our product goes to contractors whose industries are necessary to war activities, and in many cases whose plants are working 100% on Government work."

Geo. M. Ness, Jr.

"From 65% to 70% of my output is for indirect Government work and about 15% to 20% direct. We are always ready to put forth our best efforts to deliver work to the Government by the time required."

The West Tire Setter Company.

"We have furnished some tire setting machines for shipment to France, as well as others for the use of the Government in this country, and for Government contractors. We have also furnished a large number of shell banding presses, some for use by the Government direct, and others for contractors, holding Government orders."

Mr. Blacksmith It Is Up To You

Are You Going To Buy Goods From Red-Blooded Americans or Will You Buy From The Butchers Now the War Is Over?

Above, our readers will find excerpts taken from letters written by many prominent American manufacturers — manufacturers who, when the hun was doing his best to wreck the world and enslave the nations, put forth their efforts to save America and make sure that justice and right should not be trampled under foot.

To these manufacturers we owe our allegiance. To these men who have devoted their factories to war work we should now show our appreciation, and we can show our appreciation best through our acts, not by words.

You may call the german all the names in the calendar. You will not hurt his feelings one bit. You will not punish him in the least; but, when you begin to affect his commerce and his business, then, my friends, you are using a weapon that will punish him.

"Mr. Buyer, this article is addressed particularly to you; and you, Mr. Reader, are the ultimate buyer of goods, therefore it affects you also. In the next ten years you will be called upon to fight a commercial war. Are you going to stand behind our American manufacturers who can put out goods superior to those made by germans, or are you going over to the side of the enemy? Are you going to let your pocketbook rule you? For many of the following quotations we are indebted to an article written by R. F. Soule of the Hardware Age.

* * *

"The other night one of Pershing's boys went out into No Man's Land. He did not come back. Three hours later a searching party had been sent out to find him. That boy had been killed and his body hacked to bits. That brave young American was chopped to pieces with german cutlery.—Before the war we bought two million dollars' worth of german pocket cutlery each year.

* * *

"A captured British officer was recently found with his throat cut from ear to ear. This brutal job had been done with a very keen-edged instrument.—Before the war we imported annually half a million dollars' worth of razors from germany.

* * *

"Two Canadian Red Cross nurses outraged, their hands chopped off and their tongues cut out that they may never tell the hideous story of frightful wrongs perpetrated upon them.—Before the war we bought 600,000 dozen shears and scissors from the Central Powers annually.

* * *

"A short time ago the Llandovery Castle, a Red Cross hospital ship, was sunk by a german submarine. Its only passengers were doctors and nurses. It was plainly marked, there was no chance of mistaking it for anything but a hospital ship. The germans torpedoed it, took American doctors from their open lifeboats and abused them.—Before the war we imported from the central powers practically every surgical instrument used in America.

* * *

"Imagine a postal card telling that your son had lost his third finger, deliberately cut from his hand that a hun might be possessed of the ring he wore. Imagine a postal that tells of the women and children at Mons who were forced to march on their own soldiers, acting as a screen for german troopers. Read that the fifty who refused were bayoneted.—Read, and calm yourself of the statistics that inform you that before the war we purchased souvenir post cards and lithographs from germany to the amount of nearly two million dollars annually.

* * *

"Music outraged. Raise the curtain of Kultur ever so little, and peek at those villages of France and Belgium occupied by the invaders. Before your ever-widening, horror-struck eyes is an unearthly panorama of encouraged lust. Villages burning everywhere, the streets strewn with the viciously flung bodies of the helpless inhabitants. From a house before you come the terrified shrieks of a young girl who is being outraged.

"Suddenly the door of this house is burst

Digitized by Google

open and an old man is hurled into the street. It is the grandfather of the girl whose screams make your blood run cold. He is seventy-five years of age, and has gone to her rescue. As the forcefully impelled body of that courageous old gentleman strikes on the cobblestones, the crowd of half-drunk soldiers, on whose belts you see inscribed "Gott is with us," begin jumping with fiendish glee upon him. Their heavy, hob-nailed marching boots quickly reduce his frail old body to a battered, bloody mass.

"No, Mr. American, these are not hallucinations of your own imagining. They are actual sights made hideously clear by burning buildings which are being wantonly destroyed. Then you see a load of straw on a quaint two-wheeled cart coming down the street. It is stopped. Oil is thrown over it, and in its highly inflammable state the willing hands of the huns throw it into a cellar where a large number of women and children have taken refuge. And then, merciful God, a laughing soldier of Wilhelm, the Brute of Berlin, scratches a german-made match and one more absolutely inhuman atrocity has blotched the historical page of a couple of nations whose thin veneer of civilization has been scraped away in a war that is but a few days old. Where? Well, the name of the town was Charleroi.

"And from up the street came the sound of outraged music from stolen gramophones, accordions and a pianola. The officers were singing. A musical entertainment in celebration of a victory.

"Before the war, musical instruments, gramophone motors, player pianos; yes, we bought a lot of them from these twin nations of rapine. After the war? In the name of the angels who sing saddened music in heaven as they look down upon music outraged, no more musical instruments from germany and austria.

* * *

"In a recent speech John Kendrick Bangs said: 'I want to tell you what the hun is doing, tell what kind of an enemy we are up against at the end of four years. Six weeks ago I held on my knee a seven-year-old lad who was playing in a village that had not been bombarded. Then the huns dropped a bomb from the aeroplanes and killed some of the old men and women in his town. After they had passed the child was allowed to run out and play. On the road he found a toy. One of these toys we used to get at our children's parties with fancy caps and verses in them.

" 'He took it up as he was intended to do; he thought it was a toy, as it was intended that he should; then he tried to break it apart, as was also intended that he should do. Five hours later, when that little fellow regained consciousness, there was only one finger left on his hand. All the rest had been blown to pieces.' "

* * *

Mr. Buyer and Mr. Blacksmith, who is really the ultimate buyer of all products, despite these damning facts, are you going to purchase german-made articles? Can you buy a german toy without thinking about that little boy? Think of your own boy mutilated in that same way. Is it pleasant? Is it worth while?

Can you go home and eat food prepared in german-made enamel ware without recalling the atrocities committed upon the Belgium housewives and their daughters?

Can you go to a dentist and let him work upon your teeth without thinking of the prisoners whose blood has been poisoned and their bodies mutilated by german-made instruments?

Can you drive a nail in a shoe without thinking of those nails driven by huns into the hands and feet of our boys over there?

Can you wear a suit of clothes dyed with german dye without thinking of the black spot which germany has left upon the face of Europe?

Can you write your name on a post card without seeing the hun's red splotched hands upon it, and stamped "made in germany?"

Before this war germany said that she could make dyes, instruments, tools, clothing and thousands of other products better than the American manufacturer.

Her truth could be proven from America's import list. She said that she could make WAR better than anyone else. **We have proven her wrong.**

Let us continue our proof and show that Americans can manufacture and produce all products better than germany. Let us prove that we as Americans cannot only fight better but live better than germany.

We backed up our war with our pocketbooks. That is why we succeeded. Do the same by our true and red-blooded American manufacturers who have stood by us in this fight. They have helped you and me, Mr. Reader, to win the war. Let us show our appreciation by helping them in the war that is to come.

Suggestion for a Lowgear Which the Average Blacksmith or Wheelwright Can Make in Spare Time

Every Farmer Needs Some Sort of a Heavy Wagon Which He Can Use for Carting Stone, Sacks of Lime or Grain, and Bales of Hay, From or To the Market

BY F. L. ALMY

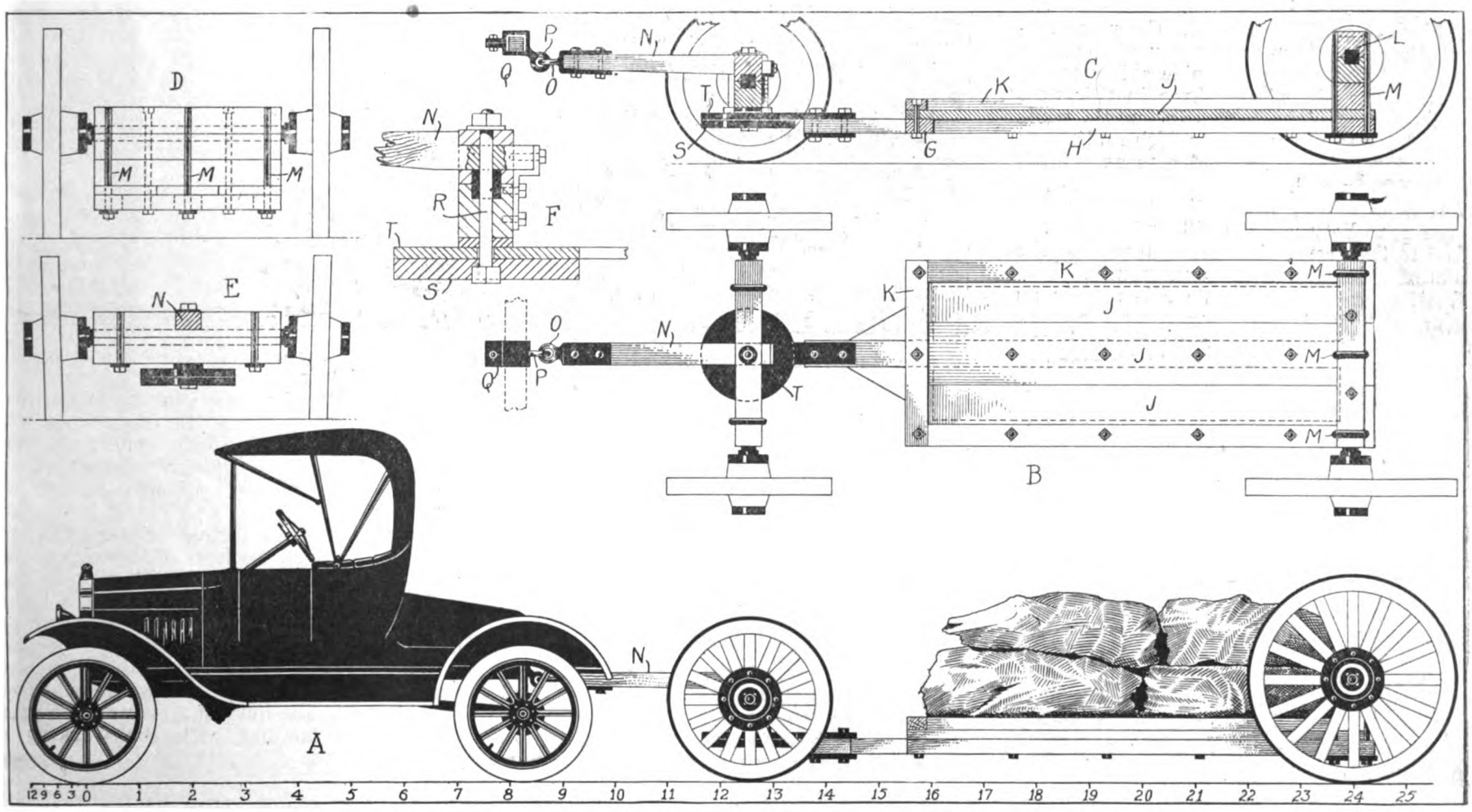
The housewife looks forward to Spring as a time for house-cleaning; the farmer, however, plans to do his farm-cleaning in the late Fall and early Winter. He patches up his walls and fences, blasts the stumps and rocks from his land and cleans up the brush and small timber.

He likes to have everything "shipshape," so to speak, for the Winter gales, and as he has not much else to do, he puts in his time preparing for the next season, when he will be too busy to bother with the buildings or walls or the piles of rubbish.

Now, cleaning the farm is not a picnic, consider it in any way you want; it means hard work and blistered hands, and as it is a necessary evil, every farmer tries to have the proper equipment when winter comes. If he can use regular equipment in the work, he does so, but often he can be prevailed upon to buy a special team.

Illustrated herewith is a low gear of peculiar design. It is intended for use with a passenger car, truck or tractor; a little change in the design of the pole, however, will enable one to use it with a team of horses. At any rate, the wheelwright or blacksmith, if he has a few hours to spare, can build one of these and have it on hand for the farmer, who is sure to see its utility.

What could be better for the farmer than this wagon? It has a road clearance of eight inches, and though it cannot be used in



Plan, Cross Section and Detailed Drawings of a Handy Lowgear for the Farmer.

Digitized by Google

swampy land or on very rocky roads, it can be used on ordinary farm land for hauling rock, stumps, cord-wood, or sacks of sand and gravel.

It can be used the year around: in the Spring for bags of fertilizer; in the Summer for sacks of grain and feed; and in the Fall for farm products. A high lumber cart is of advantage, of course, for traversing rocky roads; but when one thinks of the problem, isn't the high cart just a habit today? Most of our country roads are good, hard dirt or macadam; not like those of days past when occasionally we encountered a three-foot boulder in the middle of the path and the horse either had to airplane over it or pick his way around, leaving the team to "straddle" it or turn turtle. And so, I say, the high-wheeled, awkward cart is a habit.

You would never think of building your house on stilts, even though rain fell every day in the year; you would be more likely to dig a cellar, cement it carefully and grade the land. That's just what has been done in the way of roads—they have been dug out to below the frost line and filled with rock and cement, and there is no more danger of encountering a boulder in the middle of the road than of finding the kaiser in Paris.

The one great advantage of a low-hung cart is that the farmer need not lift heavy freight three feet in the air to load it on the team; neither does he have to roll it up a long or steep incline when using the low gear illustrated.

The low gear is of the fifth wheel design, a more practical construction than the old chain- and eye-bolt type in which the chain was continually breaking and allowing the front wheels to travel their own way, unincumbered with the heavy load.

The body should be of oak throughout, firmly braced at all corners and joints. The distance between the wheel centers is 11 feet six inches. Any heavy type of wheels can be used. Those illustrated at the rear measure four feet at the front, three feet in diameter.

Both axles, L, are square forgings, and fitted to the top and bottom of each axle are oak beams, which have been grooved out to fit the axle snugly. At the rear an extra block, M, is interposed between the axle blocks and the floor boards. Beneath the floor boards are the two sills. The front sill, G, is of oak and measures 6 by 3 inches and is 3 feet 6 inches in length, which is the width of the body. The rear sill is of 8 by 3 inch lumber and of the same length as the front.

The floor boards, J, three in number, are two inches thick and rest upon the sills; they are clamped by U clamps between the axle block M and the rear sill. For reinforcement, there are three planks, two at the sides and one at the center, the side sills measuring six inches in width, three in thickness and seven feet eight inches in length, while the center one is the same width and thickness, but ten feet long, and acts as a hitch for the fifth wheel.

The floor boards, in addition to being held at the rear between the sill and block, are bolted to the front, side and center sills, the heads of the bolts being countersunk.

Resting on top of the floor boards is an edging of 3 by 4 inch boards, as shown at K. If the gear is to be used for heavy rough work, this edging should be made of quarter-inch strap iron, and strips of this same stock extended lengthwise at about nine-inch intervals along the floor.

The fifth wheel construction is clearly shown in the sketch at F. The hitch bar, N, measures three feet 10 inches in length and is made from 4 by 3 inch stock. At the front an eye-bolt and special wrought iron fitting is provided. This arrangement is illustrated at O, P and Q, the front member being made so as to fit the frame member of the truck, tractor, or passenger car.

The king bolt, R, passes through the two axle blocks, iron axle and hitch bar, and at the point where the bolt passes through the axle the axle should be forged out in such a way as to leave practically as much metal at that point as in the rest of the axle. If this is not done, the front axle will not be strong enough. The fifth wheel, S, measures 20 inches in diameter and two inches thick.

The retaining tongue, T, should be nearly the same diameter, of the same stock and fitted with a projection so that it can be bolted to the hitch sill at the center of the body.

The detailed construction of the whole gear is clearly shown in the accompanying illustration. A shows the device in use; B, a plan view; C, the side cross section, taken at the center sill; D, detail of the rear construction; E, front construction, and F, details of the fifth wheel arrangement.

RAISE HORSES OF BETTER QUALITY.

Large numbers of undesirable, mediocre horses are being turned onto the market at present in all parts of the country in order to save feed, according to reports to the United States Department of Agriculture.

As a consequence the market is glutted with commonplace animals of this description to the extent that the prices paid are unusually low. The department urges farmers to raise horses of better breeding and quality. The supply of desirable quality heavy draft horses or animals suitable for artillery or cavalry purposes is below the demand, while the prices of such animals are correspondingly high.

In view of both the domestic and foreign demand during and after the war for quality horses, farmers should begin now to stock up their barns with horseflesh of the desirable type.

Under existing conditions feeding stuffs for work animals are extremely high in price. On this account it is imperative that the farmer should winter only work stock of the useful, most efficient, and valuable type.

One heavy draft horse will perform the work of practically two undersized, inferior plugs, while such an animal can be fed at about the same cost for maintenance as for one of the plugs.

When the farmer desires to sell a heavy horse of quality and breeding he can always locate a ready market, whereas inferior animals ordinarily can be disposed of only at a sacrifice.

An Illustrated History of Smithing

Part III—Blacksmithing As Practiced In Southwestern Asia From 2000 to 1000 Years Before Christ

BY H. H. MANCHESTER

One of the unsolved questions of ancient history is where the manufacture of iron was first developed. While, as we have seen, there have been discovered in Egypt a few specimens which are believed to belong to a very early date, so little use of iron was made there that it has been claimed that iron working must have originated elsewhere. Some scholars have credited it to the Cretans, others to the Philistines, and still others to the Hindoos.



A Relief from the Assyrian Bronze Doors at Balawat, Illustrating the Work of the Assyrian Smith.

Perhaps the earliest mention of iron in literature comes from the ancient Hindoos. It will be remembered that these Hindoos were Aryans and related more closely to the ancient Greeks than to the Turanian or Semitic peoples about them. From the north they swept down as conquerors into India, carrying with them the religious hymns which are known as the Vedas. These hymns date all the way from 2000 to 1000 B. C., and there are a number of passages in them which indicate that iron was already well known to the Hindoos.

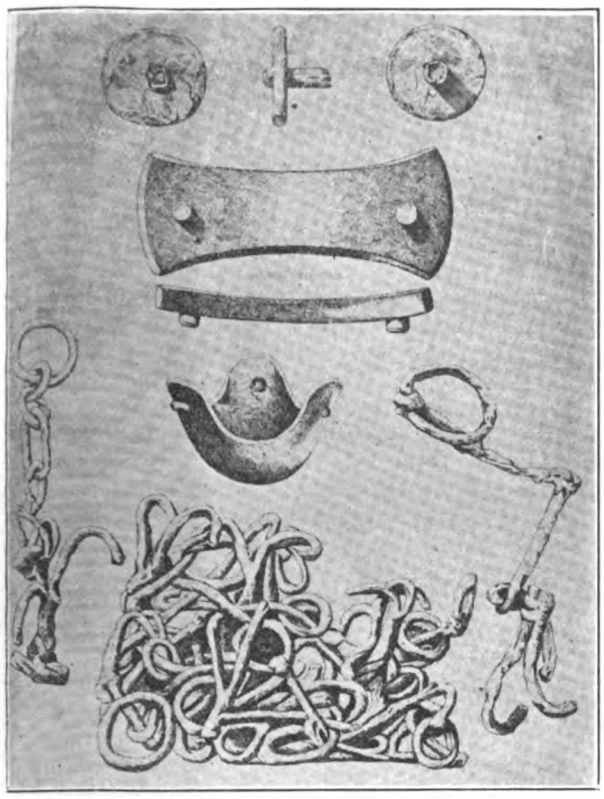
Even here, however, there is some doubt, for certain archaeologists claim that the Sanscrit word which is translated "iron" should be rendered "metal." The more accepted version, however, is iron, and iron at least best fulfills the apparent meaning in a number of the passages. In the ordinary translations we read of "showers of iron javelins," "arrows tipped with iron," "forts and cities strong as iron," "iron swords," "columns of iron," "tusks like iron," and "jaws of iron."

One significant passage in the fourth and sixth mandalays of the Rig Veda speaks of Agni "burning the woods, smelting them like a smelter." Strikingly enough, he is said to "whet his rays of splendor like an edge of iron."

In another interesting passage in the Black Yajurveda, we hear of a weapon that is a "burning iron barrel with a long bore inside, which could kill hundreds at a time." This was probably some device for throwing fire.

Whether the metal signified in each of these passages is iron or not, we have at least evidence that the ancient Aryans were great smiths and familiar with the working of metals.

Digitized by Google



Metal Products of the Assyrian Smith of About the 8th or 9th Century, B. C.

Again and again the Vedas speak of chariots, armor, and weapons, and the inference is probable that it was the possession of such improved munitions of war which enabled them so quickly to overrun the territories of central and southern India.

Another early historic record connecting iron and India is where the Hindoo prince, Porus, in giving his allegiance to Alexander the Great, presented him with 30 pounds of Wootz iron, which seems to have been of a better quality than known to the Greeks at that time. In fact, the iron of India was for centuries famous for its qualities.

In the beginning the Hindoo smith seems to have used merely a blow-pipe to quicken his charcoal fire, but even in ancient times the goat skin bellows was invented, which was often worked with the feet.

An early Hindoo picture which we are enabled to reproduce shows an arrangement through which the bellows could be worked by hand. The date of this picture, however, is after the first intercourse of the Hindoos with the Europeans, and this form of bellows may or may not have originated in India.

In Babylonia and Assyria.

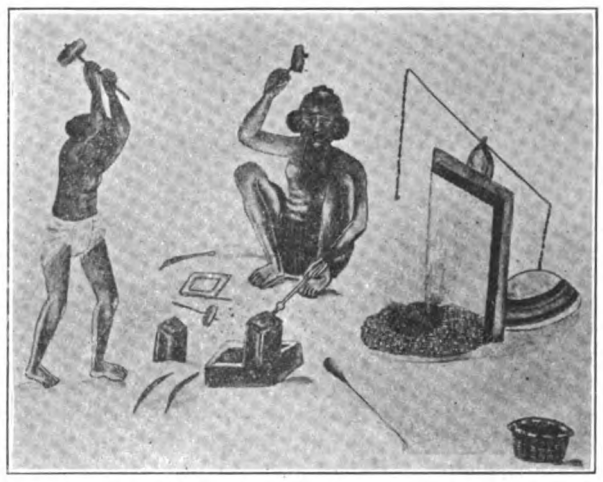
To the Babylonians iron seems to have been first known as a component of fallen meteors, for the Babylonian name, An-bar, signified "stone from heaven."

Probably Babylonian smiths worked other metals long before they did iron. Wheelwrights, however, must have come into existence in Asia Minor as early as 2920 B. C., for the "Stele of Victory" of Eannatum of Lagash about that date shows the king riding in a chariot, though there is no evidence that it had metal tires. This is perhaps the earliest known picture of a wheeled vehicle. Incidentally the same picture includes helmets, but they may have been of leather.

There are various references to silver in the laws of Hammurabi, which date from about 2200 B. C. This implies the presence of smiths, but there is no word in these regulations which has been definitely identified as signifying iron, and the blacksmith may not have yet come into being in Babylon.

When we come to the period of most of the actual remains of Babylonia and Assyria, beginning with the 10th Century B. C., we find the iron objects which have been discovered far more numerous than in the case of Egypt. At Nineveh, for example, Place discovered about 150 tons of metal relics, a large share of which were iron. These included hooks, grappling irons, picks, mattocks, sickles, plowshares, and hammers.

We are reproducing several plates from Place that illustrate the metal objects that he discovered. It is particularly noticeable that the hammers, picks, and mattocks had by this time developed sockets for handles, which, it will be remembered, had not been

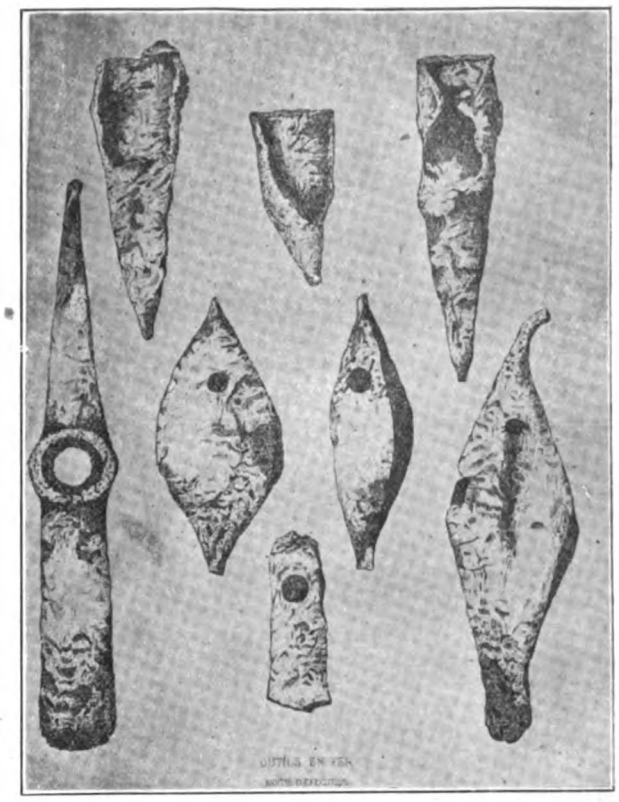


A Mediaeval Hindoo Blacksmith. The Form of Bellows, Illustrated at the Right, Followed the Blow Pipe.

in use in the case of Egyptian tools. Especially noteworthy also are heavy chains, tires for wheels, screws, and screw nuts, none of which seem to have been discovered in Egypt. Layard discovered an interesting double-handled saw about 42 inches in length.

Sometimes an object was formed of a core of iron which was covered on the outside with bronze, probably to keep it from rusting.

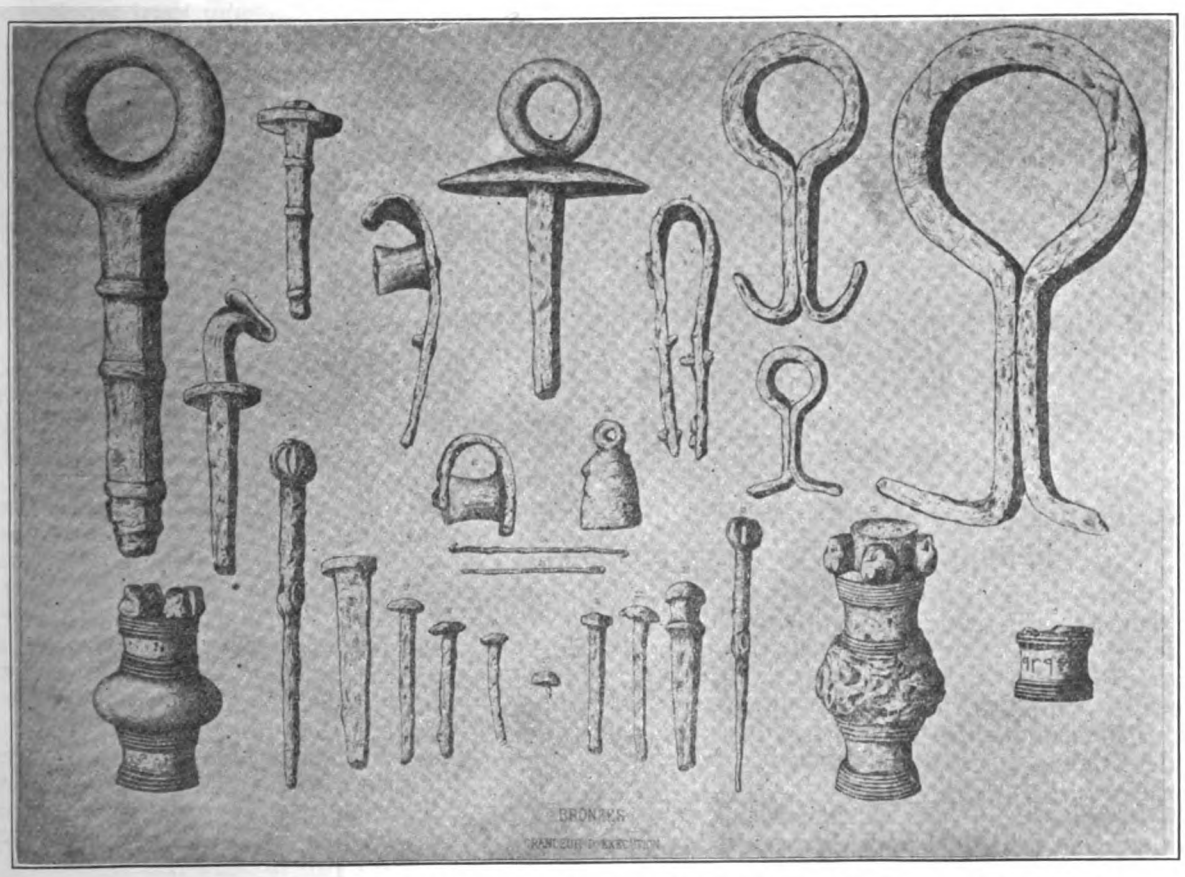
Bronze was of course worked in even more than iron, as we have seen was also



Assyrian Iron Tools of About the 8th or 9th Century, B. C.

the case in Egypt. One of our cuts shows a small detail of the relief work on the bronze bands that strengthened the gates at Balawat, which were doors of the palace of Shalmaneser III, 855-824 B. C. This relief work was beaten out from the reverse side, and then finished by engraving. The subjects included numberless details of campaigns, camp scenes, marches, battles, sieges, booty, captives, and sacrifices.

Our cut is remarkable in depicting an armored car, which was used in siege work, and itself probably represents the work of smiths. It might even be said that in it some ancient Assyrian smith had produced the predecessor of the tank.



Tools, Ornaments and Household Implements, Illustrating the Class of Work Done by the Ancient Assyrians.

TENTH ANNUAL CONVENTION.

The Tenth Annual Convention of the Blacksmiths, Horseshoers and Wagonmakers' Association of Oklahoma, held at Durant, Oklahoma, on November 18th and 19th of this year was a decided success, and marks a new era in the work of the association. About 150 delegates from all parts of the state were present, and twenty-six new members were enrolled.

The Southeastern District organization met at the same time, and in the same building, and before the close of this latter convention, both organizations were united, the District organization becoming auxiliary to the State, but still retaining its original powers and privileges.

Definite steps were taken to organize the State organization more thoroughly and judging by the spirit manifested by the delegates, this will be accomplished before the next annual meeting.

A noticeable feature of the convention was the part taken by the salesmen in attendance, who vied with each other in making the convention and the work done, a lasting benefit. The spirit manifested was co-operative and a general tendency was shown to get together on prices and to eliminate both the price cutting and credit systems.

The newly elected officers of the State Association are as follows:

W. A. Purdy of Durant, Okla., President.
W. M. Kilius of Henryetta, Okla., Vice-Pres.
A. R. Bradshaw of Okmulgee, Okla., Sec.-Treas.
J. H. McCurley of Bokchito, Okla., Exec. Com.
E. M. Blantin of Durant, Okla., Exec. Com.
L. J. Swartz of Caddo, Okla., Exec. Com.

The Association will hold its next annual convention at Oklahoma City on the third Monday and Tuesday of November, in the year 1919, and it is hoped that all of the old members who were present at Durant as well as the many new members will be present at this meeting.

Digitized by Google

BLACKSMITH & WHEELWRIGHT

The Pioneer Journal of Its Class in the World.

Member of the Audit Bureau of Circulations.

PUBLISHED MONTHLY BY

M. T. RICHARDSON COMPANY,

71-73 MURRAY STREET, NEW YORK.

POST OFFICE Box, 654. TELEPHONE—7377-7378 Barclay.

CHICAGO OFFICE, Lytton Building, 14 Jackson Boulevard

Entered as second-class matter at the Post Office in New York City.

M. T. RICHARDSON, President and Treasurer — F. R. WHITTEN, Secretary

M. T. RICHARDSON, Editor

FRANK L. AVERY, Managing Editor

F. R. WHITTEN, Advertising Manager — H. F. LUDINGTON, Western Representative

GEO. A. SMITH, Eastern Representative

FRANKLIN MYERS, Art and Copy Dept.

FOREIGN AGENTS:

NEW ZEALAND

MR. R. HILL, Matlock House, Davenport, Auckland, New Zealand.

GREAT BRITAIN

ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance.....$1.00
One Copy, six months, in advance.....60 cents
Single Number.....10 cents
Canadian subscriptions.....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English Money.

Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

ADVERTISING RATES SUPPLIED ON APPLICATION.

SPECIAL NOTICE

Subscribers failing to receive their magazine regularly will favor us by giving us notification to that effect.

CHANGE OF ADDRESS

Subscribers who desire the address of their paper changed should send us the old as well as the new address.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

Our Editor's Letter.

IN every mail, I receive at least one letter which tells me how well one of my blacksmith brothers likes the Blacksmith & Wheelwright, and with every one of these pats on the back, my chest expansion increases a half inch or so. You can see therefore that there is great danger in spreading so many compliments upon my head.

At the same time, however, I have arrived at the point where I am bound to accept most of these kindly letters with a "grain of salt," so to speak. I realize that all of the blacksmiths are kind-hearted people, who believe in the old saying that a "Person can catch more flies with molasses than with vinegar." Personally, I believe in giving praise whether it is due or not, and I try at least to find the good there is in anyone, and overlook the evils.

Now, if everyone adopted this same plan, I am sure that as a Nation we would be the happiest people on Earth. But isn't it true that soon we would feel that we were the height of perfection, and could not do anything wrong if we tried? For this reason, I believe that the class of "knockers" is necessary in order to promote our welfare, and so, brother blacksmiths, I call upon those of you who are good natured "knockers."

I am not so pleased with the magazine that I feel it is pleasing everyone of the readers, I only know that those readers who are not pleased are too polite to criticize. Now, here is your chance, brother readers who are not satisfied with our magazine, to come forward with some criticism.

I shall expect within a few days after this paper has been circulated to receive at least one letter a day telling just how you want the magazine bettered; telling just what sort of an article you want to appear in the magazine; telling just what is wrong about it—perhaps you don't like the Editorial Department; perhaps you don't like the Correspondence Department, or possibly you don't care for all the Stories.

Don't cancel your subscription, but write to us giving us "fits." Tell us you think we are not fulfilling our part of the bargain and giving you what you paid for; telling us why you think so, and then I shall be able to reduce my chest expansion and publish some of the articles that you like.

A Comment on One of the Best Ideas We Ever Have Received.

IN this issue we are publishing in our Workshop Experience Department, a letter which we have chosen to term "The Best Letter Ever Received." It was written by one of our brothers from Ohio. As a matter of fact, this same obliging brother wrote us a number of other letters at the same time, all of which will be published in due course.

We want to call the attention of our readers to this letter, and tell more of the circumstances, as well as explain the idea still further. The Ohio writer states at the end of one of his letters that he is a person of no education, that he is not much of a writer, but trusts that we will see fit to publish at least a portion of his various letters.

There is only one part of his letter which we disagree with, and that is the sentence in which he states he is a person of no education. This Ohio writer, if you will read his letter, proves that he is a person of wide education. Perhaps he has not attended the public schools any length of time; perhaps he cannot write an excellent hand; perhaps he does not know algebra or geometry. This we are willing to admit if he says it is true, but his experience must be an education in itself.

He has found the weak link in the chain which is holding down the blacksmiths at the present time, and broken it. He has suggested to you, brother readers, a remedy for your present conditions. He has shown you how you can better yourself, if you care to do so.

You cannot expect to get more money unless you use your brains, and are willing to try just a little bit. He has suggested that once a year, at least, every reader write to the Blacksmith & Wheelwright, and give conditions as well as prices prevailing in that writer's part of the country. It means a wholesale exchange of ideas, as well as an exchange of courage.

You, brother blacksmith, do not dare to charge what your work is worth, if you feel that by doing so you will drive away your customer for good. If, however, you can show him that you are not charging any more than one of your brothers in the next town, or the next state, you can keep your customer with little or no trouble.

Just remember, however, that unless all of you do your part, the plan will fail. We are willing to publish your letters, in fact, we are more than pleased to be able to receive your letters and we assure you that our best efforts are turned towards the betterment of your conditions; that is what the Blacksmith & Wheelwright is for; it is a magazine devoted to blacksmiths; it is written for blacksmiths, and it works with blacksmiths, but we can only help those who are willing to help themselves.

We Gladly Answer Any Engine Questions From Our Readers.

OF late, we have received from our blacksmith subscribers, a number of questions relative to single cylinder gasoline engines such as are used for power purposes on the farm, or in the shop, and it has occurred to us that undoubtedly many of our blacksmith readers are called upon to repair such engines.

For this reason we want to call the attention of our readers to our Automobile Question Department, and assure you that such questions can be considered under the head of Automobile Questions.

If you want to know about an engine of any sort, do not hesitate to write us a letter telling us what kind of an engine it is, giving us a fairly good description of it, and we will try to advise you about it.

This brings up the suggestion that possibly every blacksmith who is not particularly busy can enlarge his field of work by repairing gasoline farm engines. The single cylinder engine of this type is usually easier to repair than the ordinary automobile engine.

Occasionally, however, one is apt to run across an engine which the farmer claims cannot be repaired, or cannot be started, simply for the reason that he does not understand it. The two cycle engine is an eccentric machine. Anyone who has ever handled one of them will know just how "finicky" the machine can be when it doesn't want to start.

When you come across one of these balky machines, write us a letter explaining the circumstances, and we will try our best to help you out. All of our Automobile and Engine questions are answered by personal letter, and if you tell us not to, we will not publish your letter. However, we like to publish them so as to help the other blacksmiths also. Don't forget that we are here to help you.

Now That the War Is Over Let Us All Get Back to Business.

THERE are so many things to talk about this month, that it is hard to make a choice. For the first time in four years, we can go about our business with unclinched fists and a smile of happiness. Every one of us has the feeling of a little boy released from school. He wants to go out on the street and shout at the top of his lungs. I suppose many of us did just exactly that a few weeks ago when the word came that the war practically was over.

Within a few months all of us will be back on the old basis. We will be able to obtain iron and coal, and business will pick up again as it was four years ago. There is no reason why we cannot put the woodworker and the metalworker on the map, so to speak.

The present war has shown that the blacksmith is needed as much, if not more, than any other worker. It is up to us, brothers, to get out and fight for business. We know that our blacksmith business is important to the world. The coal miners and the miners of all metals require drills; the manufacturers need forgings in every branch of their work, and the farmer still more needs horses in his work. We have paid for the war, and it is over. Now let's get down to business and try to get our money back by hard work.

The advice which we gave you four or five months ago still holds good. Be careful about buying too much iron or coal. Wait for a little while until the market readjusts itself. for unquestionably there will be plenty of both products in a few months.

A Valuable Series of Articles Begins in Our January Number.

BEGINNING with the January number of The Blacksmith and Wheelwright, there will be published a series of articles entitled "The Metal Turning Lathe." Every blacksmith, (and doubtless there are many of them among our readers who have cause to use lathes of any sort or intend to use lathes,) should be sure to read these articles.

There are few mechanics who really know how to use a lathe. There are many of them who can do work upon a lathe, but how many can do it in the right way? How many blacksmiths realize how valuable a turning lathe can be made if they know how?

This series of articles should be of more interest to the blacksmith than any other branch of the trade. It is published very complete and will be published in short installments. Don't fail to read it.

Digitized by Google

Write Us Today How You Like Our Automobile Articles.

A SHORT time ago we asked our readers to write us telling how they liked the Automobile articles which are appearing in the magazine. We received only a few letters in answer to our appeal. Some of the letters told us that the writers wanted more automobile information. Other letters advised us not to publish more than the one article.

They were about "fifty-fifty," and our problem is as near solved as it was when we wrote the editorial. Therefore we call upon you again to write telling just what you want in the way of automobile information. Do you want us to publish regularly more than the two pages of automobile information?

How many of you own automobiles and like to know about them? Perhaps we can give you one or two suggestions in every issue which will save you considerable money. At the same time, however, we are publishing a Blacksmiths' magazine, and unless the majority of our readers want automobile information, we do not like to publish too much of this sort of reading matter.

The Tire Vulcanizing Business As a Side Line for the Smith.

WE doubt if there is any branch of the automobile field which offers such big profits and such easy money as that of tire repairing and we would like to suggest that those of our blacksmith readers who are unable to make their living by blacksmithing alone, investigate the tire repairing proposition.

Vulcanizing tires is an art in itself, and though it requires a little study, within a short time the average blacksmith should be able to familiarize himself with this work and be able to make ordinary tire repairs. As time goes on, he will find himself more able, until finally he can repair practically any tire that is brought into his establishment.

The automobilist of today realizes more than ever how much money he can save by having his tires repaired rather than buying new ones. A new tire costs anywhere from $12.00 to $100.00, some of them even more, and it is easy enough to convince the automobilist that if he can save a $25.00 tire by paying out $5.00 for his repair, he is saving considerable money in the course of a year.

Everyone knows that tire expense is the greatest item in maintaining an automobile and it will always be, so long as the automobilist chooses to scrap his tires rather than have them repaired.

We are willing to help any of our readers who want to start in the tire repairing business, give them all the information we can, and tell them what sort of equipment they will need. Tire repairing equipment does not cost much in proportion to the profits, and even in the small country towns, a tire vulcanizer will pay for itself in a very short time. Thereafter the money made by the machine is all profit.

You, brother blacksmith, who have spent years of study learning your trade, will be surprised at the ease with which you can learn to repair tires. Instead of going home at night with every muscle in your body aching, you will not only find that the work of repairing tires is a gentleman's job as compared with actual blacksmithing, but you will find that the money you make is much greater.

To a certain extent this editorial answers the question of one of our readers who wrote us not long ago asking how he could make $6.00 a day in his shop. We are forced to admit that we cannot see how a blacksmith can make this amount of money doing just blacksmith work.

Of course, there are some blacksmiths who can do this. That depends upon the part of the country in which they are located, and the amount of work they are willing to do. The man who is engaged in an overcrowded business cannot expect to make the money that a man does who is all alone in his profession.



Prices in Illinois.

From Fred F. Kasserman, Illinois.—I am enclosing a copy of prices we adopted here. A list which was agreed to by the smiths in our town and in a few of the small towns surrounding.

Our prices are not high, but better than we have been getting, and we are doing our best to form a county organization, as soon as we can, so as to have a uniform price the county over.

Those few smiths who did not attend the meeting will receive a price list just the same and we believe that when they find out we can get the prices, they will also charge the same.

Horseshoeing.

4 New Shoes, up to No. 3 inclusive	$2.00
4 New Shoes, Nos. 4 and 5	2.25
4 New Shoes, No. 6 and up	2.50
4 Old Shoes Reset	1.25
4 Old Shoes Retoed	1.50

New Plates 25 Cents Less.

Wagon Work.

New Tongue, Pole only	$3.00
New Tongue, Brace each	1.25
New Axle, Front	3.50
New Axle, Hind	3.00
New Bolster, Front or Hind, old standards	3.00
New Standard, Old Irons	.75
New Bent Hounds, Old Irons	5.00
Cutting Down Wagon, up to 1½	12.00
Filling Wheels (Tire extra)	20.00
Tires Reset, up to 1½, per set	3.00
Tires Reset, 1½ and up, per set	4.00

Buggy Work.

New Shaft put in	$2.00 to $2.50
New Cross Bar, Iron extra	1.25
New Pole Circle put in	2.00
Cutting Down Buggy Wheels, Tires on	10.00
1 New Spoke	.25
New Spokes, more than 1, each	.20
Refilling Wheel, per Spoke	$0.15 to .20
Putting in Half Rim	.90
Putting in New Reach, Straight	1.00
Singletree Sword End	.50
Singletree Clip End	.75
Doubletree, Old Irons	1.00
Set Box in Set New Wheels	2.00
Set Box in Set Old Wheels	1.00
Axle Cap	2.00
Head Block	1.50
Straighten Axle (Clips extra)	1.00
Welding and Setting Broken Axle	1.50
Welding Shaft Iron (Bolts extra)	.50
New Fifth Wheel	$4.00 and up

Plow Work.

New Plow Handle	$0.75 and $1.00
New 12 Plow Share	4.50
New 14 Plow Share	5.00
New 16 Plow Share	5.50
Sharpening 12 Share	.25
Sharpening 14 Share	.30
Sharpening 16 Share	.35
Sharpening Standing Cutter	.10
Sharpening Roller Coulter	.35
New Point and Sharpen Share	1.00
New Point and Sharpen 16 inch Share	1.10
Removing Share from Plow	.10
New Bolt, extra, each	.05
New Land Side	$2.00 and up

Mower and Binder.

Mower Sickle Welded, Piece furnished	$0.75
Binder Sickle Welded, Piece furnished	1.00
Sec. put on, each	.10
Guard Plates put on, each	.10
New Tongues	$3.00 and up

Work not specified 75 cents per hour and up, rivets, bolts and material all extra.

Cultivators.

Resharpening Shovels, per set	$0.60
Repointing Shovels, per set	2.00
New Shovels, Old Backs, per set	3.25

The Best Letter Ever Received.

From an Ohio Reader.—I think every blacksmith should write to the Blacksmith and Wheelwright at least once a year and tell the existing conditions in his part of the country, the prices, etc., in the same way as the farmer does to his trade papers.

Our blacksmith papers should publish more about conditions and how to get our money as well as how to do work that all blacksmiths should know. There are more actual mechanics among the smiths than there are business men. They know how to do their work, but they can't attend to their business interests.

As an instance of what I mean, I remember about a good mechanic that I once went to see. He had just finished a fine piece of forging. I asked him how much he was going to charge, and the poor fellow didn't know what to say. He only knew that he and his helper had worked two hours on it, and that he generally charged one dollar an hour. I didn't say anything, but thought a whole lot—there was more muscle used than brains.

The blacksmith business has been run on a "wild cat" basis, and the cat is growing wilder every year. The only way Uncle Sam can get good mechanics in the blacksmith line is to help them in their business and encourage them, or there won't be any in a few years. Every blacksmith should pass an examination before he is allowed to work at the trade.

Some time ago a brother from Kentucky asked about forming an organization of blackmiths. He wanted to know if the blacksmiths should organize. I will say that if there is any principal or journeymen's union in your town, organize, but if there are not any unions, don't try it; it is lost time.

(We are perfectly willing to print such a scale of prices or to publish any interesting letters we receive, therefore we should advise our readers to take advantage of this offer; it is your chance to better yourselves. —Editor.)

A Hammer Handle Kink.

From James Howard, Pennsylvania—Every blacksmith knows that hammer handles work loose very quickly if they are used very much and no matter how the wedges are made, they keep slipping out. I have found a way to overcome this, which may be of value to some of my brothers. Make the wedge for the handle in the usual way, and after it has been finished, punch a hole in its center so as to leave a burr on one side.

This wedge is driven in the hammer handle in the usual way, but when it is once in place, it is sure to stay, because the wood swells into the hole and around the burr and prevents the wedge from ever coming out again.

An Answer for Max Maser.

From J. A. Allen, Colorado.—I have traveled and worked in this country from the Missouri river to the Pacific ocean, am 50 years old and known as a plow expert. The best material I have ever found for pointing a plow is rasp steel, that is if you have any. or hammered lay steel ⅜ by 1¾ inches as shown at A. Cut this off four inches long in the shape of a diamond and draw the long corner as shown, this finishes the top piece.

The bottom piece is made of toe calk steel ⅜ by ¾ by 5 inches long, as shown at B. This piece should be drawn to a long thin point at the back with a short draw on the front end. This piece is the land side and can be made any length to fit the plow to be pointed.

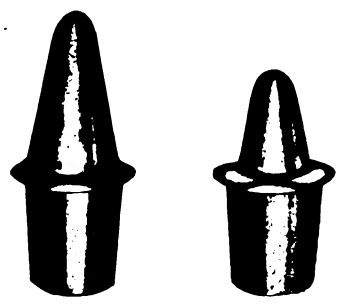
These are both welded at the point or front

Digitized by Google



The weight of a heavy man suspended from this calk failed to budge it.

ROUND SHARP



Standard Blade | Short Blade



The same man's entire weight failed to twist this calk so much as a hair.

Regular Blade



Standard Blade



Short Blade



DIAMOND Calks
Fit Absolutely Tight

don't twist in the shoe or fall out, and we know it because—

FIRST—We make them so accurate that the calk holes and calk shanks don't vary 1/10,000 of an inch in diameter.

SECOND—The extra heavy reinforcing around the calk hole adds 50% to the grip of the calk.

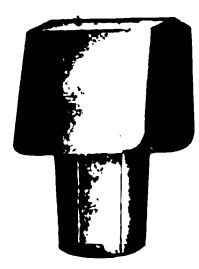
THIRD—The small ribs on the calk shank bite into the sides of the calk hole and prevent twisting.

FOURTH—We've made severe tests in our shop which show that the weight of a heavy man suspended from the calk can neither pull it out nor twist it so much as a hair.

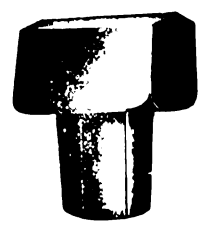
FIFTH—Users of Diamond Calks unhesitatingly testify to their accuracy of fit, and—

There's a Diamond Calk for every purpose

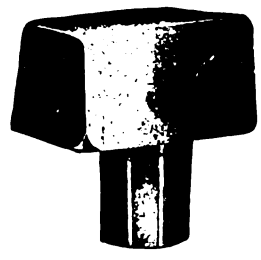
DIAMOND CALK HORSE SHOE CO.
Duluth, Minn.



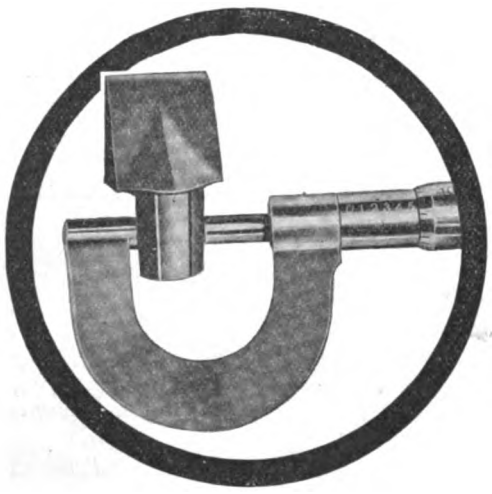
Standard Blade



Short Blade

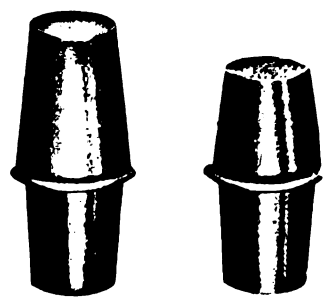


Block Calk

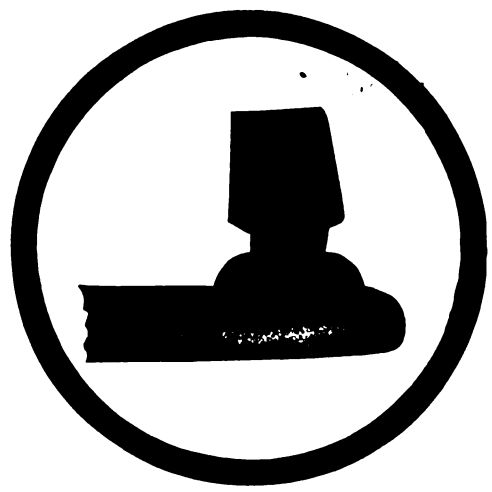


The shanks and calk holes are so accuarate as not to vary 1-10,000 of an inch in diameter.

ROUND DULL



Standard Blade | Short Blade



The heavy reinforcing around the calk holes adds 50 per cent to the "grip." The ribs on the shank absolutely prevent turning or twisting.

Index to Advertisers

Aetna Nut Co., horseshoe calks....Front cover
Akron-Selle Co., gears....4th cover
American Calk Co., calks....Front cover
Anti-Borax Compound Co., welding compounds....304
Armstrong Mfg. Co., bolt dies....308
Armstrong-Blum Mfg. Co., punches and shears....Front cover
Bailey Co., Geo. D., ball thrust bearings, 2d cover
Barcus Mfg. Co., horse stocks....3d cover
Barnett, G. & H., Co., files and rasps, Front cover
Bertschy-Bermo Co., welding plants....306
Bicknell Mfg. & Supply Co., punches and shears....325
Birch Motor Cars, motor cars....325
Bradley, C. C., & Son, shaft coupler....304
Buchanan, C. G., Chemical Co., industrial chemicals....308
Buffalo Forge Co., blacksmiths' tools....307
Burden Iron Works, horseshoes....3d cover
Butterfield & Co., taps, dies and screw plates....308
Campbell Iron Co., supplies....325
Canedy-Otto Mfg. Co., blacksmiths' tools....327
Capewell Horse Nail Co., horse nails, Front cover
Champion Blower & Forge Co., blowers....303
Champion Tool Co., blacksmiths' tools....326
Chase, L. C., motor topping....Front cover
Childs, S. D., & Co., steel stamps, Front cover
Columbus Forge & Iron Co., anvils....304
Columbian Hardware Co., vises....4th cover
Cortland Welding Compound Co., welding compounds....327
Cray Bros., blacksmiths' tools....327
Crescent Machine Co., woodworking machinery....4th cover
Diamond Calk Horseshoe Co., horseshoes....320
Edwards, C. D., Mfg. Co., shears....306
Electric Blower Co., blowers....322
Electric Wheel Co., wheels....306
Empire Mfg. Co., wheels....Front cover
Felton, Sibley & Co., paints....301
Firestone Tire & Rubber Co., tires....328
Fisher & Norris, anvils and vises....308
Franklin Steel Works, toe calks....301
Giant Grip Horseshoe Co., horseshoes....323
Gogel Mfg. Co., tire heaters....306
Greenfield Tap & Die Corporation, screw plates and blacksmiths' machinery....326
Gwilliam Co., ball bearings....4th cover
Hall Co., Sherwood, sleigh knees....306
Hart Mfg. Co., stocks and dies....4th cover
Harvey Spring & Forging Co., auto springs....328
Hay-Budden Mfg. Co., anvils....4th cover
Heller Bros., horse rasps, tools, etc....308
House Cold Tire Setter Co., tire setters, hollow and spoke augers....4th cover
Jenner, H. W. T., patents....322
Kerrihard Co., hammers....4th cover
Lauton Truck Co., truck units....305
Leonard-Morton & Co., shoes....321
Linde Air Products Co., oxygen....308
L. S. P. Calking Machine Co., calking machines....3d cover
Macgowan & Finigan Cordage Co., hammers....308
Mayer Bros. Co., hammers....3d cover
Ness, Geo. M., Jr., steel stamps....Front cover
Neverslip Works, The, horseshoe calks....306
Niehoff & Co., Paul G., defectometers....322
Nicholson File Co., files and rasps....304
Oneida National Chuck Co., chucks....306
Parker, C. L., attorney....306
Parks Ball Bearing Machine Co., woodworking machinery....322
Peck, Stow & Wilcox, pincers....328
Phoenix Horseshoe Co., horseshoes and toe calks....325
Porter, H. K., bolt clipper....4th cover
Prentiss Vise Co., vises....4th cover
Rosewater Electric Co., blowers....4th cover
Rowe Calk & Chain Co., horseshoe calks, Front cover
Sampson & Murdock, directories....325
Shaler, C. A., Co., vulcanizers....301
Sheldon Axle & Spring Co., axles....324
Standard Horse Nail Co., horseshoe nails, 4th cover
Standard Horseshoe Co., horseshoes, 4th cover
Star Mfg. Co., agricultural implements, 4th cover
Sterling Tire Corp., hoof pads....302
Stokes Bros. Mfg. Co., rasps....Front cover
Superior Oxy-Acetylene Machine Co., welding outfits....306
Thompson Tuyere Iron Co., tuyere iron, 4th cover
Union Horse Nail Co., horse nails....326
Western Newspaper Association, books....301
West Tire Setter Co., tire setters, hammers....327
Wheel B. Top & Hardware Co., supplies....325
Whisler Mfg. Co., nut splitters, jointer heads....306 and 325
Witte Engine Works, engines....325
Young, W. F., veterinary remedies....306

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co. ....4th cover

Anvils
Columbus Forge & Iron Co....304
Fisher & Norris....308
Hay-Budden Mfg. Co....4th cover

Attorneys
Parker, C. L....306

Automobile Springs
Harvey Spring & Forging Co....328

Axles
Sheldon Axle & Spring Co....324

Ball Bearings
Gwilliam Co....4th cover

Ball Thrust Bearings
Bailey Co., Geo. D....2d cover

Blacksmiths' Machinery
Greenfield Tap & Die Corporation....326

Blacksmiths' Tools
Buffalo Forge Co....307
Butterfield & Co....308
Canedy-Otto Mfg. Co....327
Champion Blower & Forge Co....303
Champion Tool Co....326
Cray Bros. 327
Heller Bros. Co....308
Nicholson File Co....304
Peck, Stow & Wilcox Co....328

Blowers
Buffalo Forge Co....307
Champion Blower & Forge Co....303
Champion Tool Co....326
Electric Blower Co....322
Rosewater Electric Co....4th cover

Bolt Dies
Armstrong Mfg. Co....308

Bolt and Rivet Clippers
Porter, H. K....4th cover

Books
Western Newspaper Association....301

Calking Machines
L. S. P. Calking Machine Co....3d cover

Calks, Horseshoe
Aetna Nut Co....Front cover
American Calk Co....Front cover
Diamond Calk Horseshoe Co....321

Calks, Toe
Franklin Steel Works....301

Chemicals (Industrial)
Buchanan, C. G., Chemical Co....308

Chisels
Champion Tool Co....326
Peck, Stow & Wilcox Co....328

Chucks
Buffalo Forge Co....307
Oneida National Chuck Co....306

Defectometers
Niehoff & Co., Paul G....322

Directories
Simpson & Murdock Co....325

Disc Sharpeners
Mayer Bros. Co....3d cover

Drills

Engines
Witte Engine Works....325

Farriers' Tools
Barnett, G. & H., Co....Front cover
Champion Tool Co....326
Heller Bros. Co....308
Peck, Stow & Wilcox Co....328

Files and Rasps
Barnett, G. & H., Co....Front cover
Nicholson File Co....304
Stokes Bros. Mfg. Co....Front cover

Forges
Buffalo Forge Co....307
Champion Blower & Forge Co....303

Gasoline Engines
Witte Engine Works....325

Gears
Akron-Selle Co. ....4th cover

Hammers
Champion Tool Co....326
Kerrihard Co....4th cover
Macgowan & Finigan Cordage Co....308
Mayer Bros. Co....3d cover
Peck, Stow & Wilcox Co....328
West Tire Setter Co....327

Hollow Augers
House Cold Tire Setter Co....4th cover

Hoof Pads
Sterling Tire Corp....302

Hoof Parers
Champion Tool Co....326

Hoof Nippers
Champion Tool Co....326

Hoof Shears
Champion Tool Co....326

Horseshoes
Burden Iron Works....3d cover
Diamond Calk Horseshoe Co....320
Giant Grip Horseshoe Co....323
Phoenix Horseshoe Co....325

Horseshoe Calks
Diamond Calk Horseshoe Co....321
Neverslip Works, The....306
Rowe Calk & Chain Co....Front cover

Horseshoe Nails
Capewell Horse Nail Co....Front cover
Standard Horse Nail Co....4th cover
Union Horse Nail Co....326

Horse Stocks
Barcus Mfg. Co....3d cover

Kerosene Engines
Witte Engine Works....325

Motor Cars
Birch Motor Cars....325

Motor Topping
Chase, L. C....Front cover

Nut Splitters
Whisler Mfg. Co....306 and 325

Oxygen
Linde Air Products Co....308

Paints and Varnishes
Felton, Sibley & Co....301

Digitized by Google

Patents
Jenner, H. W. T 322
Parker, C. L 306

Pincers
Peck, Stow & Wilcox Co 328

Punches
Bicknell Mfg. & Supply Co 325
Champion Blower & Forge Co 303

Punches and Shears
Peck, Stow & Wilcox Co 328

Screw Plates
Butterfield & Co 308
Champion Blower & Forge Co 303
Greenfield Tap & Die Corporation 326
Buffalo Forge Co 307
Champion Blower & Forge Co 303

Shaft Coupling
Bradley, C. C., & Son 304

Shears
Bicknell Mfg. & Supply Co 325
Edwards, C. D., Mfg. Co 306

Shoes
Leonard-Morton & Co 321

Sleigh Knees
Hall Co., Sherwood 306

Spoke Augers
House Cold Tire Setter Co ..... 4th cover

Steel Stamps
Childs, S. D., & Co ..... Front cover
Ness, George M., Jr ..... Front cover

Stocks and Dies
Butterfield & Co 308
Champion Blower & Forge Co 303
Hart Mfg. Co ..... 4th cover

Supplies
Campbell Iron Co 325
Wheel B, Top & Hardware Co 325

Swages
Champion Blower & Forge Co 303

Tires
Firestone Tire & Rubber Co 328

Tire Bending Machines
Buffalo Forge Co 307
Champion Blower & Forge Co 303

Tire Heaters
Gogel Mfg. Co 306

Tire Setters
Buffalo Forge Co 307
House Cold Tire Setter Co ..... 4th cover
West Tire Setter Co 327

Tire Shrinkers
Buffalo Forge Co 307
Champion Blower & Forge Co 303

Tongs
Champion Tool Co 326

Tool Grinders
Phoenix Horseshoe Co 325

Trucks
Akron-Selle Co ..... 4th cover

Truck Units
Lauton Truck Co 305

Tuyere Irons
Buffalo Forge Co 307
Champion Blower & Forge Co 303
Thompson Tuyere Iron Co ..... 4th cover

Veterinary Remedies
Young, W. F 306

Vises
Butterfield & Co 308
Columbian Hardware Co ..... 4th cover
Fisher & Norris 308
Prentiss Vise Co ..... 4th cover

Vulcanizers
Shaler, C. A., Co 301

Wagons
Akron-Selle Co ..... 4th cover

Welding Compounds
Anti-Borax Compound Co 304
Cortland Welding Compound Co 327

Welding Outfit
Superior Oxy-Acetylene Machine Co 306

Welding Plant
Bertschy-Bermo Co 306

Welding Supplies
Linde Air Products Co 308

Wheel Dishers
House Cold Tire Setter Co ..... 4th cover

Wheels
Electric Wheel Co 306
Empire Mfg. Co ..... Front cover

Woodworking Machinery
Buffalo Forge Co 307
Crescent Machine Co ..... 4th cover
Parks Ball Bearing Machine Co 322

Wrenches
Champion Tool Co 326

Wrenches (Knife Handle and Pipe)
Peck, Stow & Wilcox Co 328

Don't Send a Penny

These Len-Mort work and outdoor shoes are such wonderful value that we gladly send them, **no money down.** You will find them so well-made and so stylish and such a big money saving bargain that you will surely keep them. So don't hesitate. Just fill out and mail the coupon. We will send a pair of your size. No need for you to pay higher prices when you can buy direct from us—and know what you are getting before you pay even a penny. Why pay out $5.00 and $6.00 for shoes not near so good? Act now. Mail the coupon today while this special offer holds good.

Great Shoe Offer



We can't tell you enough about these shoes here. This shoe is built to meet the demand of an outdoor city workers' shoe as well as for the modern farmer. Send and see for yourself what they are. Built on stylish lace Blucher last. The special tanning process makes the leather proof against the acid in milk, manure, soil, gasoline, etc. They outwear 3 ordinary pairs of shoes. Your choice of wide, medium or narrow. Very flexible, soft and easy on the feet. Made by a special process which leaves all the "life" in the leather and gives it wonderful wear-resisting quality. Double leather soles and heels. Dirt and waterproof tongue. Heavy chrome leather tops. Just slip them on and see if they are not the most comfortable, easiest, most wonderful shoes you ever wore. Pay $3.85 for shoes on only arrival. If, after careful examination, you don't find them all you expect, send them back and we will return your money. No obligation on you. This is at our risk, not yours.

Leonard-Morton & Co.
Dept. 1262 **Chicago**
Send the Len-Mort Shoes No. X15012. I will pay $3.85 for shoes on arrival, and examine them carefully. If I am not satisfied, will send them back and you will refund my money.

Size..... Width.....

Name.....

Age..... Married or single.....

Address.....

Send →

Only the coupon—no money. That brings these splendid shoes to you. You are to be the judge of quality, style and value. Keep them only if satisfactory in every way. Be sure to give size and width. Mail the coupon now. Order by No. X15012.

Leonard-Morton & Co.
Dept 1262 **Chicago**

end. Place them on the share point, turn the landside in the fire, heat top and bottom then weld the edge and the point is almost done. I make 200 or 300 of these points in slack times during the winter, then I put them on the shelves. When a share comes in to be pointed I put them on in 45 minutes and obtain $1.25.

If there is any reader that can't understand this article and drawings, have him write to me enclosing 35 cents in stamps and I will send him one point by mail, all ready to weld on, then he can see just how the point is made.

There are a lot of blacksmiths who do not know how to point a plow, the farmer gets a poor job, does a poor job of plowing, and raises a poor crop. The blacksmith is really the fellow who is to blame for the shortage.

There is nothing a blacksmith can do to get the confidence of the farmer any more than to make a nice job of plow work.

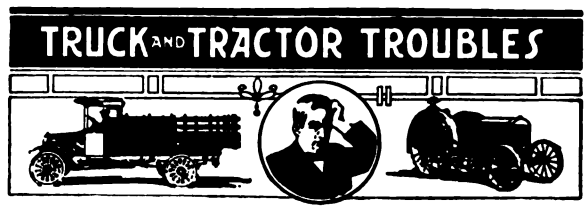
I sprinkle my share points with E. Z. Compound, apply the point and use borax and Crescent on the outside.

Pointing Plows.

From August Grothmann, Nebraska.—In answer to the Village Smith in Canadian Northwest. In regard to pointing plows, you should send for some supply house catalog, look up the plow points you like best and get them. Shape your plow points from them, then put the new plow point under the plain one you are making, double the plain one over and weld it down.

Concerning Double Tires.

From August Grothmann, Nebraska.—In answer to Max Maser of Texas, regarding double tires as used on heavy wagons in the Rocky Mountains. These wheels have an extra tire shrunk on the rear wheels so that when the wheels are dragged down a long rocky hill the felloe will not be burned. This outside tire is given ⅜ inch draw.



Material for Automobile Springs.

From a brother in Kentucky.—I wish that some one of the readers of the Blacksmith and Wheelwright would tell me what is the best material to be used for automobile springs. I have frequent calls for repairing springs and would like very much to know what to make them from and how to harden them.

Prefers to "Shoe" Fords.

From Ernest Wylie, Texas.—I don't have much time either to read or write, but perhaps I can find a minute to write for the B. & W.

I have just closed out most of my junk and some of my tools at the old stand and am about to the point where I can move. I have traded my farm for some town property and will move, so will be near a good school for my two children.

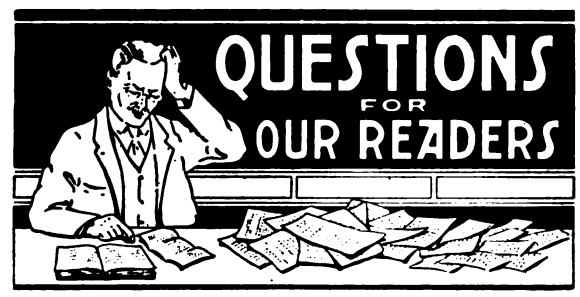
All the boys can shoe all the horses and mules they want to, but for me, I would rather tackle a Ford any day, to shoe. I have my first horseshoe nail yet to drive. I have always had all the work I could do, without shoeing, so I leave that work to those who like it; I don't.

I am willing to do almost anything else in the blacksmith line and have been practicing on all the "Fords" I could get, as well as other automobiles that happened to come my way. With best wishes to all the boys.

Publish Automobile Articles!

From F. H. Amick, West Virginia.—I have been a silent reader of your paper for some time, but when I read your question asking if you should continue articles relating to automobiles, I thought it was time to say something. I am interested in automobile work as well as general blacksmith work, and I think it would do a majority of the blacksmiths a great injustice to discontinue your automobile articles.

Personally, I get a lot of good information about automobiles from your magazine, and surely would miss the articles if you discontinued them. Keep them up, and give us more, if you can.



How About Standardizing Material?

From an Ohio reader.—I believe there would be a great saving to the blacksmiths, if the Government would standardize blacksmith material. I should like very much to hear from some of my brothers about this, as well as from our Editor on the subject.

How much work will a blacksmith have to do in a day of eight hours to earn six dollars clear of all expenses? How can a blacksmith persuade young men to learn blacksmithing? Will it pay a blacksmith that has plenty of blacksmith work to learn automobile repair work?

Which business requires the most machinery, that of a blacksmith, or automobile repair man? Why did blacksmith coal raise in price from 20c. to 52c. a bushel?

Case Hardening Receipt Wanted.

From M. Harry Deal, California.—Will some kind reader of the Blacksmith and Wheelwright give me a good case hardening receipt?

Digitized by Google

House Cold Tire Setter.

A good tire setting machine will soon pay for itself in any shop. The House Cold Tire Setter is highly recommended and well known all over the world. This tire setter has both hydraulic and lever power. Write to-day for prices and terms to the House Cold Tire Setter Co., 4143 Laclede Ave., St. Louis, Mo.

Star Steel Shapes.

Repairing agricultural implements is done by most of our readers and such will surely be interested in the line of Star steel shapes made by the Star Mfg. Co., Carpentersville, Ill.

This line consists of plowshares, listershares, moldboards, landside plates, landside points, shovel points, cultivator shovels, plow points, seeder points, subsoilers, drill points, etc. Write for free catalog, using your regular letter head.

Greenfield Taps, Dies and Screw Plates.

The comparatively small town of Greenfield, Mass., is famous all over the world as the center for manufacturing taps, dies and screw plates for blacksmiths and machinists. Those of our readers who have taken up automobile repair work should be interested in the O. K. combination screw plate set, which is manufactured by the Greenfield Tap & Die Corp., of Greenfield, Mass. A blacksmith who has a good set of taps and dies is prepared to do the thousand and one jobs necessary for repairing cars and he can also repair trucks and tractors.

The screw plate set referred to contains taps and dies for cutting both U. S. S. and S. A. E. (automobile) standard threads. Every tool is guaranteed. Send direct to the manufacturers for their interesting free catalog.

Some Good Tools.

An excellent line of blacksmith tools is manufactured by the Whisler Mfg. Co., Gibson, Iowa. This line includes jointer heads, nut splitters, and other useful appliances for the blacksmith or mechanic. Write for illustrated printed matter direct to the manufacturer.

The Roto Electric Blower.

The Rosewater Electric Co., 5516 Kinsman Road, Cleveland, Ohio, is making a special offer on their Roto electric blower. This machine is put out on trial for 30 days and is sold at a very low price. One blacksmith states that he would not sell his Roto for $100.00 if he could not get another.

A coupon is attached to the advertisement of this company, which is now appearing in our magazine, and many readers will undoubtedly want to cut this coupon out and send a trial order.

The "One Fire" Marvel Electric Blower.

A large number of blacksmiths who are situated where they have access to electric power wires have put in electric blowers owing to their great convenience. The "One Fire" Marvel blower is an excellent machine for motor power in the blacksmith shop. It has extra large ring oil bearings and a case hardened armature shaft, which sells for only $38.00 net, bringing it within the reach of every blacksmith. This blower is put out on 30 days' trial through your dealer or your electric light company. Write for full particulars direct to the manufacturers, Electric Blower Co., 352 Atlantic Ave., Boston, Mass.

Witte Engines.

The day has passed when a blacksmith shop can be successfully run without power, and so the most convenient form of power is a good gasoline engine. The Witte Engine Works, 2446 Oakland Ave., Kansas City, Mo., manufactures a full line of gasoline and kerosene engines made in sizes from 2 to 30 H.-P.

These engines are put out with a five-year guarantee as to quality, durability, fuel requirements and workmanship. They are made by a concern which has had many years' experience in producing engines of the very best quality, and if you are not satisfied with a Witte engine, you are entitled to your money back. Write direct to the Witte Engine Works for their new 90-day engine offer.

Red Tip Calks, Horse and Mule Shoes.

The red tip has been for many years the distinct market of the Neverslip Works of New Brunswick, N. J. This line embraces all styles of screw calks, iron, steel and extra light steel shoes, drilled or calked, drive calks, sharp or blunt, driving draft and mule shoes and all necessary tools.

The season of ice and snow is at hand and if you have not already laid in your stock of Neverslip goods, this should be done without further delay. Correspondence is invited and interesting printed matter will be sent out to any reader of this magazine who will take the trouble to drop a postal card or write a letter on the subject to this large and well known company.

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

will be inserted under this head at 3 cents a word, including the address, for each insertion, payable in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York.

PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT

Patents

PATENTS FOR INVENTIONS.
H. W. T. JENNER, patent attorney and mechanical expert, 622 F Street, Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trade-marks registered.

For Sale

STOCKS FOR SALE.
Second-hand Barkus horse stocks for sale. Two side arms, hobbles and harness complete, in perfect working order; $55 cash. Have gone into auto business and have no further use for horse stocks. Apply PERRIN TIRE & VUL. CO., 417 West Seventh, Little Rock, Ark.

FOR SALE.
Good blacksmith business in Eastern Pennsylvania. House, shop, barn and about one acre of ground. Plenty of fruit. For information address BOX 38, Silverdale, Pennsylvania.

FOR SALE.
New Machines. 9-inch Jointer, $50.00; 5-inch Jointer, $30.00; 5-inch Bench Jointer, $25.00. Cast iron and steel construction; quick, easy adjustable device for changing cut. Also circular and square style cutter heads for wood frame Jointers, 3 to 17-inch cut, from $7.50 to $40.00. Saw arbors, any size or style; emery grinder stands. Send for circular. W. L. SHERWOOD, Kirksville, Missouri.

FOR SALE.
A rich Iowa community offers a live mechanic a general blacksmith business unequalled anywhere. Work for three or four men the year around. Get particulars at once from A. J. ULVESTAD, Lake City, Iowa.

FOR SALE.
Tools and stock in one of the best farming counties in Illinois. Prices are the best. Shop is up to date and have lease for three years. Will sell stock and tools cheap. T. H. DEANE, Manhattan, Illinois.

FOR SALE.
40-acre Maple sugar bush, Clark Co., Wis., cheese factory adjoining. Good location for shop. Will also sell 80 or 160 acres, clay loam, all on turnpike road. H. S. BICKNELL, Janesville, Wis.

Tires

DOUBLE TREAD TIRES

GUARANTEED

SPECIAL OFFER TO AGENTS. Write for Catalogue

Get our special price on new tires

M. LIBEN & CO.

205-AK West 48th St. New York City

DOUBLE TREAD TIRES.
We carry a full line of new and used tires and tubes. GINSBERG & BERKOWITZ, 236 West 48th St., New York City.

Wanted

WANTED.
Good all-around blacksmith. Young married man preferred. Top wages for right man. Address M. W. ABTS, Morrill, Nebr.

WANTED.
Reliable married man to work in blacksmith shop; have power and good tools, 5-room house to live in; good water; 200 yards from school and Gin, seven miles south from San Marcos, or will rent or sell. Plenty work year round with good pay. Address: HERMAN TRAPPE, San Marcos, Texas.

Personal

PERSONAL.
TOBACCO HABIT may be easily overcome. Quit the terrible injury and expense. I'll gladly send necessary information. G. S. STOKES, Mohawk, Florida.

Tires

Tires

BUY EARLY AND SAVE MONEY

Double Tread Tires and Tubes

GUARANTEED

Come to the Tire Clearing House—here are prices—clear cut and plain as daylight. We buy wholesale the best "try out" Tires—and you get the benefit—you want truthful tires, and truth is never crushed to earth if given a square deal—real truth is puncture proof—

SO ARE OUR TIRES.

Size	Plain	Non-Skid	Tubes
28x3	$4.40	$4.95	$2.00
30x3	5.50	6.05	2.00
30x3½	6.60	7.15	2.65
32x3½	7.15	7.70	—
34x3½	8.25	8 80	3 00
32x4	9.50	10.50	2.75
33x4	9.50	10.50	3.25
34x4	9.80	10 80	3.50
35x4	9.90	11.00	3.50

Get your order in quick for goods listed here—by all means get in touch with us for further information about our special process—it means money in your pocket. Get in right—write to-day—yes—to-day.

Look up rating in Dun's or Bradstreet's.

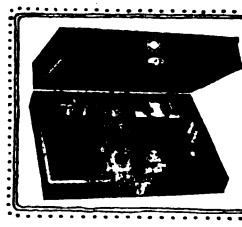
Size	Plain	Non-Skid	Tubes
36x4	$9.90	$11.00	$3.60
32x4½	9.90	11.00	3.60
34x4½	11.00	12.10	4 00
35x4½	11.00	12.10	4.10
36x4½	11.00	12.10	4.25
37x4½	12.10	13.20	4.35
34x5	11.00	12.10	4.50
35x5	13 20	14.30	5.00
36x5	13 20	14.30	5.00
37x5	13.75	14.85	5.00

For (non-skid) sizes up to 32x4, 50c extra; all other sizes $1.00 extra.
For rebuilding your old tires we charge you 60% of the above prices.

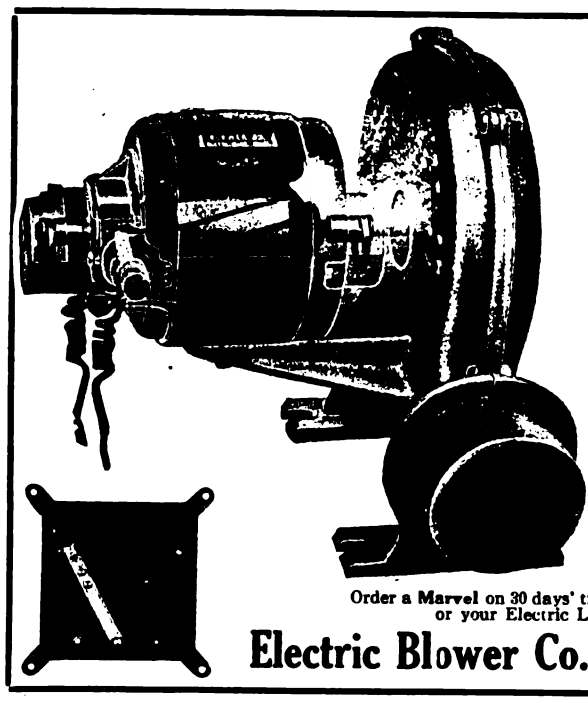
B. LIBEN & COMPANY

261-A West 54th Street NEW YORK CITY 112-A East 110th Street

THE HOME OF DOUBLE THREAD TIRES



NIEHOFF DEFECTOMETER
THE ONLY TESTING INSTRUMENT ON THE MARKET FOR LOCATING SHORTS IN A MAGNETO. ACCURATE AND TIME SAVING. A NECESSITY IN EVERY GARAGE
PAUL G. NIEHOFF & CO INC
232-242 E. OHIO ST. CHICAGO, ILL.



"One Fire" Marvel

A. C. or D. C.
or
UNIVERSAL MOTORS

Extra Large
Ring Oil Bearings

Case Hardened
Armature Shaft

$38.00 Net

Order a Marvel on 30 days' trial through your Dealer, or your Electric Light Company

Electric Blower Co., 352 Atlantic Avenue BOSTON, MASS.

PARKS WAGON SHOP SPECIAL



You may think you don't need this practical woodworker in your shop. Take advantage of our trial offer, and be convinced how much it will save you. **Machines sent on trial anywhere in United States and Canada.**

Machine is a combination of Circular, Rip and Cross Cut Saws,
22" Band Saw,
12" Jointer,
Rim Rounder,
Felloe Borer,
Spoke Tenoner,
All ready for instant use.
No Changing.

Light size takes 2 to 3 H. P., heavy size 3 to 4 H. P.

Write for catalog and full information about how a woodworker should be arranged to be convenient to operate.

Parks Ball Bearing Machine Co.
North Side Station
Cincinnati, O.

Digitized by Google

Harvey Racine Auto Springs.

Many of our readers have taken up automobile repair work and the sale of automobile accessories and supplies. To all such, the advertisement published in this issue by the Harvey Spring & Forging Co. should be interesting. Car owners will generally estimate the quality of your service by the quality of the product you sell.

Harvey Racine springs are described as practically unbreakable. There is probably a Harvey jobber in your vicinity, but at any rate you are welcome if you will write for it, to the new catalog issued by the Harvey Spring & Forging Co., 919 17th Street, Racine, Wis. This catalog contains over 900 styles of springs.

Firestone Tires.

Firestone carriage tires have been so well advertised that probably every reader of this magazine is familiar with them, but possibly some readers have not yet realized the full advantage which may be obtained from these excellent tires. Firestone tires will wear evenly down to the channel without cutting or chipping. These tires are distinctive for resiliency, lightness and endurance. They will attract and hold customers.

The slogan adopted for these tires, "Most Miles per Dollar," is certainly appropriate. Firestone tires are carried in stock by good jobbers and dealers everywhere, but interesting literature may be obtained by writing direct to the Firestone Tire & Rubber Co., Firestone Park, Akron, Ohio.

Rowe Calks and Horse Shoes.

Most of our readers are already familiar with the line of calks and horseshoes for winter use which are manufactured by the Rowe Calk & Chain Co., Plantsville, Conn. Readers who have not already obtained the stock list issued by this company should send for it at once. The season of snow and ice is at hand, when there is a large demand for these goods.

Sterling Hoof Pads.

The value of a good hoof pad for the protection of the horse's hoof, especially in wet or cold winter weather, is appreciated by every good horseshoer. The Sterling hoof pads manufactured by the Sterling Tire Corp., of Rutherford, N. J., are made with fibre compound back, vulcanized to the rubber heel in one solid piece.

These pads are waterproof, cannot get soggy or lose their shape. They are tougher than leather and wear better. Sterling hoof pads can be obtained from your jobber or full information will be furnished if you will write to the Sterling Tire Corporation at Rutherford, N. J.

Diamond Calks.

The Diamond calks which are made by the Diamond Calk Horseshoe Co., Duluth, Minn., have a deservedly high reputation for keeping their edge, not breaking off and wearing so well. This special merit is due to the high quality of steel used in these calks and the way it is tempered, also the scientific way it is shaped.

Diamond calks are stated by the manufacturers not to vary one 10,000th of an inch, which prevents twisting in the shoe and falling out—and there's a Diamond calk for every purpose. Readers who are interested should write for price list direct to the Diamond Calk Horseshoe Co., Duluth, Minn.

Giant Grip Shoes, Calks and Tools.

This is the season when calks are in greatest demand. Many of our readers are already familiar with the Giant Grip shoes, calks and tools made by the Giant Grip Horse Shoe Co., Oshkosh, Wis., manufacturers of the original drive calk. Those who are not entirely familiar with the line should write direct to the manufacturers for prices and full particulars.

THE FAMOUS ORIGINAL DRIVE CALK GIANT GRIP



Now to Get Back to Business—

Giant Grip Shoes, Calks, and Tools

are ready for you. They are the *Standard of Quality* with all leading shoers. Ask your jobber—accept no substitutes. Write us for literature—today.

GIANT GRIP HORSE SHOE CO.,
Makers of the Original Drive Calk
OSHKOSH, :: :: :: WISCONSIN.

Bailey Ball Thrust Bearings.

In this number of the Blacksmith and Wheelwright is published the regular instalment of the Automobile Overhaul and Repair article and in it are given the many reasons for the differential and why this member should be kept in condition.

In the higher priced cars provision is made, as explained, for adjustment, but no such adjustment is provided in either the Ford or Chevrolet 490 cars. Heretofore the mechanic has made bronze or fibre thrust washers and though he seldom was able to make the adjustment satisfactorily, he had no other means at his disposal.

The solution is found in the Bailey Ball thrust bearing, made by the Geo. D. Bailey Co., 4506 Ravenswood Avenue, Chicago, Ill. A bearing which is said to eliminate differential troubles resulting from poor gear adjustment. Every reader who has cause to repair automobiles should investigate this bearing.

For a time, the above company are willing to send to our readers a thrust washer gauge, a device which enables the mechanic to tell instantly whether the washers are of correct thickness and enables him to plan for the proper adjustment. Every reader should write for this gauge, using the coupon which appears in the advertisement.

Rochester Helve Hammer.

This is an excellent machine for any blacksmith shop. It is adjustable for length of stroke while running. The long stroke is said to provide for handling larger work than many other hammers of the same head sizes. The Hickory Helves give springy forging blows, combining the advantages of forging and drop hammers. Send a postal card or letter for catalog and prices direct to the manufacturer, West Tire Setter Co., Rochester, N. Y.

Bicknell Power Punch and Shear.

An excellent power punch and shear machine is manufactured by the Bicknell Mfg. & Supply Co., Janesville, Wis. This machine cuts flats and rounds and it is a great time saver in any shop. Write direct to the manufacturers for prices and full particulars.

Phoenix Horse Shoes and Calks.

The Phoenix horse and mule shoes are known all over the world, also the Bull Dog toe calks. Both of these products are made by the Phoenix Horse Shoe Co. This company has very large rolling mills at Joliet, Ill., and Poughkeepsie, N. Y., but the main office is at Chicago, Ill., where all inquiries should be addressed.

The L. S. P. Calking Machine.

In most up-to-date blacksmith shops a calking machine has been installed. The L. S. P. Calking Machine made by the L. S. P. Calking Machine Co., P. O. Box 225, Wyalusing, Pa., is a great saver of time and labor in any shop.

This machine is for turning heel calks, both blunt and sharp, sticking and welding toe calks, clipping and trimming ends of shoes. It calks shoes, doing the work just the same as you do by hand with a hammer, and this machine may justly be regarded as one of the most simple inventions ever brought out in connection with the blacksmith's trade. Write at once direct to the manufacturers for full particulars and prices.

Advertising Rates in the Blacksmith and Wheelwright made known on application

Digitized by Google

WAGON BUILDING

"Build me a wagon that will last forever."

"Sorry, Sir, but 'axle troubles' (due to wear—wear on the spindle, or on the box, or both) make it impossible."

You've often received a specification like that and been obliged to give that answer—haven't you?

The Sheldon "TON-DON"—an axle that will not wear, run hot or break—allows your meeting the requirements of the man who wants a wagon to last forever, **and we have told him so.**

The Sheldon "TON-DON" was originally made for buggies and carriages. Its success was so instantaneous and pronounced that we were deluged with requests for an axle embodying the same principle for use on Delivery, on Business and on Express Wagons.

Hence, the "TON-DON" CONCORD EXPRESS.
In EFFICIENCY—The HIGHEST.
In CONSTRUCTION—The SIMPLEST.
In SERVICE—The MOST SATISFACTORY.

The Spindle of the Sheldon Ton-Don Axle

Ordinary axles wear flat on the bottom of the spindle because the bottom side is the point of contact and where the wear of the spindle is concentrated. It takes a spindle of unusual hardness to resist this wear—greater hardness than any ordinary axle affords. The spindle of the "TON-DON" is hardened by a special process, producing a wearing surface of such hardness that a fine file makes no impression on it—yet the center remains soft or "natural."

The Phosphor-Bronze Lined Box

The peculiarity of this box lining is that while somewhat softer than the spindle, there is no perceptible wear after thousands of miles of running, but becomes harder and more wear-resisting with use.

Phosphor-Bronze (of a mixture which increases its toughness, smoothness under friction, and wear-resisting qualities) is a metal used for making the propellers of ocean steamships, bearings for locomotives, crank-shaft bearings for automobiles and other fine machinery. Imagine what a metal must be to meet such conditions, and you will grasp the advantages of applying such metal to axle purposes.

THESE AXLES CARRIED IN STOCK BY THE FOLLOWING JOBBERS AND CAN BE OBTAINED AT MANUFACTURERS' PRICES.

Baltimore, Md. ..... E. Scott Payne Co.	Providence, R. I. ... Congdon & Carpenter Co.
Boston, Mass ..... E. P. Sanderson Co.	Rochester, N. Y. ..... Burke Iron & Steel Co.
Buffalo, N. Y. ..... H. D. Taylor Co.	San Francisco, Cal. ... Waterhouse & Lester Co.
Chicago, Ill. ..... E. D. Kimball Co.	Scranton, Pa. ..... Bittenbender & Co.
Cincinnati, O. ..... G. B. Schulte Sons Co.	Seattle, Wash. ..... Gray Bros. Co.
Indianapolis, Ind. ..... W. J. Holliday & Co.	Springfield, Mass. ..... Chas. C. Lewis & Co.
Los Angeles, Cal. ..... Percival Iron Co.	St. Louis, Mo. ..... Sligo Iron Store Co.
Milwaukee, Wis. .. Shadbolt & Boyd Iron Co.	Washington, D. C. ..... Louis Hartig
Pittsburgh, Pa. ..... McLean & McGinness	Wilmington, Del. .... Delaware Hardware Co.
Portland, Oregon ..... J. E. Haseltine & Co.	Bridgeport, Conn. ..... Chapman & Bangs Co.
Ft. Wayne, Ind. ..... Mossman, Yarnelle & Co.	San Antonio, Texas Heusinger Hardware Co.
New Orleans, La. ..... Jos. Schwartz & Co.	

SHELDON

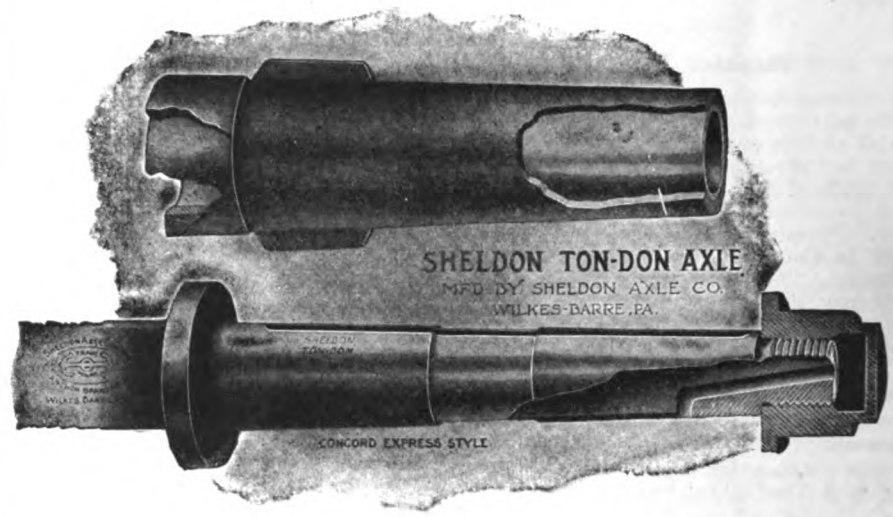
"TON-DON"

CONCORD EXPRESS STYLE

NOT A BALL OR ROLLER BEARING—BUT

ANTI-FRICTION—EVERLASTING—INTERCHANGEABLE

IT WILL NOT CUT, HEAT OR STICK

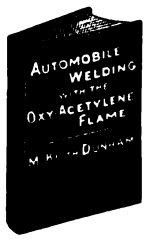


NOTICE THE PATENTED OILING DEVICE
HAS ALL THE ADVANTAGES OF FRICTION AND ANTI-FRICTION AXLES
WITHOUT THEIR DISADVANTAGES
"TON-DON" MEANS KNOWN QUALITY WITHOUT FANCY PRICE
MADE ALSO FOR BUGGIES AND SURRIES

SHELDON AXLE & SPRING CO.,
WILKES-BARRE, PA.

LARGEST AXLE FACTORY IN THE WORLD.

JUST PUBLISHED



AUTOMOBILE WELDING

WITH THE OXY-ACETYLENE FLAME

By M. KEITH DUNHAM

167 Pages **Price $1.00** Fully Illustrated

Sent Postpaid to Any Part of the World.

This is the only complete book on the "Why" and "How" of Welding.

EXPLAINS in a simple manner apparatus to be used, its care, and how to construct necessary shop equipment. Proceeds then to the actual welding of all automobile parts, in a manner understandable by everyone.

Gives principles never to be forgotten. Aluminum, cast iron, steel, copper, brass, bronze and malleable iron are fully treated, as well as a clear explanation of the proper manner to burn the carbon out of the combustion head.

AUTOMOBILE OWNERS, GARAGE AND SERVICE STATIONS, BLACKSMITHS AND MACHINE SHOPS, as well as industries using the oxy-acetylene flame, will find this book of the utmost value, since the perplexing problems arising when metal is heated to a melting point are fully explained and the proper methods to overcome them shown.

CONTENTS

CHAPTER I.—APPARATUS KNOWLEDGE.
Oxygen Supply—Care of Oxygen Cylinder—Acetylene Generator—Care of Generator—Regulators—Care of Regulators—Creeping Regulators—Gauges—Care of Gauges—Welding Torch—Care of Welding Torch—Effects of Heat—Hose and Goggles.

CHAPTER II.—SHOP EQUIPMENT AND INITIAL PROCEDURE.
Preheating Agencies—Welding Table—Location of Welding Outfit—Starting the Welding Outfit—Adjustment of Flame—Principle of Welding—General Welding Knowledge—Welding Rods and Fluxes—Choice of Tip—Expansion and Contraction.

CHAPTER III.—CAST IRON.
Simple Welding—How to Hold the Flame—Hard Cast Iron—Pin Holes and Blow Holes—Lug on Cylinder—Water Outlet—Cylinder Welding—Compression Head—Finishing and Testing—Scored Cylinders—Cylinder Parts—Fly Wheels—Pistons—Crank Cases—Babbitted Bearings—Valve Guides—Preserving Threads—Conclusion of Cast Iron.

CHAPTER IV.—ALUMINUM.
Use of Welding Knowledge—Puddle System—Flux System—Comparison of Systems Welding Rod—Preparation of the Weld—Inlet Manifold—Arm of Crank Case—Welding the Arm Without Taking Out the Motor—Break in the Body of Case Welding Cold—Wrong Method of Setting Up—Lug or Boss Welding—Preheating the Case—Gas Preheating Flame—One Side or Both—Collapse of Weld—Broken Bearings—Direction of Welding—Shrinkage Cracks—Missing Parts—Finishing—Die Mould Castings—Body—Other Parts.

CHAPTER V.—STEEL
Welding Knowledge—What the Flame Does to Steel—The Welding Rod—Simple Welding—Position of Flame—Reinforcing the Weld—Frame Welding—Lengthening the Chassis—Tube Housings—Worn Parts—Gear Welding—Case Hardening—Light Metal Welding—Gasoline Tank—Welding Adjacent to Rivets—Shaft Welding—Construction of Parts.

CHAPTER VI.—MALLEABLE IRON, COPPER, BRASS, BRONZE.
How to Detect Malleable Iron—Brazing Malleable Iron—Rear Housing—Reinforcing the Braze—Brazing Tube to Housing—Building Up Worn Parts—Copper—Brass and Bronze—Silver Soldering.

CHAPTER VII.—CARBON BURNING AND OTHER USES OF OXYGEN AND ACETYLENE.
Principle of Carbon Burning—Method of Operation—Lead Burning—Soldering—Case Hardening—Heating Uses.

CHAPTER VIII.—HOW TO FIGURE COST OF WELDING.
Oxygen Consumption—Dissolved Acetylene Consumption—Torch Consumption Test—Acetylene Generator Consumption—Cost Card—Conclusion.

ADDRESS ALL ORDERS TO

M. T. RICHARDSON COMPANY, 71-73 Murray St., NEW YORK

THE SCREW-CUTTING LATHE

How to select, set up, adjust and operate

By JAMES F. HOBART, M. E.

THIS book is a concise and exhaustive treatise on everything pertaining to the SCREW-CUTTING LATHE, including costs, erection, operation and adaptability. It is written by one who thoroughly understands his subject in all its details, and is so copiously illustrated that everything in it will be readily understood.

It will be found invaluable to those desiring to know just how a Screw-Cutting Lathe should be run.

There are ***92 illustrations,*** and the book is substantially bound in cloth. ***Price, $2.00.*** A copy will be sent postage prepaid to any address on receipt of price.

M. T. RICHARDSON CO.

PUBLISHERS

71-73 Murray St., New York

Digitized by Google

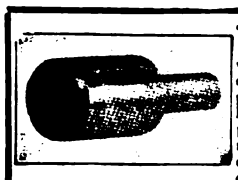
Our 1918 Fall
CATALOGUE IS READY

Get our New Prices on

Wheels, Spokes, Rims, Axles, Carriage and Wagon Hardware of all kinds, Steel and Iron Tire, Rubber Tire, Auto Tire, Shafts, Plow Handles, Etc.

B WHEEL, TOP & HARDWARE CO.

128 E. 8th Street **Cincinnati, Ohio**



THE only successful Chuck to hold square taper shank wood bits and drills so you can use them in your drill press. See the spring It keeps the drills from dropping out of the chuck. Made right Priced right. If your dealers won't supply you we can.

WHISLER MFG. CO., Gibson, Iowa

What is it worth to you to have a correct list of over 300,000 Business Firms in New England?
You may have just such a list for only $7.50
Write the Sampson & Murdock Co.
246 Summer St., Boston, Mass.
and ask for the New England Business Directory

ROBERGE'S GREAT BOOK
"THE FOOT OF THE HORSE"
By DAVID ROBERGE

The author of this book for many years enjoyed the entire confidence of Robert Bonner, who, in his day, owned many of the fastest trotters the world has ever seen. Bonner and Roberge worked together in shoeing the former's horses. Many believe that David Roberge was the ablest horseshoer this country has ever seen. His book is filled with plates and illustrations showing proper methods of shoeing horses for every kind of lameness. We have sold large numbers of these books and they have always given entire satisfaction. The work represents the life experience of its author. Sent to any address, postage prepaid, on receipt of price, $5.00. Address
M. T. RICHARDSON CO., Publishers, 71-73 Murray Street, New York.

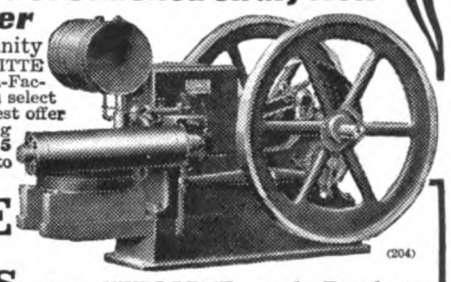
Advertising Rates in The Blacksmith and Wheelwright made known on application.



DIRECT TO YOU *from* WITTE

Money Back if not Satisfied on My New 90-Day Offer

Don't miss this opportunity to get a High-Grade WITTE Engine at a Direct-From-Factory price. Before you select **any** engine, get my latest offer and new book showing how I can save you **$15 to $200** on engines 2 to 30 Horse-Power.



Get My New Factory Offer ALL CASH PART CASH OR NO CASH as arranged for

WITTE KEROSENE ENGINES Use **KEROSENE and Produce Power at Lowest Cost**

90 Days to Decide

Sensible 5-year guarantee protects you against **defect** of material or workmanship—the **quantity** of fuel required and the **horse-power** of your engine. 32 years of success building engines **exclusively** is **best proof** that you should own a WITTE. I cannot begin to tell you everything in this ad, but **I can tell you why** the WITTE is **better** if you will send me your name and address. **Do this today.**

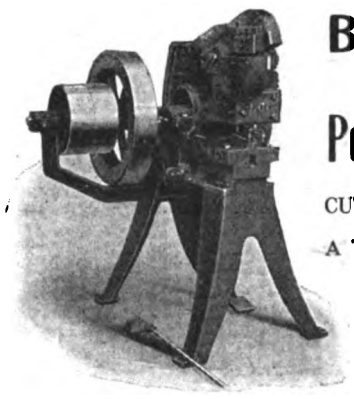


Write For My New FREE Book

"HOW TO JUDGE ENGINES"—The greatest of all engine books—the **best** illustrated and printed—the most **widely** read, most **talked** about, and most extensively **copied.** Be sure to read this original, instructive, valuable and **true engine factory book.** It will open your eyes and **save you money.** Send postal card or coupon.—ED. H. WITTE, Pres.

WITTE ENGINE WORKS,
2442 Oakland Ave., Kansas City, Mo.
2442 Empire Bldg. Pittsburgh, Pa.

Just Send Name and Address
Before you decide on any make of engine be sure to get my latest and best factory book mailed FREE.
Name.....
Town.....
State.....
R.F.D.....



BICKNELL'S POWER Punch and Shear

CUTS FLATS AND ROUNDS

A Time Saver in Any Shop

Write for Price

Bicknell Mfg. & Supply Co.
Janesville, Wis.



Get This Car



And The AGENCY For Your Territory

Drive a new 1919 Model Birch Motor Car. Pay for it out of your commissions and make big money on sales. Special offer now. Write quick for Big Free Book and full information. Address Ralph Birchard, Pres.
BIRCH MOTOR CARS, Dept. 1945 81 E. Madison St., Chicago

Campbell Iron Company

WHOLESALE SUPPLIES

Still carry a complete stock of Wagon, Blacksmith Materials, Farrier Supplies, as well as Tools, Hardware Specialties, and Duplicate Parts for Fords.
Write for General Catalogue.
817 Cass Avenue St. Louis, Mo.

PHOENIX HORSE SHOES

Constant Demand is the Best Proof of Their Superiority.
Practical to the Highest Degree. **Made of Unexcelled Material.**

BULL DOG CALKS

Hold Firmly to the Shoe. Never Jump Out When Set. Easy to Drive in Shoe.
Perfect in Every Detail.

FOR SALE BY ALL DEALERS. WRITE FOR SAMPLES.

WE ARE THE LARGEST HORSE SHOE MANUFACTURERS IN THE WORLD.





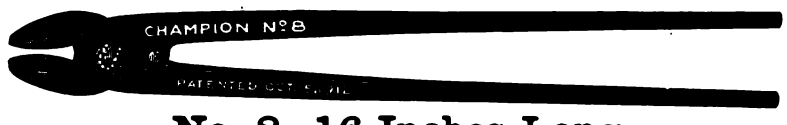
PHOENIX
Horse Shoe Company
CHICAGO, ILLINOIS
ROLLING MILLS and FACTORIES JOLIET, ILLINOIS; POUGHKEEPSIE, N. Y.

Digitized by Google

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge

Nothing to get out of order.



Will hold securely any size of shoe.

No. 8 16 Inches Long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

Weights, 1¾ to 3 lbs.

This Hammer is the most popular Sharpening Hammer on the market.

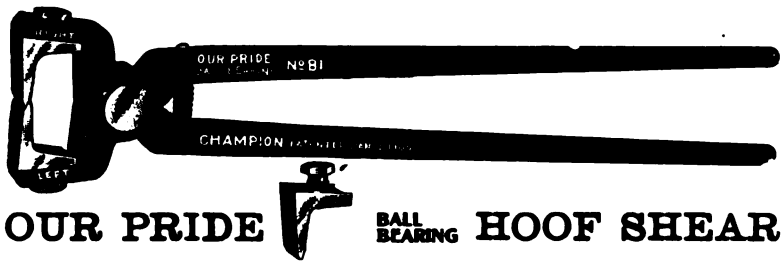


Corrugated Pein.

IT GIVES RESULTS.

No. 12 ELECTRIC SHARPENING HAMMER

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.



OUR PRIDE BALL BEARING HOOF SHEAR

Blades easily replaced when worn out.

All parts interchangeable.

Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY, - Meadville, Pa., U. S. A.

THE LIVINGSTON CO., 131 E. 23rd Street, NEW YORK, Eastern Representatives



AUTO REPAIR WORK PAYS

and the blacksmith who has a set of taps and dies is not only prepared to do the thousand and one jobs found in the day's work but he is prepared to take on auto and tractor repair work as well.

COMBINATION SCREW PLATES

contain taps and dies for cutting both U. S. S. and S. A. E. (Automobile) standard threads.

Every Tool Guaranteed. ***Send for Catalog.***

GREENFIELD TAP AND DIE CORPORATION

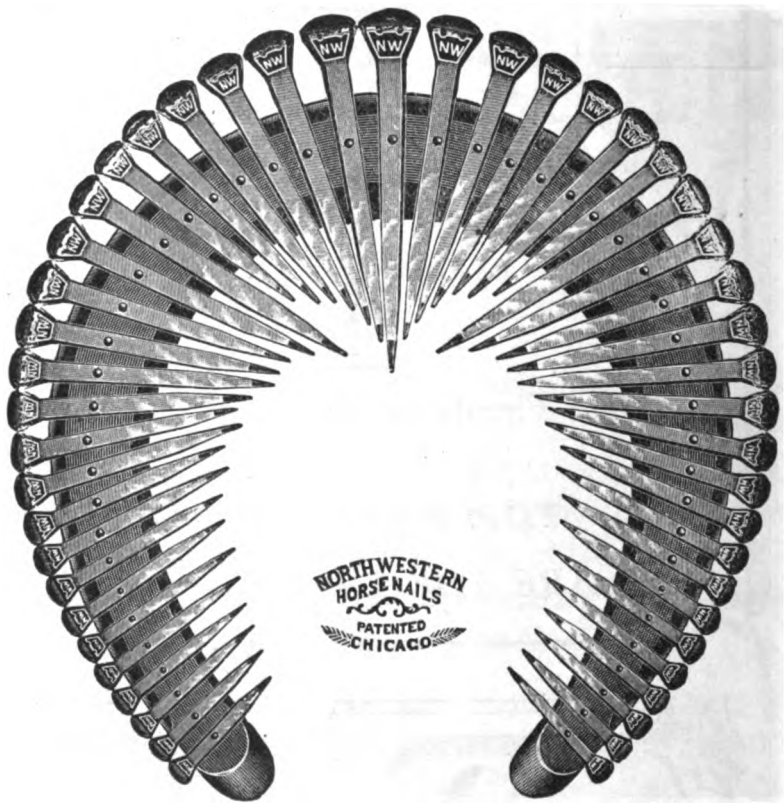
GREENFIELD, MASSACHUSETTS, U. S. A.

NEW YORK, 28 WARREN ST. -:- CHICAGO, 13 SOUTH CLINTON ST.

DETROIT OFFICE, 74 CONGRESS ST., W.

Canadian Plant, WELLS BROS. CO. of CANADA, LTD., GALT, ONTARIO

NORTHWESTERN HORSE NAILS



MADE OF THE BEST QUALITY MATERIAL

The most perfect in form and finish and will hold a shoe longer than any other nail made.

THE RE-ENFORCED POINT makes it the easiest to drive and the safest to use.

UNION HORSE NAIL COMPANY

Manufacturers

CHICAGO ILLS.

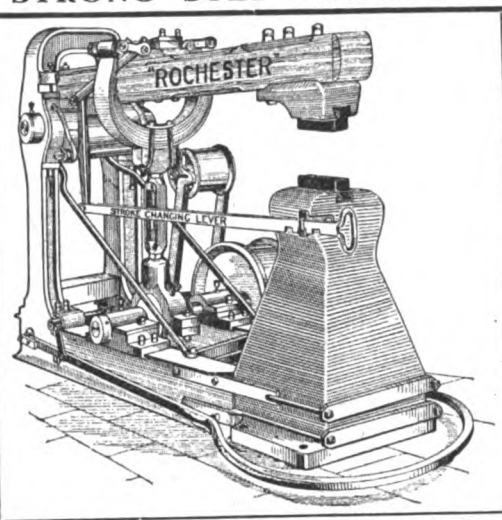
Digitized by Google

YOUR FIRST STRONG STEP FORWARD

THE ROCHESTER WEST TIRE SETTER

The Rochester Helve Hammer

is adjustable for length of stroke while running. The long stroke provides for handling larger work than other hammers of the same head sizes. The Hickory Helves give springy forging blows, combining the advantages of forging and drop hammer.



WEST HYDRAULIC SHELL BANDING MACHINES

Saves Energy. Does Quicker and More Satisfactory Work and Pays for Itself.

SEND A CARD TO THIS ADDRESS FOR OUR CATALOGUE AND PRICES

WEST TIRE SETTER CO.
ROCHESTER, NEW YORK



Free 512 PAGES OF BARGAINS

POST PAID

WE WANT TO SEND YOU THIS 512 PACE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

Tells how you can work up a profitable auto supply and repair business.

Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories
1117 W. 11th Street, Cleveland, Ohio, U. S. A.

The Better Your Equipment The Bigger Your Profits

Buy CANEDY-OTTO

AND INCREASE YOUR INCOME

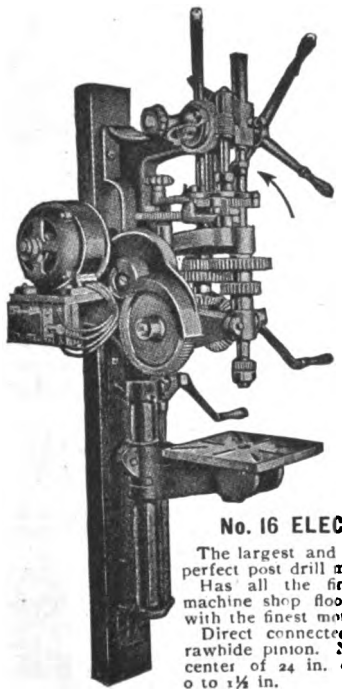
Once Tried, Always Used : There's a Reason—Quality



No. 19 DRILL

A low-priced combined hand and power self-feed drill.

Drills to center of 16½ in. circle.



No. 16 ELECTRIC DRILL

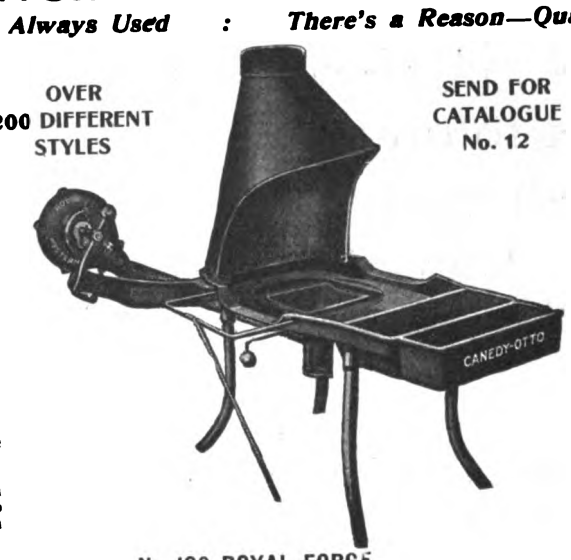
The largest and most mechanically perfect post drill manufactured.

Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.

Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1½ in.

OVER 200 DIFFERENT STYLES

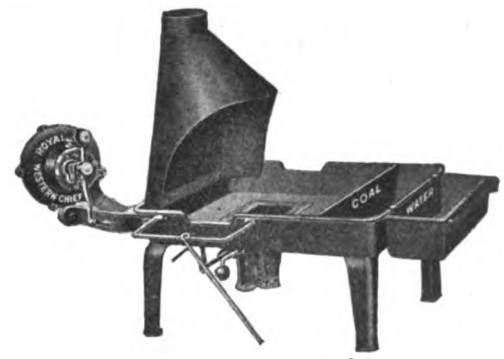
SEND FOR CATALOGUE No. 12



No. 100 ROYAL FORGE

The most popular forge ever made.

Fan, 12 in. Hearth, 31½x45½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x50 in. Blower, 12 in.



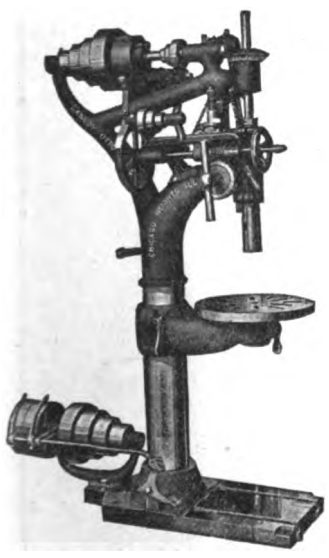
Blower, 12"
Wt., 135 lbs
Height, 47"

ROYAL BLOWER

(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.

Fire pot is 8x9 in. inside.



No. 36 POWER DRILL

A very valuable machine for all around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.

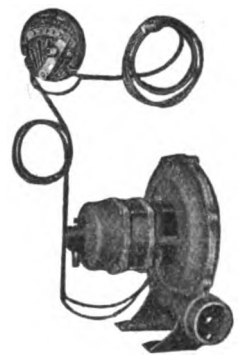
All machines are tested before leaving the factory, and guaranteed in every respect.

Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.



No. 1 1/2 SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



No. 8 ELECTRIC BLOWER

The best outfit money can buy.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS

YOU CAN WELD STEEL AS EASILY AS IRON

CLIMAX WELDING COMPOUND TRADE MARK REGISTERED AUG. 22 1905.

Especially adapted for welding tires, axles, springs and all lap welding.

Either of these compounds will weld steel at the lowest possible heat that steel can be welded. Also protects steel at high heat.

Owing to our improved process of manufacturing, these compounds do not boil off and waste in the fire, but adhere to the metal when applied.

FOR SALE BY ALL LEADING DEALERS IN BLACKSMITH SUPPLIES IN UNITED STATES AND CANADA

Large Free Samples Sent upon Request

BORAX-ETTE FOR STEEL TRADE MARK REGISTERED AUG. 22 1905 A PERFECT WELDING FLUX

PREPARED ESPECIALLY FOR WELDING FAR SUPERIOR TO COMMON BORAX

A flux which causes the steel to weld like iron. Not necessary to apply between the lap, but may be applied to the outer surface of the work, the same as borax. Has no equal for p'ow work. Just the thing for welding toe-calks so they can't knock off.

CORTLAND WELDING COMPOUND CO.,
CORTLAND, N. Y.

Digitized by Google

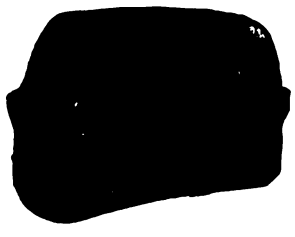


Tie Up to Firestone

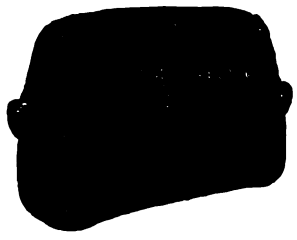
—*because* vehicle owners all know that Firestone Carriage Tires give Most Miles per Dollar. Such is the equipment for you to offer now, particularly when people demand better service than ever and are buying with more care.

The quality of Firestone Carriage Tire makes it wear evenly down to the channel. It does not chip, crack and break. It wears down slowly and gives easy, resilient riding.

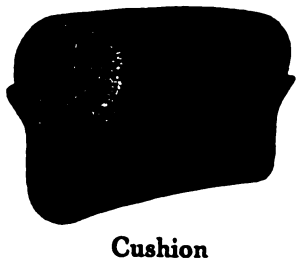
Firestone carriage rubber combines full size with the lightness which makes it profitable equipment for you to apply. Write your jobber or us for our interesting proposition.



Internal Wire



Side Wire



Cushion

FIRESTONE TIRE & RUBBER COMPANY
FIRESTONE PARK, AKRON, O.
Branches and Dealers Everywhere

Carriage Tire

Service

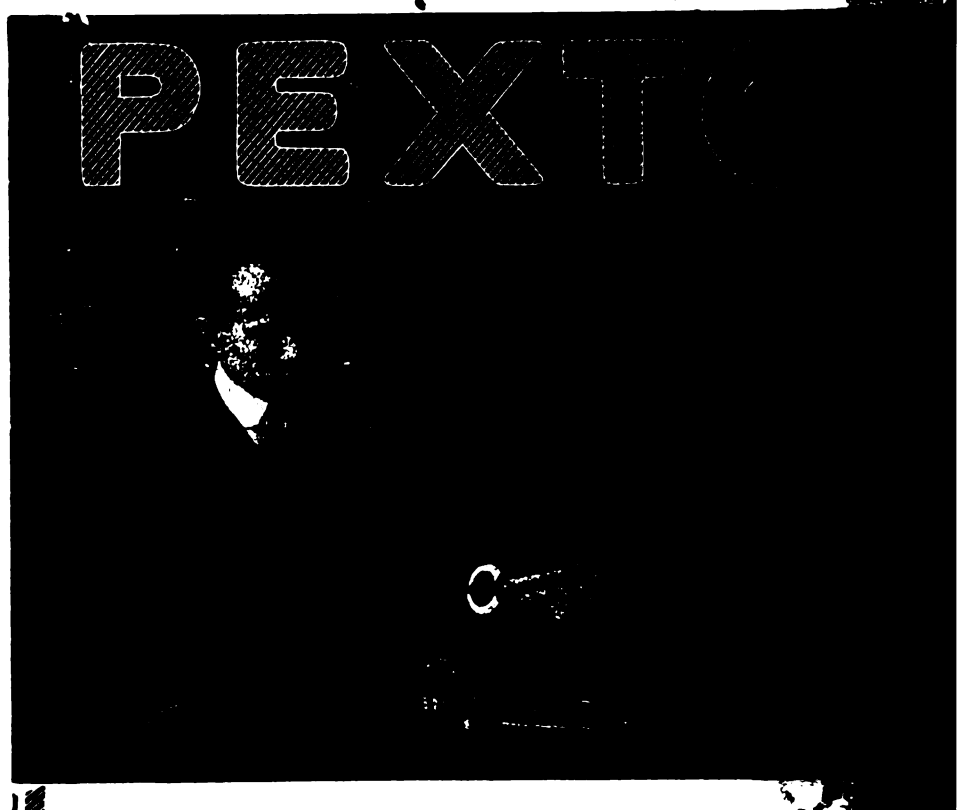
CAR owners will generally estimate the quality of your service by the quality of the product you sell.

Satisfaction to car owners—satisfaction and profit to dealers—that is the ultimate aim of Harvey Service.



THERE'S A HARVEY JOBBER NEAR YOU
Our new catalogue giving complete measurements of over 900 styles of Springs is yours on request

HARVEY SPRING & FORGING CO.
919 - 17th Street, RACINE, WIS.



How Can You Tell?

You're buying a pair of shoeing ..incers or hoof parers and the salesman spreads out an assortment of different kinds on the counter. How can you tell which is the best buy?

Appearances are not a safe guide, for poor tools often masquerade behind a handsome exterior.

Price is not a safe guide, for inferior tools often cost you more than good ones.

But there is a safe guide, and that is to know who made the tool.

When the salesman says "This is a pair of PEXTO Shoeing Pincers" or "PEXTO Hoof Parers," you know that they have been made by a ... sponsible concern with 100 ... tool-making experience and ... reputation for the excellence ... product.

Buy tools by name and see ... the name is Pexto. If your ... can't supply you, write us.

The Peck, Stow & Wilcox Co.
PEXTO Mfrs. Mechanics' Hand Tools, ... smiths' and Sheet Metal ... Tools and Machines, Bu... General Hardware.
Southington, Conn. Cleveland, O...
Address correspondence to ... 209 W. Center St., Southington, C...

Digitized by Google

NEW YORK PUBLIC LIBRARY

ESTABLISHED 1880

The Pioneer Journal of its Class

THE BLACKSMITH & WHEELWRIGHT

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

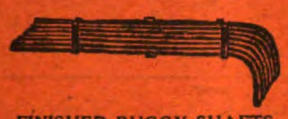
M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U. S. Patent Office.

Entered as Second-class Matter March 4, 1880, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Published Monthly.

Vol. LXXIX. No. 1 NEW YORK, JANUARY, 1919 TERMS: One Dollar a Year. Foreign, $1.50, (6s. 3d.)



SARVEN WHEELS
$11.90 Per Set and Up



FINISHED BUGGY SHAFTS
$10.00 Per Bundle of 6 Pairs



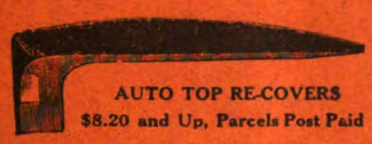
PLAIN HICKORY RIMS
$2.15 Per Set and Up



OAK WAGON SPOKES
$3.65 Per Set and Up.



REPAIR GRADE SARVEN SPOKES
$2.50 Per 100



AUTO TOP RE-COVERS
$8.20 and Up, Parcels Post Paid

Auto Tires
Non Skid
30 x 3½ $14 75
Other Sizes in proportion

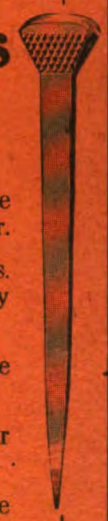
Wheel Top & Hardware Co.
Dep't. W2 (Get our Catalogue) Cincinnati, O.



NIEHOFF DEFECTOMETER
THE ONLY TESTING INSTRUMENT ON THE MARKET FOR LOCATING SHORTS IN A MAGNETO. ACCURATE AND TIME SAVING. A NECESSITY IN EVERY GARAGE
PAUL G. NIEHOFF & CO. INC
232-242 E. OHIO ST. CHICAGO, ILL.

WELDING PLANTS, $25.00 to $300.00
Designed for all purposes. Small cash payment; balance, three to six months.
Every mechanic and shop should have one.
BERTSCHY-BERMO CO. OMAHA, U. S. A.

Use "Capewell" Nails



Some Reasons Why:

1 The Capewell Horse Nail is easiest to drive and the most economical. Holds both the shoe and the customer.

2 No waste material to pay for when you buy Capewell Nails. Quality always the best. Inspection most rigid. Every nail serviceable.

3 No loose shoes to tighten for nothing when they are put on with Capewell Nails.

4 Safety for the horse, confidence for the owner, and easier day's work for the shoer.

5 Horseshoers, horse owners and horses all share in the benefits which follow the use of Capewell Nails.

Not the cheapest nail regardless of quality but the world's best at a fair price.

Look for the Trade Mark on each nail head—a pattern formed by lines crossing each other diagonally.

The Capewell Horse Nail Co.
Hartford, Conn., U. S. A.

New York, Buffalo, Philadelphia, Baltimore, New Orleans, Cincinnati, St. Louis, Chicago, Detroit, Denver, Portland, San Francisco, Toronto

Largest Manufacturers of Horse Nails in the World



Saw Those Heavy Bars ON A MARVEL Power Hack Saw

Machine stops when work is cut off. Requires very little power.
Price is Low. Write Us.
Ask for reply by return mail.
ARMSTRONG-BLUM MFG. CO.
340 N. Francisco Ave., Chicago, Ill., U. S. A.



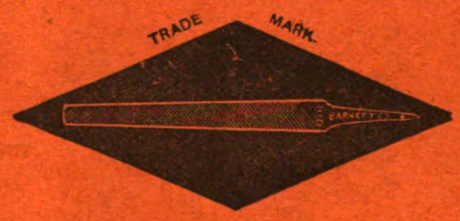
HORSESHOES In Stock
Ask for Stock List



ROWE CALKS
Screw and Drive
ROWE CALK & CHAIN CO.
Plantsville, Conn.

THE TEETH IN
BLACK DIAMOND RASPS
ARE MINGLED
So as to Cut Clean and Free and Leave no Furrows in the Work

Twelve Medals of Award by Jurors



At International Expositions

G. & H. BARNETT COMPANY
Black Diamond File Works, PHILADELPHIA, PA.
Owned and Operated by NICHOLSON FILE CO.
Copy of Catalog sent Free to any interested file users upon application.

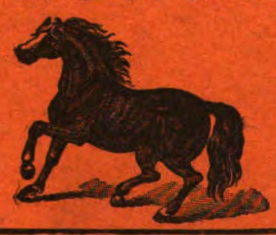


We Make STEEL WHEELS
To Fit Any Axle
Plain or Grooved Tire
Steel or Hickory Axles
Any Size
A Full Line of Wood and Steel Farm Trucks
With Steel or Wood Wheels
Write for Large Catalog and Prices
ELECTRIC WHEEL CO.
Box N, Quincy, Ill.

STEEL STAMPS
LETTERS and FIGURES
For Marking Your Tools and Your Product
NAME PLATES OF ALL KINDS
S. D. CHILDS & CO.
DEPT. 2
136 S. CLARK ST. CHICAGO

AETNA STEEL TOE CALKS
Made by THE AETNA NUT CO., Southington, Conn.
BLACK HORSE BRAND

BEST SHAPE
BEST SPUR
TO DRIVE
BEST STEEL



TOE AND HEEL CALKS

SOLD BY ALL DEALERS

Stokes Bros.' Improved Horse Rasps
Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A.



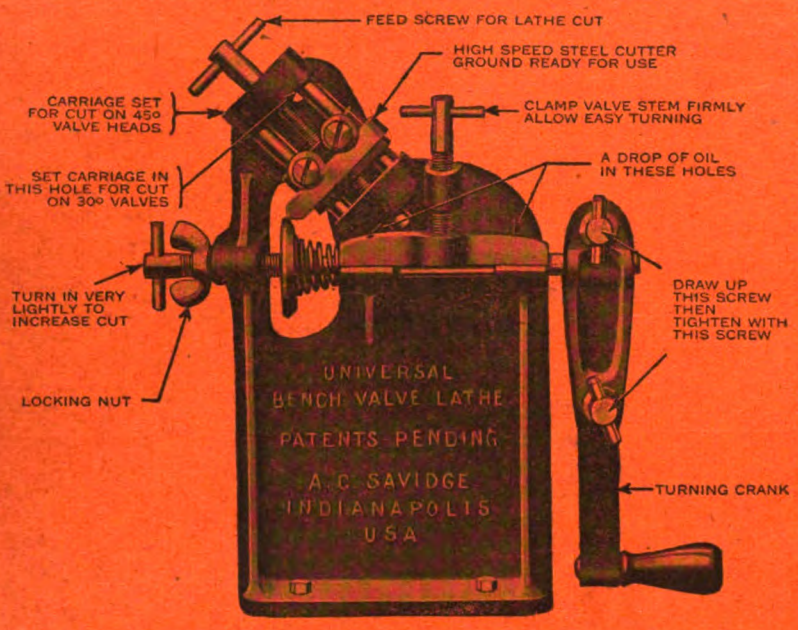
SUREGRIP CALKS
American Calk Co.
DETROIT, - - MICH

STEEL STAMPS
BURNING BRANDS
RUBBER STAMPS
STENCILS
GEO. M. NESS, JR.
61 FULTON ST. NEW YORK
Send for price list.

Digitized by Google

SAVIDGE

UNIVERSAL BENCH VALVE LATHE



Anyone—**ANYONE**—can now quickly and accurately true the valve heads, thereby assuring a perfect fitting valve, an easy starting, a sweet running motor.

Savidge Valve Lathes are simple, rugged and efficent.

Vastly better and quicker than a machine lathe because self-centering and the angles are fixed,—YOU ARE SURE TO BE RIGHT.

To have a perfect job your valve heads must be concentrically true with respect to the stem,—THE SAVIDGE WAY.

Eliminate those carbon ridges caused by grinding—save gasoline, save grinding, save time and money and conserve your old valves.

Make a REAL lasting job and have that satisfied feeling due to perfect workmanship.

Write for full information about the Savidge Line of Valve Lathes—They are ABSOLUTELY GUARANTEED.

A. C. SAVIDGE, 615 N. Capitol Ave., INDIANAPOLIS, U. S. A.

The Perfect Power Hammer



Note the difference in construction over other makes:

Extra Long Guides, insuring a direct movement of the ram without any side motion, which causes guides and springs to break on other Hammers.

The only Hammer made with a disk attachment with special anvil for sharpening harrow and plow disks.

A recently invented **Friction Clutch** fitted with **Ball Bearings,** absolutely controls the operation of the Hammer by foot pressure from the lightest tap to the heaviest blow. This ease of operation makes the Hammer particularly well adapted for plow work, as you can get as light a stroke as you desire.

Will ship to any responsible party on approval. If not as represented, no sale.

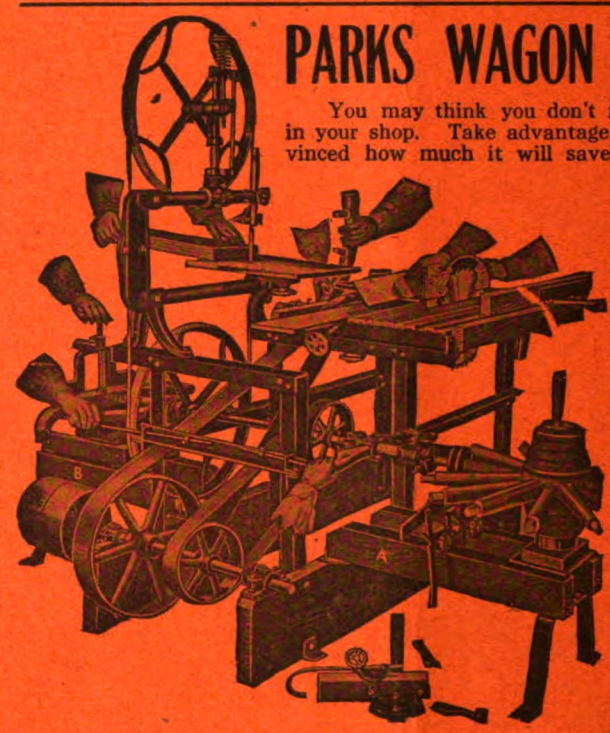
Made in two sizes:

3 inch square, 40 lb. ram—shipping weight, 1,150 lbs.
4 " " 80 " " " " 1,800 "

Write any jobber for prices, or

Macgowan & Finigan Cordage Co.,
204 North Third St., ST. LOUIS, MO.

PARKS WAGON SHOP SPECIAL



You may think you don't need this practical woodworker in your shop. Take advantage of our trial offer, and be convinced how much it will save you. **Machines sent on trial anywhere in United States and Canada.**

Machine is a combination of Circular, Rip and Cross Cut Saws,
22" Band Saw,
12" Jointer,
Rim Rounder,
Felloe Borer,
Spoke Tenoner,

All ready for instant use. No Changing.

Light size takes 2 to 3 H. P., heavy size 3 to 4 H. P.

Write for catalog and full information about how a woodworker should be arranged to be convenient to operate.

Parks Ball Bearing Machine Co.
North Side Station
Cincinnati, O.

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge

Nothing to get out of order.



Will hold securely any size of shoe.

No. 8 16 Inches Long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

Weights, 1¾ to 3 lbs.

This Hammer is the most popular Sharpening Hammer on the market.

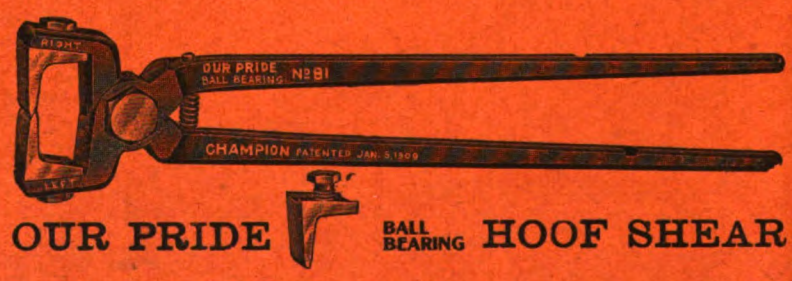


Corrugated Pein.

IT GIVES RESULTS.

No. 12 ELECTRIC SHARPENING HAMMER

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.



Blades easily replaced when worn out.

All parts interchangeable.

OUR PRIDE BALL BEARING HOOF SHEAR

Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY, - Meadville, Pa., U. S. A.

THE LIVINGSTON CO., 131 E. 23rd Street, NEW YORK, Eastern Representatives

Digitized by Google

"F-S" PAINTS



The Quality of "F-S" Products Is Acknowledged.

Your skill will not be wasted when you use "F-S" Automobile and Carriage Paints. They have the quality which you want for a well-finished and durable body. They dry free from dust over night in moderate temperature.

FELTON, SIBLEY & CO., Inc.

Manufacturers of Colors, Paints, Varnishes since 1863

136-140 North Fourth Street, Philadelphia

(145)

STERLING HOOF PADS

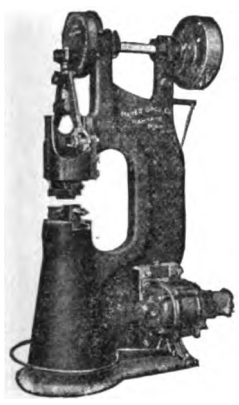
Are sold on quality, but the price is right. The rubber heel is vulcanized permanently to the fibre composition back (patented). The pad is one solid piece. Try the back with a knife, or rasp—bend it—give it any test you like. Better still, put on a few pairs and watch them. Protectors also.

Sold only through the regular jobbing trade.

STERLING TIRE CORPORATION
RUTHERFORD, N. J.

EXPORT DEPARTMENT, 44 Whitehall Street, New York

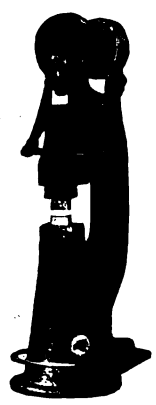
LITTLE GIANT POWER HAMMERS



Motor Driven.

25, 50, 100, 250 and 500 lb. Models.

Belt or Motor Driven.



Belt Driven.

The Boys in Khaki and Sailor Blue Will Be the Farmers of the Future.

Their war equipment has been the most modern, and when they return home the old out-of-date methods will no longer satisfy them.

They will insist on their farm equipment being kept in first class repair and they will take their work to the blacksmith who has up-to-date shop equipment.

No blacksmith shop is modern unless it has a Little Giant Power Hammer. Either of our models will pay for itself in a few months on our easy payment terms, and continue to repay for itself for many years after.

The first Little Giant Power Hammer made 26 years ago and every one since sold,—some 8,000 in all,—are still in use. There is no wear-out to them.

Average annual repair sales on all Little Giant Power Hammers in use, large and small, from oldest to latest, is 48c each or less than 2/5 of 1% of original cost to user.

Any Belt Driven Little Giant Power Hammer can be quickly changed to a Motor Driven Outfit. Ask your power plant superintendent for current, voltage, phase and cycles of motor required. Send this information to us and we will quote prices.

Little Giant Power Hammers are guaranteed FOREVER against defective material and workmanship, and are shipped on 30 days' trial.

Write Your Jobber, or Direct To Us.

LITTLE GIANT COMPANY, 103 Rock Street,
Established 1876. MANKATO, MINN., U. S. A.



ADVANCE OF THE GRAND ARMY

NAPOLEON'S name fills more pages in the world's solemn history than that of any other mortal. The advance of the Grand Army into Russia is the turning point of his career and marks the beginning of his downfall. Mighty armies are once again marching over the same battlefields where Napoleon fought a hundred years ago. All the causes of this mighty struggle may be learned from the pages of history. The one complete, accurate, authoritative and reliable history, containing the rise and fall of every empire, kingdom, principality and power, is the world famed publication,

Ridpath's History of the World

Dr. Ridpath is universally recognized as America's greatest historian. Other men have written histories of one nation or period; Gibbon of Rome, Macaulay of England, Guizot of France, but it remained for Dr. Ridpath to write a history of the **entire World** from the earliest civilization down to the present. We offer the latest edition, 4000 pages, 2000 illustrations, brand new, down to date, beautifully bound in half morocco.

At a Great Sacrifice in Price

We will **name** our **special low price** and **easy terms** of payment only to Blacksmith and Wheelwright readers and in direct letters to all who mail the coupon printed on the lower corner of this advertisement. **Tear off the coupon,** write your name and address plainly and **mail now.** Our **plan of sale** enables you to buy by saving only about ten cents a day for the ensuing year. Mail the coupon now before you forget it. The sample pages are free.

32 Page Booklet Free

We will mail you 32 free sample pages without obligation on your part to buy. These will give you some idea of the splendid illustrations and the wonderfully beautiful style in which the history is written. You can purchase this great history at the **lowest price ever offered** and pay for it in **small sums monthly** if you prefer.

Six Thousand Years of History

Ridpath takes you back to the dawn of history long before the Pyramids of Egypt were built; down through the romantic troubled times of Chaldea's grandeur and Assyria's magnificence; of Babylonia's wealth and luxury; of Greek and Roman splendor; of Mohammedan culture and refinement; to the dawn of yesterday. He covers **every race, every nation, every time** and holds you spellbound by his wonderful eloquence. **Mail the coupon.**

Western Newspaper Association
CHICAGO



FOLD HERE, TEAR OUT, SIGN AND MAIL

1(
18
FREE COUPON

Western Newspaper Association
H. E. Sever, Pres.
140 So. Dearborn St., Chicago, Ill.

Please mail 32 free sample pages of Ridpath's History of the World, containing photogravures of Napoleon, Cæsar and other great characters in history, and write me all particulars of your special offer to The Blacksmith and Wheelwright readers.

Name .....

Address .....

Mail this Coupon

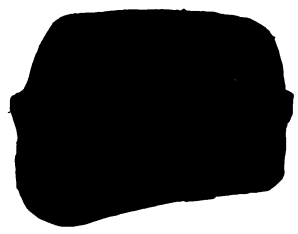
Digitized by Google



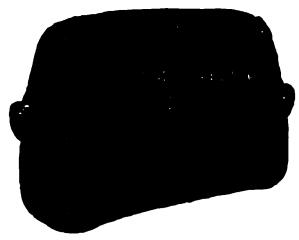
Tie Up to Firestone

—*because* vehicle owners all know that Firestone Carriage Tires give Most Miles per Dollar. Such is the equipment for you to offer now, particularly when people demand better service than ever and are buying with more care.

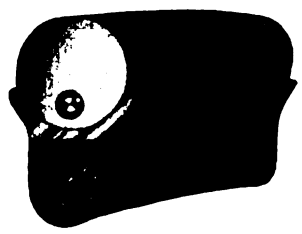
The quality of Firestone Carriage Tire makes it wear evenly down to the channel. It does not chip, crack and break. It wears down slowly and gives easy, resilient riding.



Internal Wire



Side Wire



Cushion

Firestone carriage rubber combines full size with the lightness which makes it profitable equipment for you to apply. Write your jobber or us for our interesting proposition.

FIRESTONE TIRE & RUBBER COMPANY
FIRESTONE PARK, AKRON, O.
Branches and Dealers Everywhere

Carriage Tire

Get a GTD Screw Plate
with O. K. Drop Forged Dies

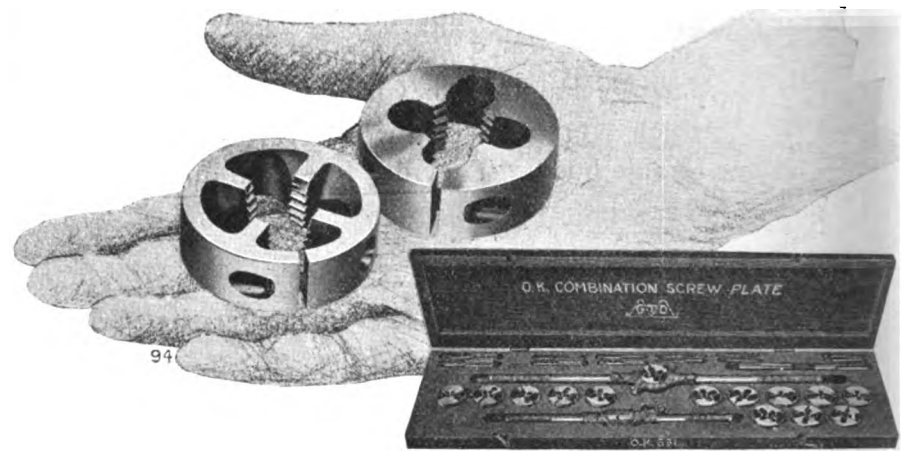
No Blacksmith Shop is complete without a GTD Screw Plate. Not only will it recut jammed threads, but new threaded parts can be made—and it's mighty hard to get spare parts now-a-days.

GTD Screw Plates are made in over a hundred assortments. Yours is among them.

Write for New Small Tools Catalog No. 40 describing Screw Plates, Taps, Dies, Reamers, etc.

Greenfield Tap and Die Corporation
Greenfield, Massachusetts

NEW YORK, 28 Warren St. CHICAGO, 13 So. Clinton St. Detroit Office, 74 Congress St. W
Canadian Plant, Wells Brothers Company of Canada, Ltd., Galt, Ontario





Stay With the Game and Win Out

Until thought is linked with purpose, there is no intelligent accomplishment.

Get down to the point of purchase—then make it the

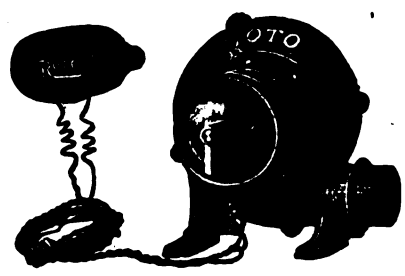
Kerrihard Power Hammer

It does the work of four men.

Write for Full Particulars

THE KERRIHARD CO., Kerrihard Station, Red Oak, Iowa, U. S. A.

The ROTO ELECTRIC BLOWER ONLY $30.00



Write for information about our special cash price of Twenty-Nine Dollars

SAVE TIME! SAVE MONEY!

It is your patriotic duty to save. Labor is in great demand. Machinery must take its place. Are you still blowing your forge by hand? Do you know that this time is WASTED? Install a ROTO ELECTRIC BLOWER and SAVE this time. It lets your hands free for other work. You will then say, like hundreds of our customers,

I wouldn't sell my ROTO for $100.00 if I couldn't get another.

Buy direct from the makers and save from $10 to $15, the middleman's profit. The Aeronautic Department of the United States Navy uses the ROTO. You can rely on it. Mail the coupon today and try out this time and money saver.

SEND THE COUPON. DO IT NOW.

THE ROSEWATER ELECTRIC CO.
5516 KINSMAN ROAD, CLEVELAND, OHIO

Send me by.....An AIR COOLED ROTO BLOWER with one year's guarantee, complete with cord, plug and Speed Regulator. I will return it to you at the end of 30 days, if it does not give me entire satisfaction, and if I keep it, I will pay you $30.00 at the end of 30 days.

Name.....Address.....

Current.....Voltage.....Cycles.....

Your Electric Light or Power Company Will Give You This Information.

Digitized by Google

THE FAMOUS CHAMPION BLACKSMITH TOOLS

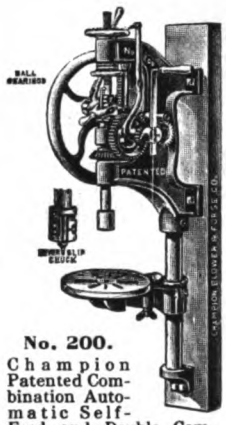
CHAMPION BLACKSMITH TOOLS HELPED TO WIN THE WAR



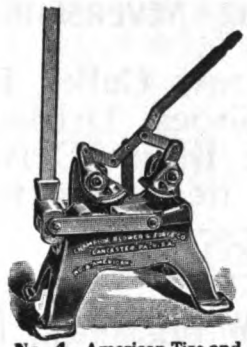


No. 400. Crank turns either way.

FAMOUS 400



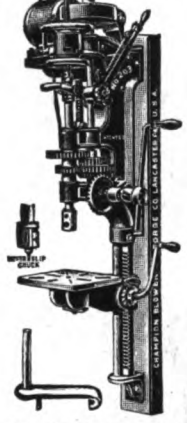
No. 200. Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



The Champion "Columbian" Tire Bender. Made in 3 sizes.



No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.



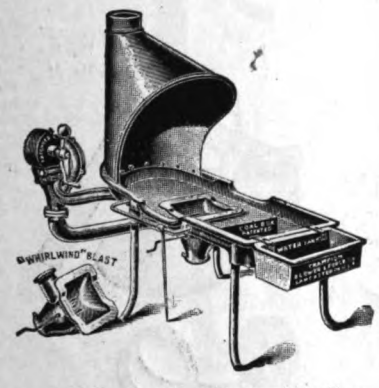
No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower.



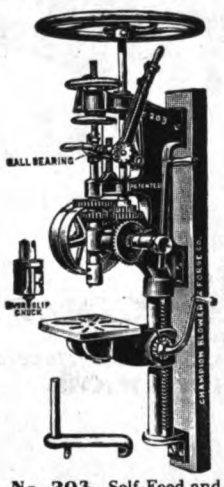
No. 408. Steel Blacksmith's Forge.

Don't Fail to Get Our 1918 Catalog

Before purchasing a Hand Blower Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



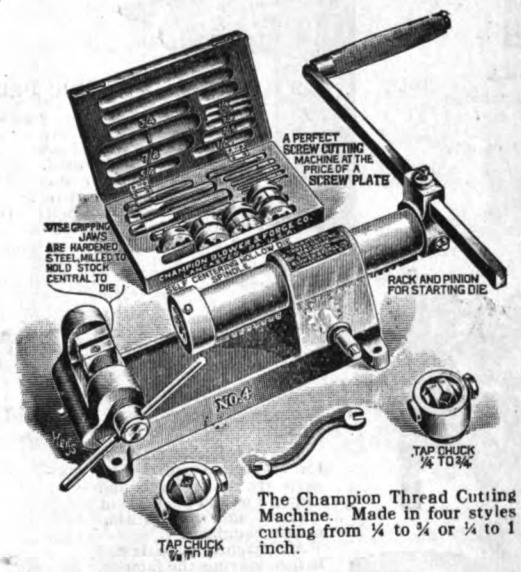
No. 433. Cast Iron Blacksmith's Forge



No. 203. Self-Feed and Double Compound Lever Feed Drill.



Hercules Patented Power Hammer. Weight of ram, 65 pounds.



The Champion Thread Cutting Machine. Made in four styles cutting from ¼ to ¾ or ¼ to 1 inch.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

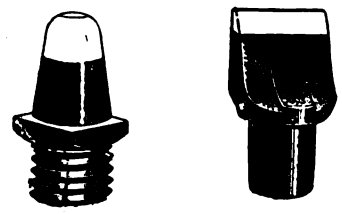
Digitized by Google

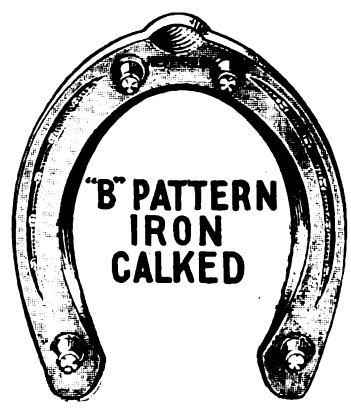


Get Ready
For Icy, Sleety Weather

RED TIP CALKS — HORSE AND MULE SHOES







Order Now

REMEMBER THE NEVERSLIP

Line embraces all styles of Screw Calks, Iron, Steel and Extra Light Steel Shoes, Drilled or Calked; Drive Calks, Sharp or Blunt, Driving, Draft and Mule Shoes, and all necessary tools.

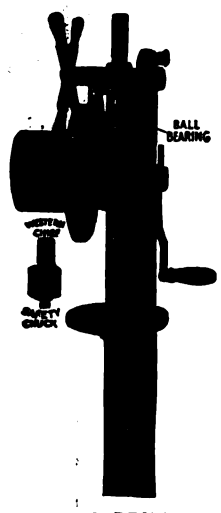
THE ONLY COMPLETE LINE

THE NEVERSLIP WORKS New Brunswick, N. J.

The Better Your Equipment The Bigger Your Profits

Buy CANEDY-OTTO
AND INCREASE YOUR INCOME

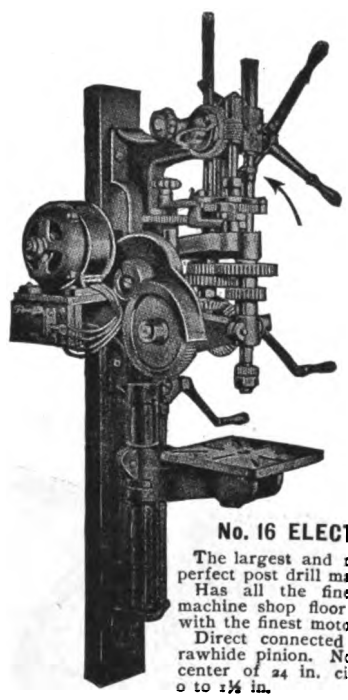
Once Tried, Always Used : There's a Reason—Quality



No. 19 DRILL

A low-priced combined hand and power self-feed drill.

Drills to center of 16¼ in. circle.



No. 16 ELECTRIC DRILL

The largest and most mechanically perfect post drill manufactured.

Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.

Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1⅛ in.

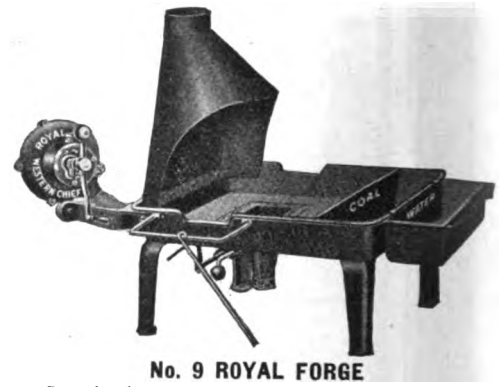
OVER 200 DIFFERENT STYLES

SEND FOR CATALOGUE No. 12



No. 100 ROYAL FORGE

The most popular forge ever made.
Fan, 12 in. Hearth, 31½x45½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x30 in. Blower, 12 in.



No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.

All machines are tested before leaving the factory, and guaranteed in every respect.

Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS

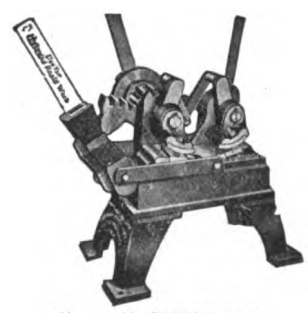


ROYAL BLOWER

(Ask the man who owns one)

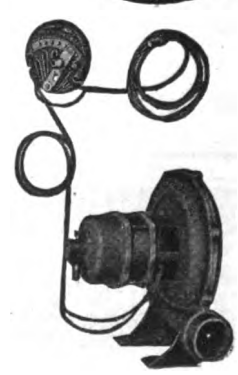
Gives more powerful blast than any hand blower made. Crank turns forward or backward.

Fire pot is 8x9 in. inside.



No. 1 1/2 SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



No. 8 ELECTRIC BLOWER

The best outfit money can buy.

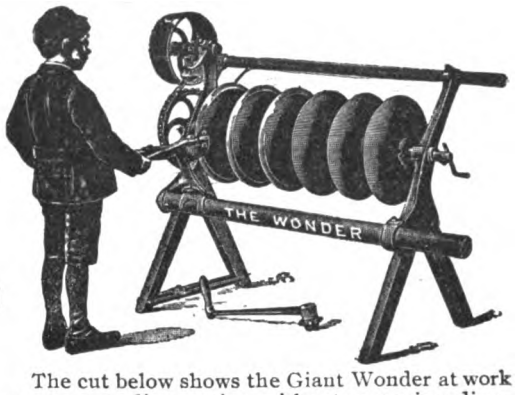
Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

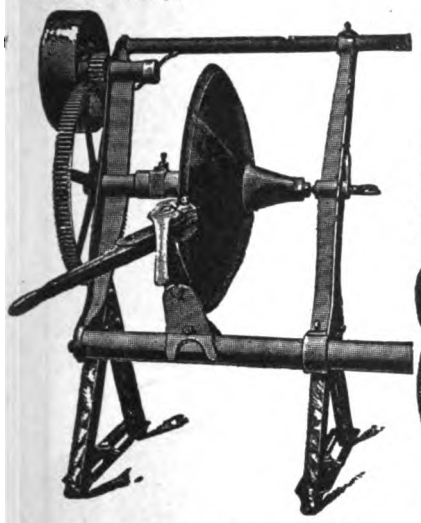
THE WONDER DISC SHARPENERS

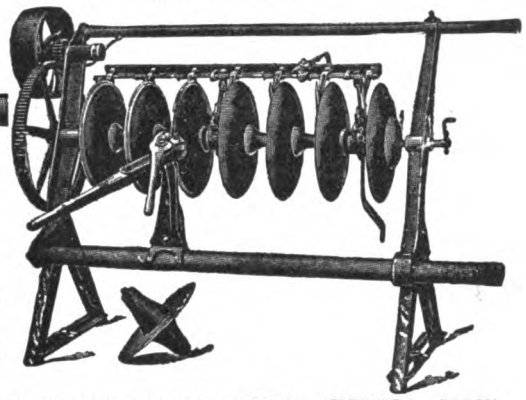
BUILT LIKE A LATHE

This cut shows the Little Wonder at work on a whole section of discs. This machine is especially adapted for sharpening disc harrows. While the Little Wonder is being successfully used to sharpen plow discs of 22 inches or less, we would recommend the Giant Wonder where disc plows are used extensively.



The cut below shows the Giant Wonder at work on a seven-disc section without removing discs, thereby saving one-half the time and labor, as in many cases you can sharpen a whole section of discs while your competitor is taking his off the shaft the old fashioned way.





The above cut shows the Giant Wonder at work on disc plows. Will sharpen any size from 12 to 32 inches in diameter.

FOR SALE BY LEADING JOBBERS IN UNITED STATES, CANADA, MEXICO, SPAIN, AUSTRALIA, ARGENTINE REPUBLIC, SOUTH AFRICA AND FIJI ISLANDS.

A. E. DURNER, Manufacturer EVANSVILLE, WIS., and BRANDON, MAN., CAN.

ADDRESS ALL INQUIRIES TO

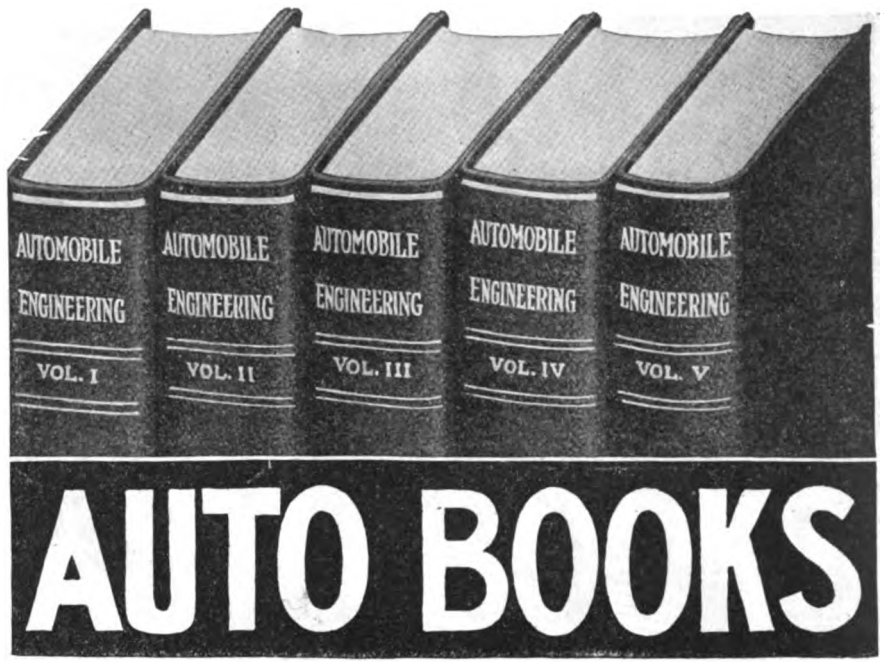
A. E. DURNER; Head Office, Evansville, Wis.

Both size machines are equipped regular, long enough to take in 8 disc section. Special length furnished for 10 and 12 disc section at small cost.

I hold the original patent on this style sharpener. I could build them cheaper, but I won't. I would build them better, but I can't. Write for testimonials from your neighbor. Did you ever buy a cheap machine that gave satisfaction?

THINK ABOUT IT, THEN BUY A WONDER.





AUTO BOOKS

New Edition 7¢ A Day

Now ready for you—this marvelous five-volume Library on Automobile Engineering! The newly written reference work covering the construction, care and repair of pleasure cars, motor trucks and motorcycles. The most complete and advanced information in Ignition, Starting and Lighting Systems, Garage Design and Equipment, Welding and other Repair Methods. Five wonderful volumes beautifully bound in flexible covers, gold stamped. 2,400 pages (5½x8¾ in.), 2,000 illustrations, tables and explanatory diagrams. This great automobile library, combining the knowledge of the greatest experts in the business, now yours on payments so small as to average only 50c a week, or only 7c a day.

Partial List of Contents

- Explosion Motors
- Welding
- Motor Construction and Repair
- Carburetors and Settings
- Valves, cooling
- Lubrication
- Fly-Wheels
- Clutch
- Transmission
- Final Drive
- Steering Frames
- Tires
- Vulcanizing
- Ignition
- Starting and Lighting Systems
- Wiring Diagrams
- Shop Kinks
- Commercial Garage design and Equipment
- Electrics
- Storage Batteries—Care and Repair
- Motorcycles
- Commercial Trucks
- Glossary

SHIPPED FREE

No money in advance. Not a cent. See the books in your own home or shop absolutely free, at our risk. Read them, examine them, study them for seven whole days before you need decide whether you want to keep them or not. Send no money to get the books for free examination. Make no deposit. Assume no obligation. Simply put your name and address on the coupon below and mail it to us. The books will be promptly shipped to you for your examination. Take seven days to ascertain their value to you. If you are not more than delighted with them and do not consider the books one of the biggest bargains you ever made, just send them back to us and you won't owe us a penny. If you value the books and see them to be worth many times their price to you, send only $2 in seven days and then $2 a month until the special introductory price of $17.80 has been paid.

Send No Money

Every repair man, every auto mechanic, every auto driver and owner will prize this magnificent library. Even the most experienced veteran in the business will find a wealth of practical information and help in this work. Prove their value to yourself at our risk. See the books without cost or obligation to you. Not a cent do you risk by sending the coupon. So do it today—NOW—while this special offer is open. **You have nothing to lose, and much to gain.**

FREE

CONSULTING SERVICE

With each set we give you, free, a year's Consulting Membership in the American Technical Society. The regular price is $12. Put your problems up to our Staff of Experts, for one entire year.

American Technical Society

Dept. A-7641, Chicago, Illinois

American Technical Society, Dept. A-7641, Chicago, Illinois

Please send me the 5-volume Automobile Engineering for 7 days' examination, shipping charges collect. If I decide to buy, I will send $2 within 7 days and the balance at $2 a month until the $17.80 has been paid. Then you send me a receipt showing that the $25.00 set of books and the $12 Consulting Membership are mine and fully paid for. If I think I can get along without the books after the seven days' trial, I will return them at your expense.

NAME.....

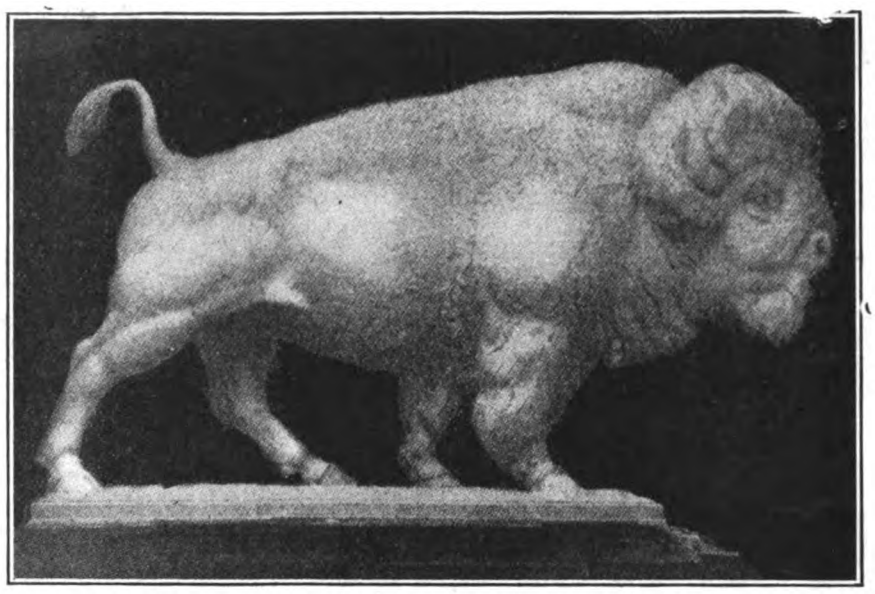
ADDRESS.....

REFERENCE.....

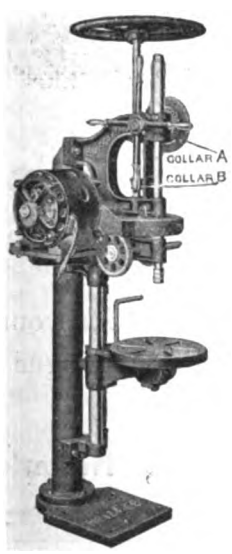
Digitized by Google



Digitized by Google

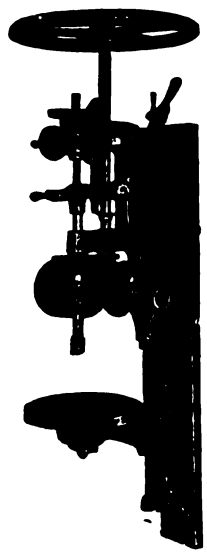


Modern Shop Efficiency



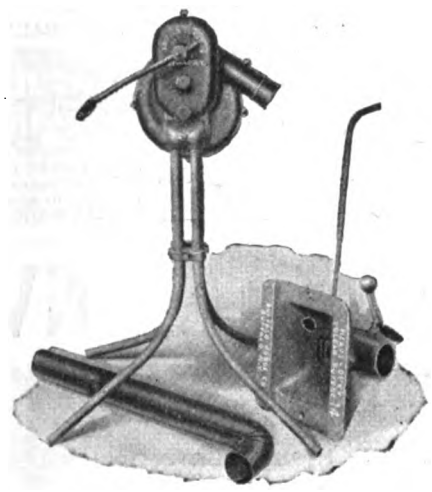
BLACKSMITHS AND GARAGEMEN are determined to have the best that may be had in Blacksmith Shop Equipment.

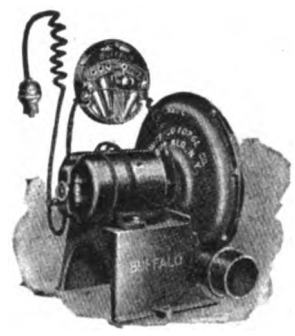
The work of the modern shop demands modern efficient tools—tools that will stand up under severe service.

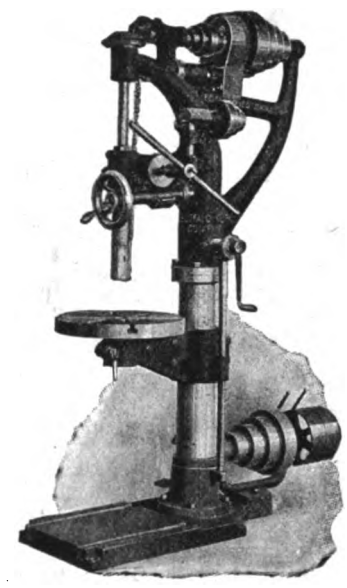


Forges; electric blowers; drills—floor and post type; shears —for cutting angles, bars and sheets—and of every size from the little bench type hand power shear to the heaviest power shear made—these are the tools you should know about.

Buffalo Forge Company - - Buffalo, N. Y.







WRITE DEPT. 6 FOR CATALOG

"Buffalo"

Digitized by Google

Linde Oxygen Now on a Peace Basis

THE War Industries Board has withdrawn all restrictions on Oxygen manufacturers and users, effective December 1st. All direct Priorities, with the exception of a few departments of the Government, and all Automatic Priorities, have been revoked.

We desire, therefore, to do everything in our power to help rapidly build up all Peace work for which Oxygen is required, and have instructed our Distributing Stations to accept and enter orders for shipment on that basis.

As we anticipate a continued heavy demand for our product for some further time we are not curtailing in any way our War construction program, which calls for the completion during the next few months of several new additional manufacturing plants, and additional cylinder equipment represented by thousands of new cylinders now in process of delivery.

In view of these facts we feel safe in assuring all users of Linde Oxygen that their orders will be given the same consideration and attention as before War-time restrictions were imposed.

¶ The whole force of the Linde organization has been directed to the winning of the War. Some day the story of its efforts will be told. Now that it is free to resume activity in the field of general industry, the entire force and complete organization are concentrated on the building up of Peace-time industries.

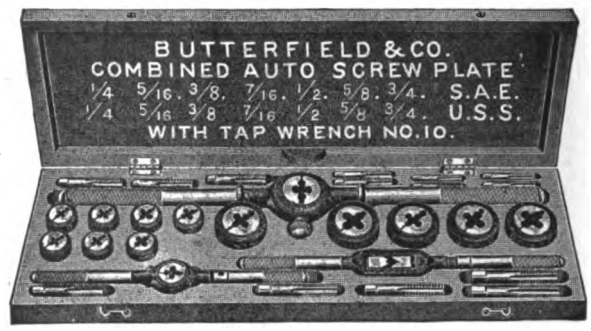
We ask your co-operation in the matter of returning empty cylinders immediately. Such co-operation will be an important factor in the maintenance of efficient service during the period in which industry is being readjusted to a Peace basis. Kindly send orders and correspondence regarding their execution direct to the nearest Linde Distributing Station. Inquiries as to prices, terms, etc., should be addressed to our Sales Department, New York (except for Pacific Coast).

The Linde Air Products Co.,

The Largest Producers of Oxygen in the World

30 East 42d Street, New York
Kohl Building, San Francisco

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.
New York Store: 126 Chambers Street

The Horse Rasp of Quality



Ask your Dealer for the

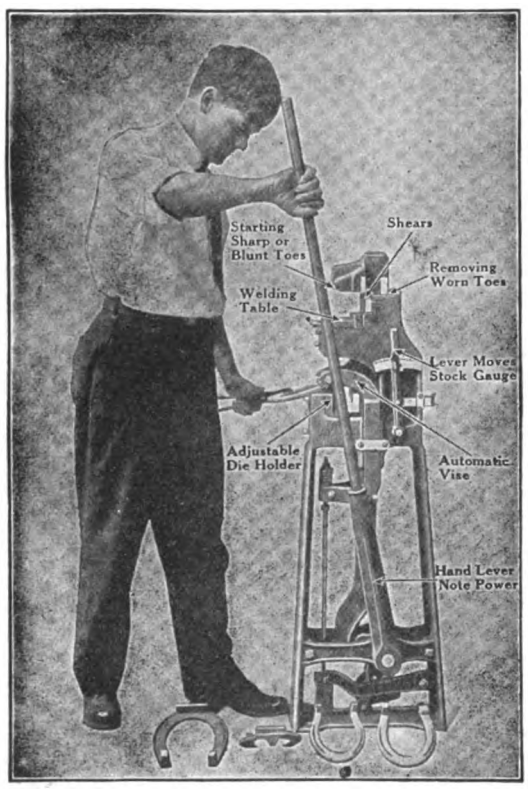
IMPROVED HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, **"Slim," "Light," "Slim Light"** and **"Fine Cut."** Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial. New catalogue mailed free on application.

HELLER BROTHERS CO. *Established in 1836* **Newark, N. J.**

1919 MODEL
THE L. S. P. CALKING MACHINE

The Greatest Time and Labor Saving Machine On Earth



1919 MODEL—Fully covered with Patents

OUR 1919 Model is the same as our 1918. We agree with the users and so would you, that it cannot be improved.

Do not mistake this for a machine which makes toe calks or a foot vise. This machine is for turning heel calks, both Blunt and Sharp, sticking and welding toe calks, clipping and trimming ends of shoes. IT CALKS SHOES, doing the work just the same as you do by hand with the hammer, only it is done much better and easier, and in a fraction of the time.

In turning heels, you can turn up just as much stock as you wish, upset or stoveup to make as heavy as you like and square up the calks without use of hammer. There is no losing of toes when you weld on the L. S. P.

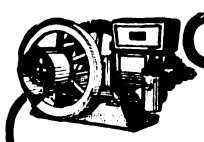
It is a strong, handsome, well made machine and will last, as you might say, a life time, fully warranted for one year. It is in use in the best shops in the United States, users claiming more for it than we do.

Write at once for full information and prices.

L. S. P. CALKING MACHINE CO.

P. O. Box 225 **WYALUSING, PA., U. S. A.**

NATIONAL MACHINE CO., Brighton, Ontario, Canada



OTTAWA KEROSENE ENGINES

Start Easy In any weather. Pull steady. Carry big overload. All sizes and styles. 1½ H-P. to 22 H-P. 90 Days' Trial. Money Back Guarantee. Prompt shipment.

Low Prices Write for present money saving prices and Free Book, telling all you want to know about engines. Write today.

OTTAWA MFG. CO. 1783 King Street, OTTAWA, KANS.



Shipped on Approval

This Five Passenger 25 H. P. car, 116 in. Whl. base, Goodrich 32 x 3 1-2—Delco Ign.—Dyneto Stg. and Ltg. Write at once for particulars of shipment and my 48-page catalog. Agents wanted to drive and demonstrate. Territory open. Prompt shipments. Big money. Cars guaranteed or money back. 1919 cars ready. Address J. H. Bush, President. Dept. A-5

BUSH MOTOR CO., Bush Temple, Chicago, Illinois

Subscribe for The Blacksmith and Wheelwright. $1.00 a year.

"NATIONAL" BLACKSMITHS' DRILL CHUCK



Made especially for Blacksmithing and Carriage Work. Positive, durable, strongest, self-cleaning, always works, quickest to change Drills, casts no shadow, will save its cost over other Chucks in saving of time. BUY THE BEST. Money refunded if not as represented. Ask your jobber for it, or send direct for prices and circular.

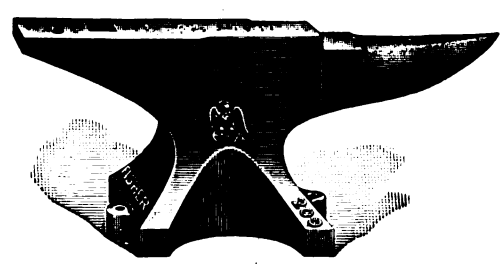
ONEIDA NATIONAL CHUCK CO., Oneida, N. Y.

1843 EAGLE ANVILS 1918
AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE

BLACKSMITH AND WHEELWRIGHT

Vol. LXXIX No. 1. NEW YORK, JANUARY, 1919. TERMS ONE DOLLAR A YEAR

Design, Construction, Operation and Repair of Automobiles and Motor Vehicles

Part XII—Various Types of Bearings Commonly Used; Construction of the Front Axle; Steering Gear Arrangements and Linkages

Now the type of axle makes a great deal of difference to the assembly. Some manufacturers claim that a semi-floating axle is better than a full floating. Other manufacturers who have adopted the latter type disagree, and there are arguments upon both sides.

From another standpoint, however, one is inclined to favor the full floating, or three-quarter floating type for this reason:—In a full floating axle, or a three-quarter floating, the axle itself may be removed from the car without removing the wheels. This means a lot should one of the axles break on the road. It makes a difference also to the differential assembly.

In the three-quarter or full floating type of axle, the differential is supported by bearings at each side, while the differential gears are fitted upon the axle, but the axles are feather-keyed and can be slipped from the axle without removing any pins or disassembling.

In the semi-floating type, however, the axles are pinned to the gears and cannot be removed until the differential is disassembled. This means, then, that the whole rear axle must be taken apart before the shafts can be taken out or the differential repaired in any way.

Full Floating Easy to Repair.

In repairing any part of the axles or the differential in the full floating type of axle, the driving flanges are unbolted from the wheels, the axle slipped out of place, then the differential can be removed through the hand hole at the rear of the assembly.

Since the axles slide into the differential gears, any side play such as is had in turning corners is absorbed by the bearing in the wheels in the full floating or three-quarter floating types, whereas in the semi-floating type of axle, side thrusts must be absorbed inside of the differential.

Types of Bearings.

In an automobile may be found many types of bearings; for different purposes, special types of bearings are necessary. In the connecting rods a babbitt liner is usually used, for the reason that babbitt will melt quickly,

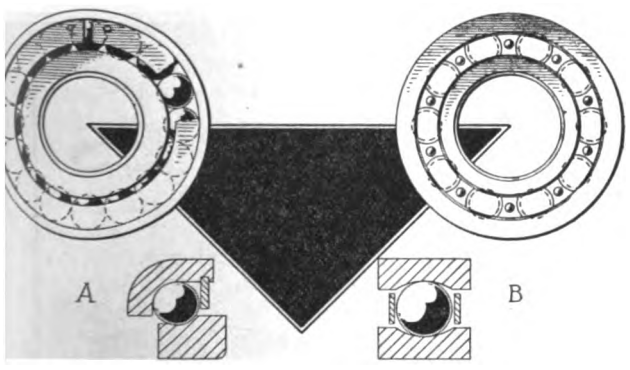


Fig. 51—Two Types of Ball Bearings. A, Cup and Cone; B, Annular Bearing.

if for any reason oil is not furnished it, and with little danger of damaging the crankshaft or crankpins. The same type of bearings is used for main engine bearings, though occasionally roller or ball bearings may be found.

Plain bearings, either of bronze, iron or babbitt are used throughout the engine, on the camshaft, the gears, the valve stems and push rods. When any of these bearings are worn new ones must be put in their places, or if they are of the half circle type, such as are found in the connecting rods, the halves of the circle can be brought nearer together and the metal scraped to fit the shaft. In this series of articles we will only mention this fact, and at a later date explain the operation in detail.

There are two classes of bearings, in addition to the plain bushing or liner type, the ball and the roller types. Doubtless all of us remember the old ball bearing arrangement that we had in our bicycles, those of us who were mechanically inclined usually pulled the things apart on the average of once a week, just for fun. There was an inner race which was termed a cone, and an outer race called the cup, and between them the balls were mounted.

Ball Bearings.

Upon the same principle are made the ball bearings of today. In Figure 51 are shown two kinds of ball bearings. The bearing

Fig. 52—A, Components of Taper Roller Bearing; B, Solid Type Roller; C, Spring Roller Bearing.

shown at A is similar to the old bicycle bearings, except that the inner race or cone is not beveled quite as much as the older types. One can see by the illustration that this type of bearing can be used where there is a certain amount of thrust, such as upon differentials or in the wheels.

This brings us to the subject of "thrust" and what the word means. Where two bevel gears are meshed, such as in the differential master and pinion gear assembly, the pinion or small gear has a tendency to thrust away from it the master gear. This action results in considerable side friction, and in order to prevent the friction a thrust bearing is provided. As the car sways from side to side the wheels and bearings are strained sideways and so thrust bearings must be provided at this point as well.

If there is no thrust, and if the bearing is in place simply to prevent rotary friction, an annular bearing can be used. We have an instance of such bearings in the gear-set. The bearings upon which the counter shaft and main shaft are mounted are usually annular.

Now let us again refer to the 51st figure. The type of ball bearing shown at A can be used for both annular and thrust purposes, provided the thrust upon the inner race is from the right side, and the thrust upon the outer race is from the left. If we used such a bearing arrangement in the wheels, since the thrust might come from either side, it would be destroyed very quickly, and to protect it from left side thrusts we would apply another bearing of the same type, but turned around to take the thrust from the opposite direction.

The type of ball bearing shown at B is of the annular type only; it cannot be used for thrust purposes and differs from the bearing shown at A in that respect. The small rings at each side of the ball, shown in the cross section, are simply for the purpose of protecting the ball at the sides and keeping the balls from frictioning against each other.

Now manufacturers differ as to the application of bearings, and though it is generally conceded that the ball bearing has many advantages, many engineers are in favor of the roller type, claiming that a roller contact, being of greater length, will give better support to the shaft or the weight. Consequently another type of bearing has come into general use, the roller type.

In Figure 52 are illustrated three kinds of roller bearings. The older or solid roller

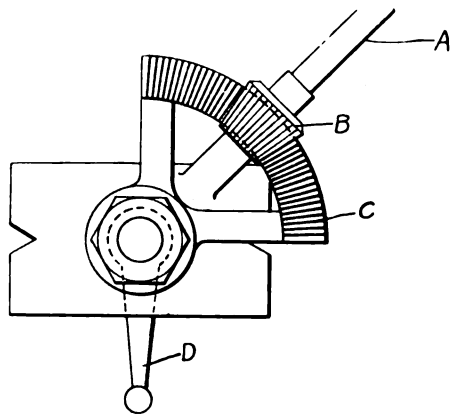


Fig. 53—Gear and Quadrant Type of Steering Gear.

type is shown at B. Like all bearings, it consists of an outer sleeve or race, a set of rollers and an inner race. The rollers are spaced a certain distance apart and kept from contact with each other by a cage-like arrangement in which they are mounted. Like any type of ball or roller bearing, the rollers support the weight of the shaft which passes through their center, and this is a good fact to remember. After the shaft and the inner sleeve are in place the outer sleeve in the housing should just slip over the roller assembly. If there is any side play, or looseness, the roller will wear very fast, or the shaft become damaged.

This type of bearing, as well as the one shown at C, is of the annular type. It will support radial loads, but will not take care of any thrust. If there is any thrust to be taken care of, another bearing is necessary in addition to this. The rolls, being made of steel and solid, are not so resilient as the type shown at C.

The roller bearing illustrated in this figure, in principle, is exactly like B, only the rolls are different. In this case the rolls, instead of being solid, are made of twisted steel. They much resemble a coil spring, except that the coils are very close together. The illustration shows very plainly how the roll is made.

The Taper Roller Bearing.

After much experimenting, engineers finally evolved a type of roller bearing which would not only support radial loads but would take care of the thrust as well. Such a bearing is shown at A in the same figure. Both the outer and the inner races are tapered.

Digitized by Google

The rolls are held in a cage, and the rolls are likewise tapered.

The bearing shown at A will take a thrust on the inside race from the left, and a thrust on the outside race from the right. As in the case of the cup and cone bearing shown at A in Figure 51, two bearings are necessary if the thrust is to come from two directions.

There is one fact to remember in regard

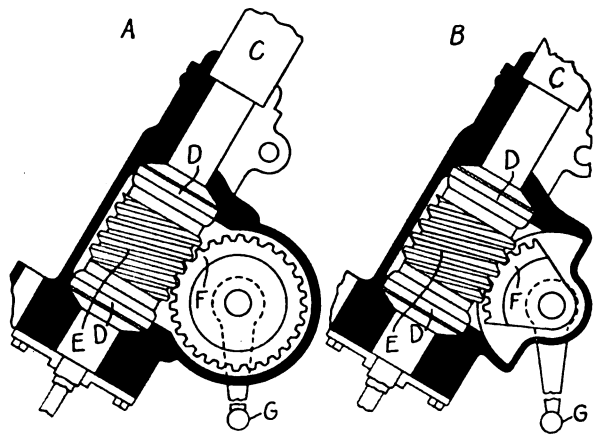


Fig. 54—Worm and Wheel, and Worm and Sector Types of Steering Gears.

to taper roller bearings. While all other bearings should be adjusted tight so that there is little or no play in them, there should be a certain amount of play in the bevel type of roller bearing. If the bearing is assembled in such a way that there is continuous pressure upon the rollers, their destruction will be rapid.

In addition to the above types of bearings there is still another, a ball thrust bearing. This latter type of bearing will support no radial load. It is simply designed to work in conjunction with annular ball bearings or annular roller bearings. It is nothing more or less than a series of balls held in a flat plate between two hardened steel washers. In the cheaper cars, thrust is often taken by a washer only, no ball or roller bearings being used. This thrust washer is usually made of different material from the faces against which it works. Bronze and fiber are the two materials usually found. We might expect to find such a thrust washer inside the differential housing between the differential gears and the housing.

The Steering Gear.

No part of the car receives so little attention as the steering gear, yet it is really the most important device on the car. The steering assembly in the modern car consists of a number of parts which are illustrated in Figure 57.

At A is shown the steering wheel; B the steering column; C the steering gear, which embraces all of the steering reduction gearing, or similar devices; D shows the drag link which connects the Pitman arm, H, with the projection on the steering knuckle, G.

Passing through the steering knuckle, G, is a pin termed the "king pin," or sometimes the "king bolt." There is a similar bolt at the opposite end of the axle for the left steering knuckle. Both steering knuckles are connected by a tie-rod, E. This arrangement permits the wheels to turn upon the

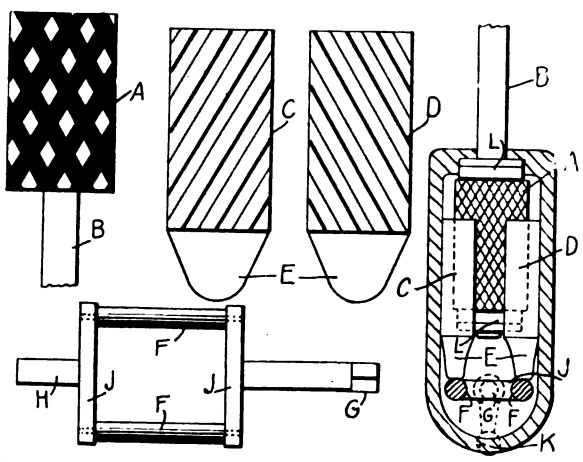


Fig. 55—Parts and Assembled Block and Worm Steering Gear.

wheel spindles without swinging the whole front axle, F, as in a wagon.

At the present time we are concerned particularly with the unit C, termed the steering gear, which transforms the circular motion of the steering wheel, A, into lateral or back and forth motion of the pitman arm, H. In the older types of machines a long lever, extending up to the driver's seat, connected with the tie-rod and permitted the driver to move the wheels in the various directions. However, should one of the wheels strike an obstruction in the road, there was danger that the steering arm would be jerked out of the hands of the driver and the car run wild.

To prevent this, the steering gear C was devised. It is nothing more or less than a means of power reduction. The older type is called the gear and quadrant and is shown in Figure 53. A indicates the steering column upon which is mounted a bevel pinion steering gear, B, which meshes with a quadrant or quarter gear C. As A is turned, through the steering wheel, the quadrant is rocked back and forth, and since the Pitman arm, D, is connected directly with the quadrant forging, the drag-link is moved back and forward as required, steering the car.

One can see that this type of steering gear has its disadvantages. Road shocks are not entirely eliminated. The driver is under a strain at all times to keep the steering wheel steady. To eliminate this backlash, designers produced the worm and sector type of steering mechanism shown in Figure 54 at B.

Worm and Sector Type.

In this diagram C indicates the steering column upon which is mounted the worm E. The worm meshes with the sector, that is, a section of a worm wheel, as shown at F, and this sector carries upon it the Pitman arm

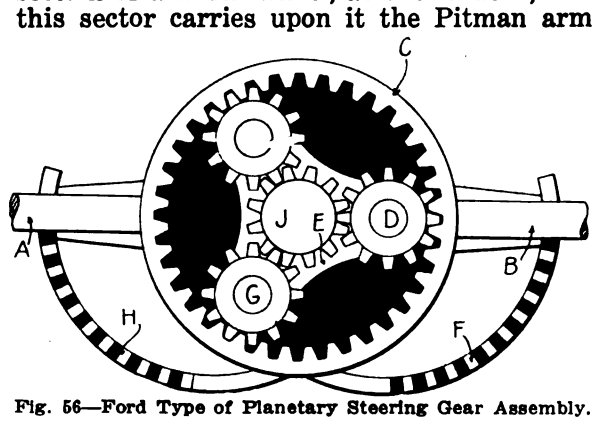


Fig. 56—Ford Type of Planetary Steering Gear Assembly.

G. In this case it is easy enough to turn the steering wheel; the steering wheel turns the worm through the shaft and the sector F is moved back and forth. On both sides of the worm, and illustrated at D, are usually mounted a pair of ball thrust bearings, though in some cases simply a bronze washer is used. Continued use of this type of steering gear naturally would result in a certain amount of wear. The wear comes usually upon the sector F, and as there is no way to prevent this, after a time it will become necessary to replace F.

To obviate this, and to increase the life of the device, engineers evolved the worm and wheel type of steering gear shown at A in the same sketch. In action this device is the same as the one shown at B, except that the full wheel F replaces the quarter wheel or quadrant in the first type. When one-quarter of the gear F becomes worn, the Pitman arm G can be removed, the gear given one-quarter of a turn and the Pitman arm G replaced. This is practically a replacement of the worn portion with a new section, and is one means of adjustment of this gear.

End play in the steering column C can be taken up by screwing down the large nut at the top of the gear assembly. This nut presses against the bearing D and compensates for any lost motion or wear in the bearings. In some types of steering gears this nut may be found at the bottom of the gear. In the higher priced cars a more complicated steering gear is adopted. This gear is termed the "sliding block" type, and consists of the parts shown in figure 55. An assemble sketch is also reproduced in the same figure.

Worm and Block Type.

Upon the steering column B is mounted the double worm A. By a double worm we mean a worm that is cut with both a left and a right-hand thread. Two blocks, C and D, are fitted with teeth, one block has left-hand teeth fitted upon it, the other has right-hand teeth. As the steering column B is turned towards the right, the block D will travel upward on the worm, while the block C will travel downward. Each of these blocks rests against a roller, F, upon the peculiar shaped piece J. At one end of J is mounted the shaft G, and upon it the Pitman arm K.

As the blocks travel upward and downward, J is twisted to the left or to the right and the Pitman arm moved forward or backward, steering the gear. The general method of adjusting this device is similar to that adopted in adjusting the steering gears shown in Figure 54.

The steering gear on the Ford car is of an entirely different type from any of those described. Instead of being located at the lower end of the steering column, it is located directly beneath the steering wheel. The lower end of the steering column is fitted with the Pitman arm and the gear reduction is had by the device illustrated in Figure 56. The housing for the steering column is fastened to the dashboard. This housing, C, is fitted inside with an internal gear. To the upper end of the steering column is fastened the forging E, upon which are mounted three studs, and upon these three studs are mounted, free to move, three small gears, two of which are shown at G and at D. The center gear J is fastened directly to the steering wheel. As this gear is turned, then the small gears, G and D, are revolved. They form small levers which twist the forging E around and so turn the steering column.

Steering Linkage.

Next in importance to the steering gear come the fittings at the steering knuckle. It is very important that this portion of the car be kept in good condition, for should the king-pin break, an accident surely results. Since all of the pressure and shocks of the road go through this pin, the wear at this point is excessive. Every car that comes into your shop should be examined at this point. The front of the car should be jacked from its wheels, and if there is any play in the steering knuckle, new parts should be put into place. Usually the steering knuckle forging is bushed with a bronze sleeve, though in a few expensive cars ball bearings are provided at this point.

We have made comparisons with the bicycle of olden days; let us go back a minute and learn another lesson from it. If you ever tried to reverse the front wheel—that is, turn the forks in the other direction—you know how hard it was to steer the bicycle. As a matter of fact, it was almost impossible to steer the wheel at all if the forks were wrong side foremost.

The same thing is true about the front axle of an automobile. The king-pin slants backward at the top slightly. Very frequently an automobile will be brought into your shop for repairs. The owner will claim

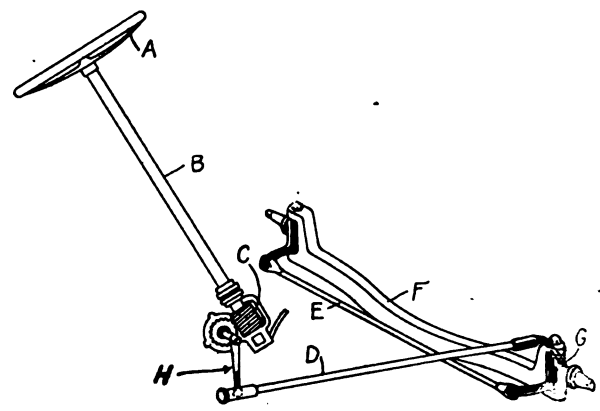


Fig. 57—Showing Parts of the Steering System.

that he has great difficulty in steering it. Always examine the front axle and see that the steering knuckle and king-pin slant backward slightly. The axle may be bent or it may be that the springs have slipped just enough to tip the axle slightly. At any rate, once you know about the trouble, it is easy enough to repair it.

(To be continued.)

Digitized by Google

Getting the Money You Earn

Next To Knowing How To Do Good Work, Comes the Art of Charging Your Customer a Satisfactory Price

J. F. HOBART, M. E.

The writer recently spent a very instructive hour in a small shop where two men did all the work, shoeing, wagon repairing and "Anything and Everything" which came along which could possibly be accomplished in a blacksmith shop with woodworking facilities.

One day a considerably heavy lot of work was brought in from a neighboring dock where a ship was being repaired. The work

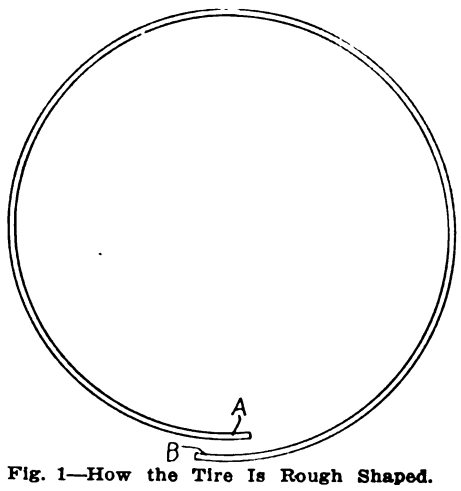


Fig. 1—How the Tire Is Rough Shaped.

was readily accomplished, then came the matter of making a price upon it.

The owner of the shop, after frequent head scratchings, formulated a row of figures which included:

So much for time	$18.50
So much for material	9.45
So much for coal	.75
So much for shop	4.00
Total	$32.70

and there the owner stopped. He could think of nothing further which he should charge for—still the amount did not seem right to him.

Just then one of the two proprietors of a neighboring shop in which were built, almost exclusively, ox and bullock wagons for export to South and Central America, chanced to pass and the smith appealed to this gentleman as to the method of "cost-finding" in relation to the case in hand.

"You are away off," said the wagon manufacturer after the case had been explained to him. "How do you know how much coal you use? How do you know that the charge for 'Use of Shop' is enough, and still not too much? And does that charge include all your 'Overhead?' "

"Overhead?" said the smith, "What is that? I never heard of that charge before! What is it for?"

"Overhead," said the wagon manufacturer, "is what it costs to run your shop, no matter whether you are doing all you can, little or nothing. Into this charge you should figure all the expense for rent, light, heat, insurance, repairs and renewals of machinery, salaries of all the non-productive men in the shop."

"What is non-productive labor anyway? I never heard of a man working and not producing anything; what does that mean?"

"Non-productive labor is that done by the bookkeeper, the collector and the man who takes care of getting new business and all such things. In a small shop, the owner does it all—the shoeing and the collecting, also the bookkeeping, and if he does not allow something for this work, he is not charging his customers as he should and is losing money."

Unproductive Labor.

"In a large shop which is doing a heavy business, there must be one or more men for such work and the labor of these men is called 'unproductive' for the reason that it does not produce anything which can be charged for to the customers. And, there is frequently a very large leak in the profits of a shop just because these unproductive things, which must be had, are not paid for."

"How is it when the shop owner does these things? Then he does not have to hire the unproductive work done, therefore he does not have to pay for it, so he don't have to make any charge for it, does he?"

"Yes, sir! He should make a charge for that work. While the owner or other man is doing unproductive work, he is taking just so much of his time from paying work, therefore the shop owner should surely charge for the time he is busy otherwise than at the anvil.

"And now, here is the way to figure the cost of that job. From the records of the preceding year of business, find the sum expended for labor. Do not let this include the cost of material or 'shop expenses.' Keep these all separate, particularly the shop expenses which, as stated, include all the unproductive time and its cost, the interest on money invested in the business, insurance, taxes and cost of collections and of getting business; in fact, bring into this sum the cost of everything save the labor and the material. And be sure to keep these separate.

"Thus, there are three charges: Labor, Material and 'Overhead.' Now, establish another charge for quantity which may be called 'profit.' This is what is left after all the other charges have been paid from the receipts from the year's business.

"Supposing" a Case.

"Now, if we have no real figures from a shop we will assume some and show how the true cost of any job should be calculated from the cost records of the preceding year's business. We will assume that the cost records show the several figures to have been as follows:

Labor	$10,000
Overhead	5,000
Material	8,000
Profits	3,000
Total business	$26,000

"Nearly $2,000 a month, which is pretty good for a medium sized shop. Now, we may divide the labor by the 'overhead,' or divide the 'overhead' by the labor. It makes very little difference which. In this case it will be 10,000 divided by 5,000 = 2. Or, 5,000 divided by 10,000 = ½, or 50%. Thus, in this shop the 'overhead' is one-half the cost of the labor, or 50% thereof.

"Now, we can find the labor cost of the job we are figuring on, or rather the charging cost from the labor, this figure will be 50% of the cost of the labor, in order to cover the 'overhead' which we have not fully charged off before.

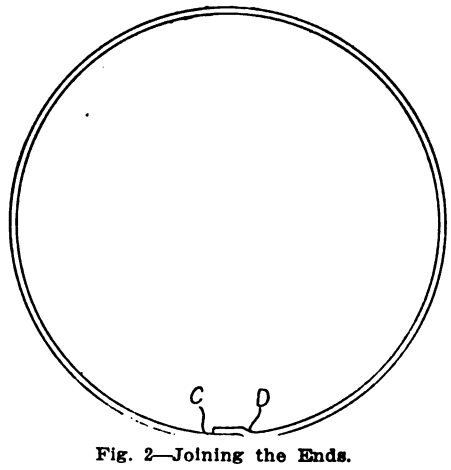


Fig. 2—Joining the Ends.

"Then there is the matter of profit to be considered. The records of last year show that 3,000 divided by 23,000 = 13% very nearly, therefore we are justified in charging 13% profits on everything which goes through our shop. Also, instead of taking 150% of the labor cost of the job, we may take 163% thereof. Or we may figure the cost of the job without profit and then find and add the percentage of profit afterwards. This is perhaps the better way.

"The items on the repair job heretofore mentioned were:

Labor	$18.50
Material	9.45
Profit	13%

"Now, for the 'Overhead' which plus the labor will be 1.50 times 18.50 = $27.75

"We now have these items:

Labor and overhead	$27.75
Material	9.45
Total	$37.20

"But this is not the proper charge to make to the customer. There is no profit in it for

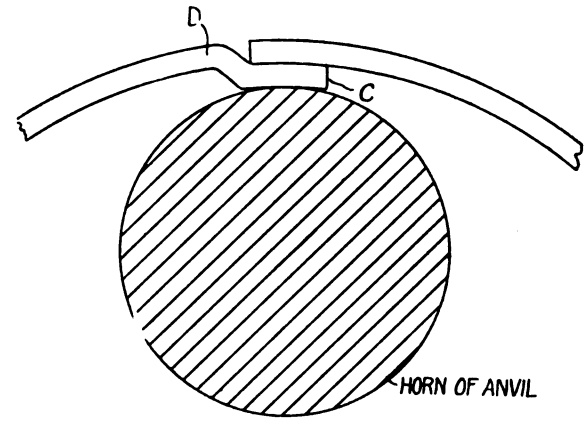


Fig. 3—Welding the Ends.

the shop at that figure, therefore we must add 13% of the profit, making the real and proper charge to the customer to be $37.20 times 1.13 = 42.04. Compare this with the 'so much' charge given in a preceding paragraph, and see what the difference may be:

"Proper" charge	42.04
"So much" charge	$32.76
Difference	$9.28

"And here is where the shop profits often get away. The smith has not charged as much as he should. Little for 'overhead,' nothing for unproductive labor, and perhaps nothing for the interest on the money invested in the shop and tools. See what it means if $9.28 be dropped off of each $42.04 charge! That means that you are losing over 22% of what you should receive, and as the profits are only 13% at the most, there is no profit but a dead loss in running a shop on the 'so much' plan of fixing costs."

Base Charges on Last Year.

Make charges from your last year's records, then you will not go astray. If you are just starting business and have no "last year" to fall back upon, then take the last month's records of charges and business done and fix your prices from that. As the months pass, add the several items of each, and soon you will have a more accurate percentage to work upon than when the first month's figures were used alone. Adopt a method of this kind, Mr. Smith, for cost or price fixing, and there will be more profit in your business and you will stand a better chance than when you guess at what jobs cost!

Tire Making by Hand.

Some of the negro smiths in the South—and many of them are very good smiths indeed—do all the work by hand and have not even a tire bending machine in the shop. They bend up heavy tires on the anvil, the smith holds the cold bar of steel while the helper bangs away with a sledge, the steel being placed over the corner or angle formed by the face of the anvil and the soft pad at the beginning of the anvil horn.

Very little attention is paid to making the tire round. It is bent up haphazard as shown by Fig. 1, usually with one end, A, coming inside of the other end, B, as shown. Then for the welding end A is forced outside of end A, as located in Fig. 2.

Sometimes the body of the tire opposite the ends has to be bent a bit to permit the spring of the two ends to hold them firmly together during the heating operation. But after the ends have been sprung together, as shown in Fig. 2, from the positions A and B, Fig. 1,

Digitized by Google

then the end C, Fig. 3, is placed flat on the anvil and the tire is hammered flatly at D, until there is somewhat of a crook in the tire at D, close to end C.

Then the ends are pried apart a short distance and some powdered borax sifted in between the ends C and D, after which end C is allowed to go back to the position as shown in Figs. 2 and 3. Then the welding heat is taken and during the hammering necessary to draw down the lap weld the short bend at D is straightened out and the tire rounded up to as nearly a true circle as possible. But the bending of the tire, as shown by Fig. 1, the reversing the position of the two ends, as shown by Fig. 2, are some of the novel points of this method of tire welding.

The other novel features are the making of the short bend as at D, Fig. 2, for the purpose of preventing the ends of the tire from slipping too far over each other, and the placing of the borax exactly between the lapped ends in a manner which prevents the loss of any of it and also obviates the use of too much borax. By preparing tires for welding in this way the negro smith said he had seldom lost a weld. Neither was there any necessity for riveting, splitting or otherwise fastening the ends of the tire.

Getting Men and Keeping Them.

"If I can get a man now, I'll keep him," remarked the owner of a busy shop. "It used to be that we could have the pick of a lot of good men, but nowadays it is best to make sure that the first man you can get hold of will stay with you and you had better offer all the inducements necessary to make a man stay. And even then it is mighty hard to get men enough to do the work that comes along. I am putting in a power hammer and all the other power tools possible so as to do as much work in the shop as possible with the limited man-power that I can secure."

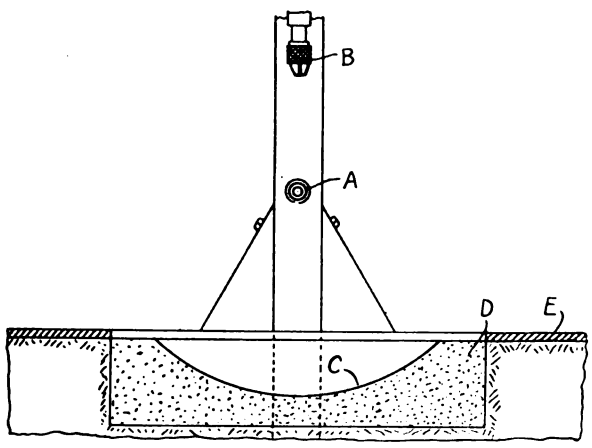


Fig. 4—Hub Boring Arrangement.

Post-Drill, Hub Boring Machine.

In one shop where machines were a bit scarce, the smith had rigged up a fine post drill to work as a hub boring machine. He rigged a movable hub—center A, Fig. 4—to which the wheel could be clamped, put a hollow auger in the chuck B in place of a drill and many a wheel had its spokes "hollow-bored" in good shape.

The floor had to be removed in front of the drill, a hole C was dug in the ground to receive the lower portion of large wheels, and the sides of the holes were finished as at D with concrete which came up just to the lower side of the floor E and served to receive the ends of the short pieces of planks with which the floor-hole was closed when the tool was being used as an ordinary drilling machine.

"Hammering the Anvil."

A good many smiths have a useless habit of pounding the anvil. Some of them are content to strike once upon the anvil as a sort of "guide-blow" seemingly in order that the hand might obtain the proper grip upon the hammer and give to the blow the exact direction, before striking the real blow itself. But some smiths do not seem satisfied with a single blow as above noted and the writer has seen some men strike two, three, and in one instance four quick blows upon the anvil before the real blow would be delivered.

The negro smiths are great for "anvil-hammering" and, as one man remarked, who stood beside the writer as he was watching the smith in question: "You might as well try to change the course of the Mississippi River as to change that habit!"

These things are mentioned here that the young smith who is just forming his habits of work may make strenuous endeavor to avoid the "anvil hammering" habit, or, if unfortunately he has already formed that habit, to break it just as soon as possible. Not only does "anvil hammering" take time, but it consumes energy which might far better be directed to something which pays for the energy expended, for anvil hammering don't.

The Rock Drill Blacksmith

Part V—Special Suggestions on Heating, the Depth of Hardening and How To Make a Quenching Trough

Copyright, J. F. SPRINGER

Whether we heat the steel once or twice, it is important not to expose it to sulphur fumes. This means that the use of soft coal should ordinarily be avoided, if the steel is to be put into the fire or exposed to the flames. Anthracite coal, coke, charcoal—all these are better. Charcoal is probably the best. But any kind of fuel may be used, if the steel is not exposed to it or its flames. A furnace in which the fire chamber is one compartment and the heating chamber an entirely different compartment is a proper piece of apparatus, provided the flames are not permitted to get into the heating chamber.

Fast heating is to be avoided when reheating. I do not see any great objection to fast heating from the first heat in the two-heat method. The outside will perhaps be quite a bit hotter than the inside, when the bit is taken out, to forge it into shape. The outside may, perhaps, be a full yellow and the inside only a dull orange. But it makes little difference, provided the forging can be easily done. Even if the inside is a black when the forging is complete, that will hardly make any difference. The work is to cool until it is all black anyhow.

Fast heating is apt to be uneven heating; but this is not necessarily so. The heating may be done rapidly and still be managed so as to heat all over the proper region. But on the second heat, when we have before us the duty of restoring the quality of steel, damaged by the forging heat, then we need to be on our guard.

Heat the Work Slowly.

The early part of the heating may be done rapidly; but, as the stopping point is approached, it is advisable to slow down. Or, if there is sharp control of the heating, the smith may hold the heating from going higher the moment the proper point is reached. It is generally safer, I judge, to go slowly as the proper high point is approached rather than attempt a sudden halting of the upward rise. Nevertheless, if the smith can do the halting, the next thing to do is to hold the heat steadily at the high point for a time. It is well to understand the reason for slowing down or halting.

Heat penetrates from the outside. It takes time for heat to travel from point to point. These two facts combine to produce a tendency for the inside always to be cooler than the outside. And this cooler inside is not wanted at the moment when the reheating is stopped. A certain heat is needed to effect the restoration of quality. We propose to stop at this heat.

Now, if the heating is stopped because the outside has gotten hot enough, although the inside is not yet that hot, then the restoration of quality may not have been accomplished at all upon the interior metal. The remedy for big-grained steel has in fact been applied to the outside but not to the center. Consequently, the interior metal will remain in its inferior condition. It didn't get the medicine.

Give the Bit More Heat.

It is possible to avoid heating the outside much higher than the inside by reducing the heating speed sufficiently as the finish is approached. By increasing the temperature very slowly near the end, the heat is given time to travel to the interior. No doubt temperature of the inside core will generally lag behind and will be continually cooler than the outside. But with slow heating, the difference can be kept small. Consequently, at the finish, it will only be necessary to stop the temperature at a slightly higher point than what is required for the restoration of quality. The inside steel will at the same time be at just about the right temperature.

If the heating up is done rapidly and there is in consequence a difference between the temperature inside and out, then the inside will not be restored to its proper quality when the outside is restored. If the heating is stopped to suit the outside, the result to be expected in this case is good steel on the outside and poor steel on the inside.

If the heating is done rapidly, about the only thing that can be done in order to get the result of the restoration of quality inside and outside is to heat the outside high enough to cover a big difference. This is not the best thing for the steel, as it results in a good inside but a somewhat poorer outside. And outside is where the best steel is wanted.

It is possible with proper skill and equipment to halt the temperature rise suddenly. Under these conditions, fast heating is permissible. The halt is made at the proper point, and the heat is held there for a while in order to give the interior its chance of coming up to the point. Ordinarily, though, slow heating at the finish is the thing. Nevertheless, where rapid heating must be done, it is undoubtedly better to heat up the outside high enough to be sure the inside is heated high enough—it is better, doubtless, to do this than to heat just enough to get the outside right and to leave the inside unrestored. There are, perhaps, exceptions; but what has been stated is to be regarded as the better thing for most cases.

The Magnet.

A magnet has been referred to as a very proper instrument to determine the temperatures of restoration and the temperature of hardening. There is no difference for steels used in rock drilling. Restoration and hardening are, for these steels, done at the same heat. The magnet serves to determine it; for when the magnet loses its grip, the temperature is carried a little higher and then halted.

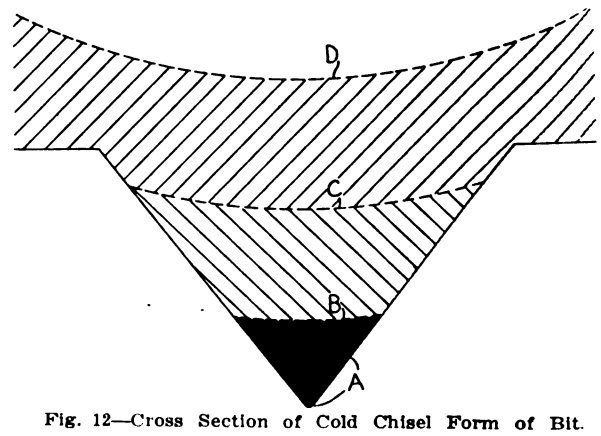


Fig. 12—Cross Section of Cold Chisel Form of Bit.

One may choose to hold this temperature a trifle to give the interior steel a chance to rise all the way to it; but holding the heat will hardly be necessary, provided the last

Digitized by Google

part of the heating is done quite slowly. In either case, when the heat inside and outside is somewhat higher than that at which the magnet loses its grip, the steel may be put into the quenching bath. It is good steel that is hardened, because the proper restoration has been carried out by the reheating. The magnet is thus wonderfully useful in determining the proper moment for quenching.

In fact, even if we use the one-heat method, the magnet may have some value. As the forging goes on and the steel cools, the metal will approach the moment when the magnet regains its grip. The proper thing is, I judge, to stop forging and to do the hardening before the magnet clings. However, if hammering is still going on, when the magnet shows that it is able to attract the steel, then it is time to stop forging. And it may be a little too late to do the hardening. The bit may be heated, however,

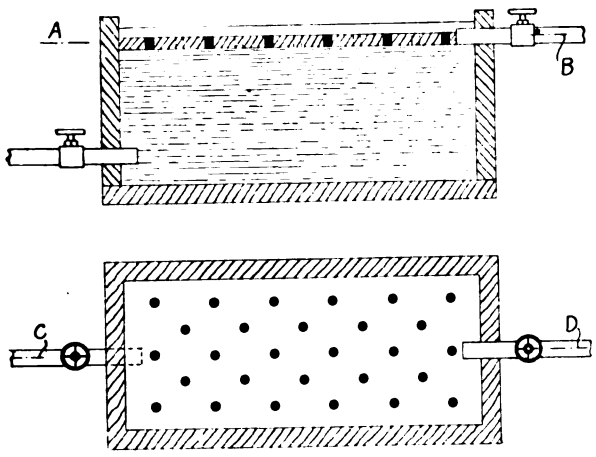


Fig. 13—Section and Plan Views of Quenching Trough.

a trifle and the hardening done thus at a little higher heat. For the one-heat method the magnet serves to give warning.

Quenching Apparatus.

It is of exceedingly great importance that the quenching be done right. Most blacksmiths probably do it wrongly. That is, they probably dip the bit too far or not far enough. The margin between the two is often too small to make it safe to depend upon one's judgment. The blacksmith should remember that it is only the face of a bit and the reaming sides of its wings that do any cutting. They should be hard and should of course be backed up with some stiffness of metal.

Beyond these requirements there is little or no call for hardness. It is toughness instead of hardness that is wanted. In general, hardness is associated with brittleness and not with toughness. If extreme hardness is imparted not only to the points on the bit which come into actual contact with the rock, but also to the metal reaching back of such points for any considerable distance, a good deal of the bit will be involved in brittleness.

Naturally, pieces may be expected to break off. At the cutting points, hardness is absolutely required. Some metal just back of the actual cutting points will also need to be hard to support the cutting points by their stiffness. So, then, both at the cutting points and for a small distance back of them, it is perhaps necessary to put up with brittleness.

This matter is so very important that a little further explanation will be in place. Consider the cutting edge shown in figure 12. It is a cross-section of a cold-chisel form, commonly used for faces of rock drill bits. It is easy to understand that the very edge, A, must be hard. Otherwise the proper cutting action would not take place when the bit is in service. But it is more difficult to answer the question as to how far back the hardness should reach.

Consider the dotted line B. If the hardness is limited to the region between A and B, then it is to be decided whether a soft, but tough, steel extending from B back will properly support the hard region. There are a number of considerations which enter here. When the blow is struck, the edge, A, is severely tested because of its small size.

At the line B there is a broadened backing. Is it broad enough? That will probably depend upon the hardness of the rock, the force of the blow and the sharpness of the angle at the cutting edge. It will also depend upon the steel and the degree of hardness. There may even be other things not mentioned. It will be understood, then, that the question of the proper backing may receive very different answers because of the differences in conditions.

Hardness Differs With Requirements.

At any given mine, where a given steel and a given style of bit are employed, some tests should be made. Under the conditions at one mine, hardness extending to the line B will be sufficient. At another mine, the line C will perhaps be better. And at another mine—representing perhaps the majority—the hardness may be needed back to the line D. That is, it may be necessary, frequently, to harden back to line C or D in order to get sufficient stiffness to back up the cutting edge properly.

At the same time, it will apparently be advisable to halt the hardening and not allow it to go any further back than is absolutely necessary. The reason for this is that it is undesirable to make more of the bit brittle than can be helped.

The reader will now, perhaps, have no difficulty in understanding that there are two things working against each other. First, the hardness should be carried back far enough to furnish a good backing. Second, against this is the requirement not to have the bit brittle. In any case, there will have to be a compromise between these opposing considerations. And what the smith has to do is to make a good compromise and not a bad one.

All this means that the hardening should extend just so far and no further. In one case, what will be best, will be, say, ¼ inch from the cutting edges; in another, ½ inch, and so on. If ¼ inch is the thing, then ⅛ inch one time and ⅜ inch another time are not wanted. The smith is in fact up against getting very close to the ¼ inch.

It surely is not hard to see that the smith should not do the quenching by guesswork. What is needed is some means of getting just the depth of quenching wanted—no more, no less. It so happens that a special but simple quenching tank or trough has been devised, which covers the requirements in fine shape.

A Special Quenching Trough.

What is wanted is a flow of water and some provision to regulate the depth to which the drill bits are immersed. In Figure 13 at the top is shown a longitudinal section of a trough adapted to these purposes. The water enters the trough by a supply near the bottom at one end and passes out through a tube near the top at the other end. Each tube is provided with a regulating cock.

A false bottom is arranged at about the level of the discharge tube. This false bottom is perforated, as shown in lower half of Figure 13. It may be arranged in place by providing cleats for its support, these cleats being nailed to the walls of the trough. To prevent the false bottom from floating, it may be screwed down to the cleats at several points. The precise level of the top of the false bottom is adjusted relatively to the discharge tube in such way that when water is flowing through the trough the depth over the false bottom will be just right for the immersion of the cutting faces of the drill bits.

By giving attention to the proper adjustment of the two cocks, a steady flow at an unchanging level may be secured. If it seems desirable to provide for varying the depth of immersion from time to time, this may be done by setting the cleats somewhat lower than ordinarily devised and then blocking up the false bottom to the precise level desired at the time.

In using this quenching trough, the drill bits are rested with the cutting faces squarely on the false bottom, their shanks reaching vertically upward. A bracket, or the equivalent, should be arranged above the trough to hold the shanks in place.

The false bottom may be made of hard wood to prevent too rapid wear. There should be an abundance of holes in it, in any case, to insure plenty of communication between the shallow layer of water and the considerable body of water underneath. Otherwise, the actual water into which the hot bits are immersed may lose its chilling power too quickly.

There is, apparently, some objection that may reasonably be raised against using wood for the false bottom. This objection relates to the possibility of the sharp edges of the cutting faces sinking down into the wood a little and losing some of the chill, the weight of the shank promoting this. If this happens, in the case of any trough constructed as described, because of the weight of the bit and shank and the form of the cutting face, a remedy may be found by employing brass angle bars for the actual support of the bits.

Cleats Locked in Place.

The false wooden bottom may still be used and the angle bars arranged on it. Figure 14 at A shows how they may be placed. Cleats may be set in and secured in place to hold the angle bars in proper position. The cleats may be removably held in position by the circular wedges or buttons shown in Figure 14 at B.

Such a wedge consists of a circular piece of hard wood or of brass or of some other suitable material. It is arranged to turn on a pivot located away from the center. There are two notches shown. By tapping one of the notches a light blow or two with the hammer, the wedge is pressed down on the cleat; by tapping the other notch similarly, the wedge is loosened. The angle bars may be bought in the form desired, when it will only be necessary to cut them to proper lengths. In case of difficulty in buying the

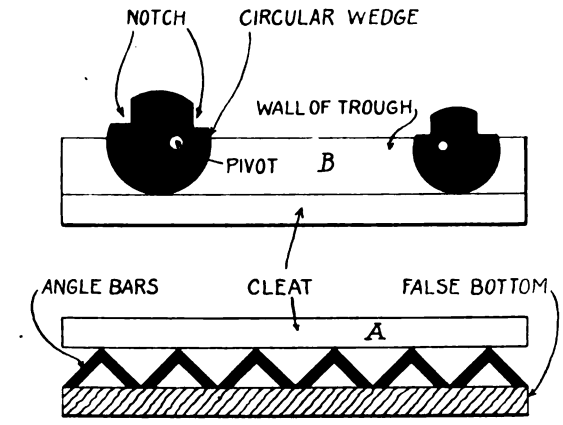


Fig. 14—How the Cleats Are Held.

angle-bar material ready formed, the several pieces may be made from sheet brass.

The object in using brass in preference to steel is two-fold. Brass is comparatively soft and will accordingly have less effect on the edges of the bits. Then it resists the corrosive action of the water. It may, perhaps, be found advisable to round the sharp corners of the angle bars. This may very well depend largely upon the softness of the brass employed. The edges of the bars which rest on the false bottom are to be notched at intervals so as to facilitate the passage of the quenching water.

(To be continued.)

THE HORSES' REVENGE.

In this office we keep fairly close track of automobile accidents, and naturally we hear of hundreds of accidents where horses have been run into by automobiles. Perhaps some of the horses object to this treatment.

They object to being displaced by automobiles, and a short time ago a clipping came into the office which was very peculiar in its way. A horse ran into an automobile! The automobile was badly wrecked and the wagon smashed into a mass of wood and iron. The report did not say what the machine was. We know of but one machine which can be beaten by a horse in speed. You can draw your own conclusions.

Digitized by Google

Getting Winter Business

If You Wait Long Enough Beneath an Apple Tree the Fruit May Fall Into Your Hands, But You'll Get It Much Quicker If You Climb Up aud Pick It

BY F. L. PHILLIPS

"How long since you decided to go into the junk business?" asked the old-timer of the village blacksmith, as he unhitched his horse from the lumber wagon, which he had brought in for repairs. "What are you doing, making a collection of relics, or is it just another evidence of your craziness?"

"Nope, just a proof that you don't use common sense or know what you are talking about," retorted the smith. "I wouldn't let you into the secret unless I was looking for business, but as long as you're here, I might as well see if I can't pry a few extra cents out of you and pound some sense into your block.

"This junk, as you call it, is just a collection of farm implements from five miles around. Sunday, you remember, was a nice, sunny day; everyone was feeling pretty good and ready to celebrate, 'cause peace had been declared. I got out my tin Lizzie and took a trip into the country. Visited all the people I knew and quite a few I didn't know.

"I dropped in to see old man Sims, the fellow out near the cross-roads, that made such a pile on potatoes last spring. He's just rolling in money. Folks say that he has yellowbacks hidden in every corner of the house. Out in his yard he had a spring harrow; that one in that corner there, four teeth missing; a nearly new cultivator with one wheel twisted out of shape; and an old cultivator that had seen better days.

"Just picked up a bargain for you, said I. An almost new cultivator that's just what you need. I'll sell it to you for $10. Did he bite? Say! he pulled out his roll and peeled off two fives so quick that I couldn't see his hands move.

"Wait just a minute, said I; you haven't heard me out yet. I'm not in business for fun, you know. What are you going to do with all this broken down junk here?

" 'Well, I dunno,' he said; 'guess I'll have to see about getting it fixed up when I get a chance. Some of it's about ready for the junk pile anyway. That new cultivator there set me back a heap of money. Now it's busted, or I wouldn't buy one from you. Wheel's all smashed up, cost more'n she's worth to fix her up. What sort of cultivator are you aiming to sell me?'

"Same as that one, said I, but wheels are a little heavier: reinforced with an extra band of iron. In fact that's just the cultivator I'm trying to sell you. Do you get me?"

"It took me about ten minutes to make him see the point. I wanted to have him pay me $10 for fixing up the bent wheel and putting a band around it, and before I left I had sold him all of his own junk in the same way. I calculate to get about two days' work out of him. I made him haul the machines down here yesterday, and when I get the chance I'll put in a few hours on them.

"He's got no kick coming, either. He expected to buy a new set of machines for next year and let that old junk lie around in the yard until it rusted to pieces. As it is, he gets the old machines all fixed as good as new, I get the work, and he saves a pile of money.

"Next I stopped in to see old man Bones—the fellow that gave the patriotic speech in the town hall on election day. I started out by asking him how long since he had decided to help out the kaiser. He tried to sick old Tige on to me, but Tige knows me too well and only barked. It took me half an hour to smooth him down; then I told him what I meant.

"All this summer he has been using a gasoline engine to pump water for the stock, using Uncle Sam's gasoline and burning up his money. You remember he was one of the first to buy one of those new-fangled wind-mills: the tin kind, and it seems last winter, in a big blow, the thing got itself all twisted up. It wouldn't turn back again, so he bought an engine. I dickered with him to let me fix up the old wind-mill. Showed him how much gasoline he could save and how patriotic it would be. If the wind failed, he could use the engine, and when it was windy he could use the wind-mill. He finally let me pull off the fan blades and take out some of the braces. I'll fix it up for five dollars and charge him twenty. It's worth that to him, and he's satisfied.

"You'd be surprised at the amount of work I've picked up for this winter: and you'd be surprised at the friends I've made by giving them the suggestion. They didn't realize how much money they had lying round in dead tools until I began to show them.

"There's an old saying that 'The garbage pails of the poor are always full,' and the fellow who thought it up sure was a bright man. The poor people are usually the ones who throw away or waste the most—the rich know how to hold on to what they got. You call them 'tight wads,' but they're only economical. You know, that's just the way it is with farmers.

"You let me drive past a farm-yard and I'll tell you in three shakes of a lamb's tail whether the farmer is prospering or not. You show me a farm-yard full of rusty farm machinery and broken down lumber wagons, and I'll go inside the house and find a farmer who is telling about how much money the poor farmer is losing to-day.

"You find a farmer plowing with a ten-year-old plow, and I'll bet he will be whistling and jingling some spare coin in his pocket while his wife is papering the strong box with liberty bonds.

"The one big difference between the shiftless and the successful fellows, particularly the farmers, is that the first buries himself on the farm, while the second brings in the business himself.

"Now I'll give you the whole meat of the nut which I have cracked, in a few words. The blacksmith who waits in his shop for business surely gets the work from the thriving farmer, but he doesn't ever get any work from the other kind. You've just got to go out and dig them up; pull them out of the rut and make them get busy.

"As soon as they begin to see that they can save money by keeping their farming machinery in good order, then they begin to bring the smith the business. But it takes real missionary work to get some of them started. And it was just that sort of missionary work that I did Sunday.

"And that's no joke, either. Missionary work means converting folks, and, believe me, I had some job Sunday converting a few of those shiftless farmers.

"The young Hinkley boy was a hard nut. He inherited his farm from his dad. Used to be quite a nice hunk of land when the old man run it, but the boy, with his half-baked notions, plastered it white with mortgages and bought a whole new set of farming tools. Told me he believed in efficiency; said a good man couldn't work with poor tools; said that old machinery was just like old men, only fit for scrap. The only way to run a farm and do it right was to keep all the tools new: as soon as a plow got rusty or broke its point, throw it out and get a new one.

"When I suggested fixing up the old junk for him, he called me a grafter and confidence man—goodness knows, I deserved his confidence, and as for being a grafter, I'll guarantee to graft on a new plow point that's just as good as the original. That being the case, I kept cool and thanked him for his good opinion of my abilities.

"It seems he had bought a patent forge and about fifty dollars' worth of tools and tried to do his own blacksmith work. That's the reason he knew that a farm tool couldn't be fixed by a blacksmith, or thought he knew it. You should see some of his welding jobs; no wonder he got disgusted with the results. Plowing with one of his fixed-up plows must be like trying to shave with a tin case knife. It can't be done.

"I finally persuaded him to let me take a whack at one of his rusty plows. Told him he could have the work for nothing if it didn't suit him. But he's honest, and so I guess when he gets his plow back he'll be glad to pay me and pass over some more work besides.

"Good gracious, don't you feed your horse any more? Put a muzzle on him, will you, before you bring him in here again? He's eating the side of the shop out. Tie him out in the middle of the road there, and let him eat that.

"Now that you've got the arguments, ain't it about time you decided to bring down some of your farm tools and let me fix them up for next spring? Did you say yes, or have I lost my hearing? That's the first time you ever agreed with me without an argument, and I must say I think you're beginning to chase the spiders out of your brains and brush out the cobwebs.

"So long as you're feeling good, let me make another suggestion. Here 'tis the first of December and winter is 'in our midst,' as the Bugle puts it. Have you thought about harvesting ice yet? Course you haven't; you farmers never do until the pond freezes over and its time to cut it: then all of you land on me at once with tears in your eyes, want your ice cutters and markers and plows all fixed and sharpened within an hour.

"If I try to put you off for a day or so, you almost threaten to burn me out of house and home. I can't do all your work in a minute. You want to remember that the early iceman fills his house, while the fellow who waits gets left.

"I'll have this wagon fixed up for you tomorrow noon, so's you can bring down your old junk. You'd better quit bothering me now and go home and pick up some of it. Think over the ice-cutting proposition and bring down those tools, too. Might just as well make one trip of it."

ONE HUNDRED PER CENT AMERICAN.

There once did live a Patriot true,
Whose name was J. C. Wagner.
He didn't shoot the kaiser up,
Nor hunt him with a dagger.
But he did have one son, did John,
A sturdy six foot Danny,
Who donned the khaki uniform,
And fought for Uncle Sammy.

* * *

Besides his son, old Johnnie had
A clock that said "Cuckoo."
And on its back, in letters bold,
"From germany to you."

* * *

When J. C.'s son had marched away,
That clock no more was heard;
The Cuckoo you will recollect,
Is hunland's national bird.

* * *

For thirty days and thirty nights,
Old John scarce shut his eyes;
His idea was, perhaps you know,
That clock to naturalize.

* * *

With saws and drills and bits of wire,
J. C. began to work,
He rigged a funny bellows up,
From last year's hard boiled shirt.
At last he rested from his toil,
His work is finished right;
The clock is running once again,
The bird now says "Bob White."

Digitized by Google

Why Not Make a Number of Snow Plows for the Nearby Farmers?

The Old Style Triangular Snow Plow, Made from a Couple of Boards, Is Not Worth the Effort Required To Build It; Make a Real Serviceable One Instead

F. L. ALMY

One of the popular weather prophets, who says that he never makes a mistake in forecasting, says that this winter is going to be the longest in history. He says that he knows this because of the thickness of the goose bone, or something like that.

So long as the winter does not get any worse than it has been up to the present time, we won't have to worry very much about it. However, as a rule, from the first of January to the end of March, we are visited by many snow storms. Of late years, most of our snow has fallen late in the winter.

The ordinary old-fashioned snow plows which one sees on the street may be all right in some parts of the country where the snow seldom falls to a depth of one-quarter of an inch. The snow plows that I see in New England usually consist of two boards bound together at the front, triangular in shape, and drawn by horses. Such is the construction of these plows that they invariably ride on top of the snow, very seldom clearing the ground.

The path that this leaves is full of ruts and holes, and I much prefer walking in the street to following such a plow. As far as the triangular shape is concerned, perhaps the idea is good, and working on this supposition, the plow shown in the accompanying illustration is designed.

At A, shown in the center of the drawing, is the completed plow. The artist has thoughtfully placed an old automobile top on the driver's seat to protect him from the storm. This is merely ornamental, however, and not at all necessary. At B is given a plan view, at C a cross-section taken at the center line. At D a section taken just above the ground level. E shows a section taken on the line XX of the view D. F shows the point and one of the runners. G illustrates the shape of the runners and H the shape of the wood block which fits inside the plow point to hold the latter to the plow and give it a firm base.

In constructing this plow a regular triangular frame is made consisting of two runner boards, J, measuring six feet in length, twelve inches in width and two inches in thickness. At the top of these runner boards, which are shown in the sketch A, are two boards of the same size which have been cut out for entrance to the driver's seat.

The runner boards and the sides are mortised and bolted to the front or pulling post, L. One will note that the original frame of the device does not come to a point as usual in snow plows, but an old plow point is fastened at the front. In order to prevent this plow point from filling with snow, an iron bottom, P, should be welded in place.

Fitted to the inside of the point is the block H and to this block the plow point is fastened by a number of wood screws. This block also serves as a base by which it may be bolted to the pulling post. The pull bolt passes through the plow point and to this is fastened the pull bar R.

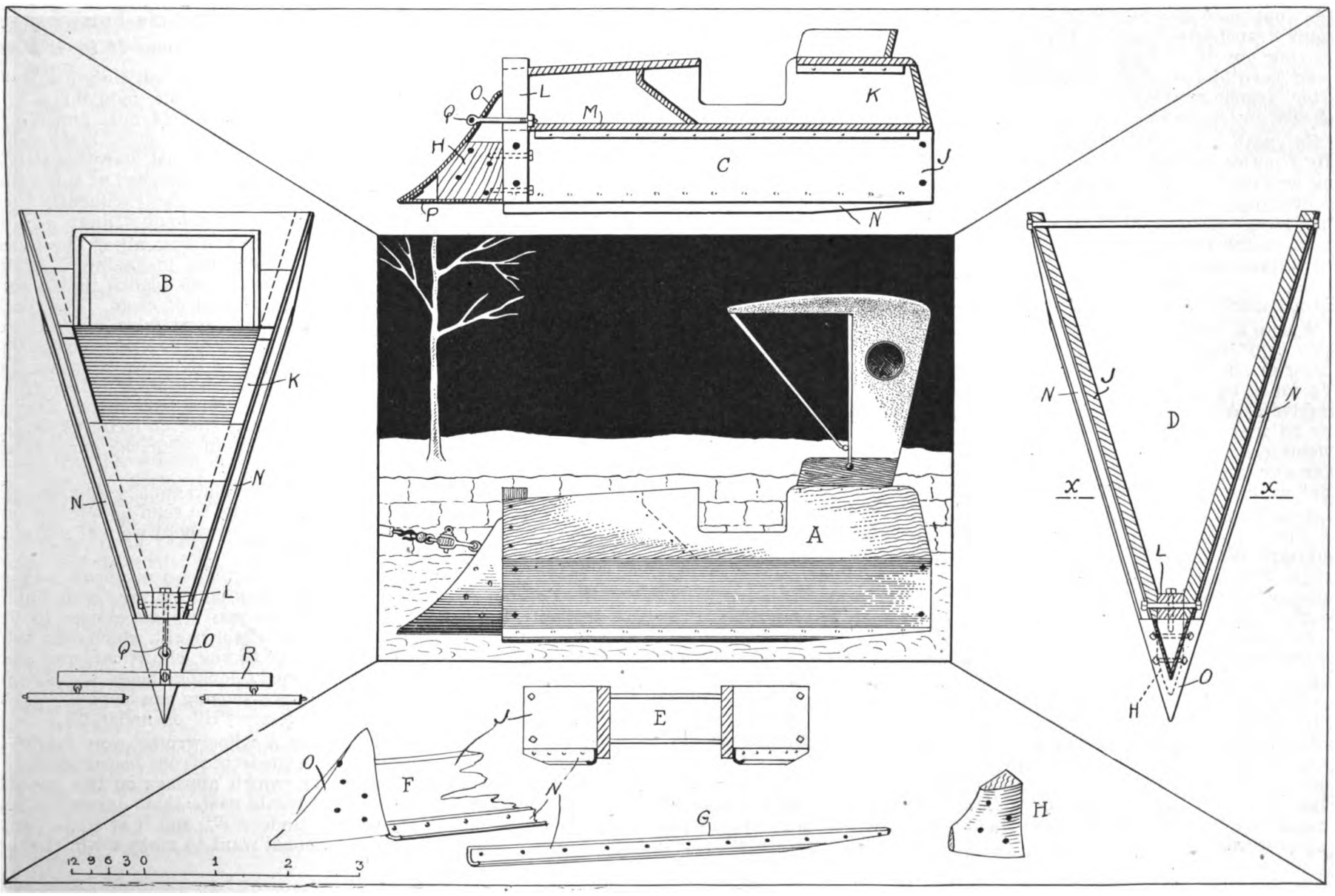
The runners shown at G extend about one-half of an inch below the runner board, while the point O is put on a level with the runner board. In this way there is a general tendency for the plow to stick to the ground, rather than to ride up toward the surface or on top of the snow. The shape of the runners adds to this tendency.

As a means of strengthening the plow a floor board M is put in place slightly below the top of the runner board C. With this as a bottom, a compartment is had at the front, wherein may be placed shovels or picks, or any other tools necessary.

The seat is mounted at the top of the plow and may be made from three-quarter inch boards or from an old carriage.

Every blacksmith in a farming community should find quite a little profit in turning out his plows. They are easily made and after a little experimenting in the exact location on the plow point, one will find that he can turn out a better snow plow than any of those on the market at anywhere near the same price.

Do not make the mistake of locating the pull bolt Q too high on the front of the plow. If the pull is directly ahead or at all downward, there is danger that the plow point will catch in the ground, whereas if the pull is slightly upward, the plow itself will work itself downward.



We Are Here to Help You and So, Bring Your Problems to Us.

WE don't want our blacksmith readers to lose sight of the fact that we are in this office to help them. We are interested in every blacksmith reader who is seeking for knowledge and we want all of our readers to come to us with their problems. If you want to know of a particular book or a particular article, or in fact any information relative to the blacksmith or automobile trade, do not hesitate to write us a letter. The three cents which you spend for the stamp is a good investment. Make it to-day.

Digitized by Google

BLACKSMITH & WHEELWRIGHT

The Pioneer Journal of Its Class in the World.

Member of the Audit Bureau of Circulations.

PUBLISHED MONTHLY BY

M. T. RICHARDSON COMPANY,

71-73 MURRAY STREET, NEW YORK.

POST OFFICE BOX, 654. TELEPHONE—7377-7378 Barclay.

CHICAGO OFFICE, Lytton Building, 14 Jackson Boulevard

Entered as second-class matter at the Post Office in New York City.

M. T. RICHARDSON, President and Treasurer
F. R. WHITTEN, Secretary
M. T. RICHARDSON, Editor
FRANK L. AVERY, Managing Editor

F. R. WHITTEN, Advertising Manager
H. F. LUDINGTON, Western Representative
GEO. A. SMITH, Eastern Representative
FRANKLIN MYERS, Art and Copy Dept.

FOREIGN AGENTS:

NEW ZEALAND
MR. R. HILL, Matlock House, Davenport, Auckland, New Zealand.

GREAT BRITAIN
ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance.....$1.00
One Copy, six months, in advance.....60 cents
Single Number.....10 cents
Canadian subscriptions.....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English Money.
Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

ADVERTISING RATES SUPPLIED ON APPLICATION.

SPECIAL NOTICE

Subscribers failing to receive their magazine regularly will favor us by giving us notification to that effect.

CHANGE OF ADDRESS

Subscribers who desire the address of their paper changed should send us the old as well as the new address.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

Our Editor's Letter.

FROM where I sit in my office, I can look out upon the North River and see the many transports come in from day to day bearing our boys from the other side who have been doing the fighting. Transport after transport arrives and each one is greeted by sirens and bells.

So great is the enthusiasm that occasionally I notice someone on the roof of a building waving his hand and shouting at the top of his lungs. We are so glad to get our boys back that we can hardly keep quiet. We take them to the theatre and give them rides in our automobiles. We can't do too much for them, for we feel that they surely have earned more than we can ever repay.

Within a few short weeks we will be called upon to furnish them with positions in our factories, in our offices, and in our shops. We must be optimistic as we face the big problem. All of us who can afford to, should try to make a place for these boys in our business. If we can't do this now, we should plan our business and try and increase it so that we can take care of them.

America is rich enough to take care of all of these boys. With but little trouble the industry can absorb all of this additional labor. There is one big "if," however. We must patronize home industries. You, or I, brother blacksmith, cannot afford to purchase goods which are not made in America, at the present time, if we can obtain American made goods to take their places.

If we spend our money for foreign products, our own American manufacturers cannot sell theirs. Our boys will have no place to work. We will be criticised, and justly so, because we have fallen down in our duty. They will say that we supported the war because we had to, and that our thanks are empty words.

The boys don't want sympathy and don't want our gratitude in words. They don't want charity either. They are too proud for that. All they desire is a chance to re-establish themselves in business.

There is another point that probably will arise in relation to the employment of some of these boys, probably in the smaller towns. Before the war, a boy might have earned for himself a poor reputation. We should not let this count against him. We must realize that he has torn out this page of his history. Uncle Sam has made him an upright, strong, clean-hearted American. Military

Announcement of Another Prize Photograph Contest

ALL of our friends know how interesting the prize photograph contest was. We had a chance to get acquainted with our other brothers in different parts of the country; to see what their shops looked like, and in many cases to see their faces. Taken altogether, we consider that our prize photograph contest for ten months was the best part of our magazine.

Every blacksmith who reads our magazine and has occasion to do automobile work is eligible for a prize in the contest starting with our next issue. Three prizes will be awarded. The first prize of five dollars will be given to the subscriber sending us a picture which shows the most automobile work going on in his shop. The second prize of five dollars will be given to the best looking shop. The third prize of five dollars will be given to the person who writes the best letter telling how successful he has been in doing automobile work.

In automobile work we include repairs to motor-driven vehicles of all kinds. All you need to send us is a clear photograph of your shop. The size does not matter. As soon as the picture has been published in our magazine, we will return the photograph together with the half-tone which we used in printing the picture.

These half-tones can be used by your local printer, on the tops of your letterheads, on the tops of bills, or in advertising literature. It does not matter how many pictures you send us. You can enter as many as you wish. We will choose the best one, in our opinion, and publish it. In some cases we may publish more than one of the same shop, if they are particularly good. All it costs you to enter the contest is three cents postage for your letter, and for this three cents you will receive a half-tone which is worth anywhere from one to five dollars. Besides this you stand a chance of getting one of the prizes, so sit down to-day and write us a letter enclosing a photograph.

High Salaries for a Few, Mean High Costs For Everybody

MR. GOMPERS, president of the American Federation of Labor, has announced that labor will not surrender the gains that it has made in the way of increased wages in consequence of the great war. When Mr. Gompers uses the word "labor," he does not mean labor in general but simply the labor controlled by the American Federation of Labor and allied organizations.

It is estimated that there are some over two million labor unionists in the country. As against that, there are probably thirty-five or forty millions of people who are not organized in unions and who are as much interested in getting increased pay as any other. A large proportion of this forty million did not succeed in securing any such advance in wages as the labor unionists got.

Is it fair for a small proportion of the workers to continue to get war-time wages under peace conditions which others cannot participate in? We are very far from desiring to see wages reduced. In many cases they should be increased but in some there can be no question but what they are too high.

In other words they are not evened up justly. When the Government was paying big wages it was because it had to have war supplies and have them in a hurry. In peace conditions a very few manufacturers can afford to pay such wages as the Government paid. A manufacturer has got to put his goods on the market at a price which will enable him to sell them. If the cost of labor, which is the biggest factor in the production of anything, is exorbitant, the goods will cost so much that they will not be salable.

It all simmers down to the great question of supply and demand. While the Government was forced to accept high priced war material, the great purchasing public cannot be forced to accept anything that it does not want. There is bound to be a tendency downward and this tendency will be very marked if the present Underwood Free Trade Tariff law is continued in force, because under this law large quantities of goods can be shipped into this country from foreign countries made by foreign workmen at low wages, and will compete with similar goods made in this country by high priced labor.

The only way to keep wages up to a proper point in the United States, is to enact a tariff law which will bar out low priced foreign goods. It should be kept in mind that every dollar's worth of goods made in a foreign country and shipped into this country and sold here, which could be made by our own people, takes just so much out of the pockets of our laboring men. There is no escape from this conclusion. Free trade in theory may be all very well, but in practice it is destructive to any nation which has to pay high wages.

Of course most people will remember that before the great war broke out in 1914 a wave of depression had spread all over the country caused, it is believed, by the Underwood low tariff that was letting in millions of dollars worth of foreign goods that we ought to have been making in this country. These same conditions will be repeated unless the next Congress takes hold of the matter in earnest and enacts a satisfactory tariff measure.

When You See an Article You Like, Paste It in a Book

THERE is one fact which always attracts the attention of the publishers of a magazine such as The Blacksmith and Wheelwright. From year to year blacksmiths throughout the country ask questions about work which had been answered at some time previously in the magazine. Frequently these questions come from old subscribers.

As a rule, it pays to keep all of The Blacksmith and Wheelwright magazines. At the same time, however, we realize that a complete file takes up a lot of room. The blacksmith in search of a particular suggestion is obliged to look through every magazine. Consequently he does not always bother, but writes a note to us. We never refuse to answer a question. It is part of our service, and if you take the time to write us, we are more than pleased to take the time to answer.

There are many blacksmiths, though, who do not take the time to send us a letter, and it is to these men to whom we make the following suggestion.

Obtain some sort of an old book; an old telephone book can be used very well for the purpose. When you see an article in The Blacksmith & Wheelwright which you think will be valuable to you, clip it out, and paste it in the indexed telephone book. All articles relating to Horseshoeing can be pasted under the indexed letter "H" or under "S."

If you are a wheelwright, you might be interested in the letter from Jasper McGrady, for instance, which appears on the opposite page. You would paste this suggestion with the picture under "W" and if at some future time you should want to make a wheel bench

Digitized by Google

it would be an easy matter to find it. You can have one scrap book for wheelwright work, and another scrap book, for shoeing, and still another for miscellaneous suggestions, indexing them according to your own method. Within a few months you would find that you could hardly do without the book.



The Value of Double Tires.

From a Reader in Ohio.—I will try and answer Mr. Max Maser's question about double tires on wagon wheels. Before putting on double tires, the wheels must be in good shape, and the old tires tight. Then the double tire can be applied outside the old one, giving the second tire five-sixteenths of an inch draw. This will make a satisfactory job, and a strong wheel.

Only a few days ago, I saw a wagon at my shop that had been fitted with double tires three inches wide, and the man that owned the wagon said the tires had been on over fifteen years, and he was well pleased with them.

A few years ago, I worked in the southern part of Ohio where the State was doing a small job of paving. Most all the wagons that were used on the job had one and a half inch tires, and as three inch tires were required, the teamster asked me if I could suggest a way to change for larger tires without rimming the wheels—a job that he could not afford as the work did not pay him enough profit.

We tried out one wagon by shrinking a three inch tire on top of the old one-and-a-half inch tire. In less than a week I had all of the wagons to tire in the same way. He found that the mud did not clog the wheels as it did the regular three inch wheels, and therefore it was really better than a wider wheel.

Now, I believe in giving the prices as well as the answers to questions. I charge $2.25 for each tire, that is, in addition to the cost of material. The real trouble with the blacksmith today is, that he cannot get money enough. He can get plenty of work, but can't seem to make the money that he should. That is the reason that so many blacksmiths can't afford to take a trade paper, simply because they cannot finance their business. If they made profits in their business they would all take trade papers.

Mr. Lynn is right when he asks you not to turn the Blacksmith and Wheelwright into an automobile paper, but of course a little automobile stuff is all right, and we need it. There are about fifteen garages in this city, and they have all been sold out at least three different times in the past five years. What is wrong with them? You can't say that about the blacksmiths.

We have in this same city four blacksmith shops that have been doing steady business for over 50 years. I like Mr. Lynn's suggestion, and I wish every other brother was like him. The trouble with us blacksmiths is that we don't read enough. Every blacksmith should write his trade paper once a year and give conditions and prices. Mr. Lynn wrote an article on "thank you" jobs—tightening old shoes and giving prices, and jobs which otherwise took up his time, and telling about the man who would take advantage of these favors and then go to another shop. His article saved me considerable money.

I have stopped doing such work, and I am going to stop un-hitching horses for people. It takes too much time when I am busy. A liveryman charges 35c. for this work, while very often the people who come here and expect me to do it only want an old shoe put on, and the money I get doesn't pay for the trouble. The public expects too much from us poor blacksmiths.

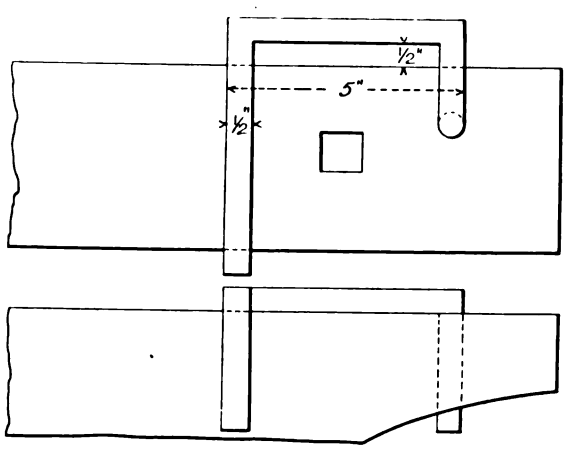
Not long ago, a farmer asked me what I would charge to stop at his house some evening as I was driving by, and put two shoes on his horse that was so lame he could not get him to town. I asked him what the veterinary charged for going out to his house, and he said $3.00, so I told him that that was what I would charge too, and even though he got pretty angry, it was the best I would do.

Stay in the blacksmith business, brothers, raise your prices, buy an oxy-acetylene outfit, put in machinery, and above all, keep up with the times by taking the Blacksmith and Wheelwright.

A Handy Vise Clamp.

From James Howard, Pennsylvania.—I am giving you herewith the drawing of an iron clamp which I made to hold shoes which are to be sharpened on the anvil. I designed this device many years ago, and I also invented a sharpening block that is used a great deal.

Obtain a piece of half inch square iron, and round one end for a distance of two inches, and fit it in the round hole at the heel of the anvil. Bend it at right angles flat upon the face of the anvil. Turn it so that



A Handy Clamp.

it extends half an inch over the edge of the anvil and bend it again at right angles so that it extends along parallel with the face of the anvil.

Five inches from the first bend, make another right angle bend so that it goes across the face of the anvil at right angles to it, then bend it down the side nearest you and cut it off.

You will find that it is as good as a vise. When welding a toe on a shoe, the iron need not be lifted out of the anvil, just hit it with the hammer, and swing it out over the anvil. As the hole is round, it will swing very easily.

A Letter From South Carolina.

From Fred J. Turner, South Carolina.—I am enclosing my subscription money, I get so many hints and short cuts from The Blacksmith and Wheelwright that I can't afford to discontinue it.

My shop has a five horsepower motor, a Silver band saw, hand-made jointer, emery wheel, Little Giant hub borer, Brooks cold tire setter, Champion hot shrinker, two Champion electric blowers, Champion drill press and hand tools as well as a tire bender.

In shoeing, I find that a three-quarter inch rope with a strap 12 inches long, fitted with a ring in each and a whip save lots of time with contrary horses or mules. With the strap around the back ankle and a rope around his neck a horse is much safer as he cannot kick. The strap is better than a rope because it will not irritate the ankle.

If the work cannot be done in this way, pull the foot forward until it is high enough to work on. The device will hold the front foot up, and works just as well as putting a rope around the body.

I can save lots of time and labor by using a drill press to work spoke ends. I have a pit under the press to receive part of the wheel. When the pit is not in use a board covers it.

I haven't time to do much auto work, but take a little of it if it is strictly blacksmith or woodwork. Have made several neat hangers for Ford engines. These hangers were used to replace the lugs which had been broken from the sides of the flywheel housing and which supported the power plant. I made them from iron ⅜ by 2½ inches and fastened them to the housing with studs.

At present I am rebuilding a log cart, built by a neighboring smith. The very principles of design are wrong, so I know he does not read anything on the subject, if he did, he would realize that he was making many mistakes.

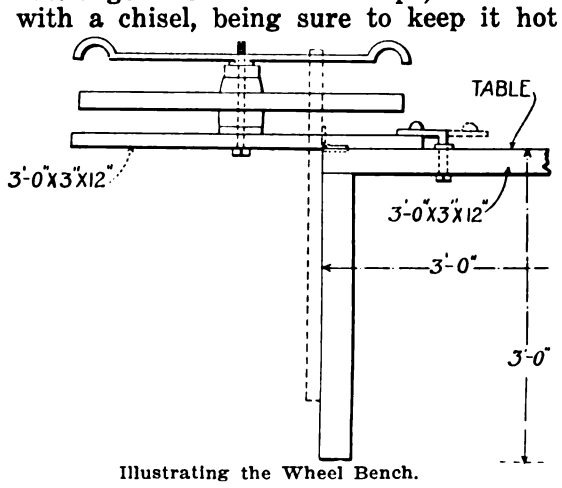
(Editor's Note.—For the benefit of Mr. Turner, as well as our other readers, we would suggest that there is a device called the Hudson crankcase repair arm, now on the market, sold by Hudson Motor Specialties Company, 1606 Real Estate Trust Building, Philadelphia, Pa., which makes the above repair in a few minutes in much the same way and at probably less cost than making one by hand.)

A Wheel Bench.

From Jasper McGrady, Virginia.—I don't think that I can afford to get along without your paper. Every once in a while I find an article that is well worth what it costs me for one year. I am sending a pencil sketch of my wheel bench and have tried to make the drawing plain enough so that everyone can understand it.

How many smiths do any re-working of old axes? I wonder if they know how to make them so they will chop better than new ones. Here is how I fix them: I first heat the ax to a red heat, then draw out a bit. I am careful to hammer both sides alike so that the strains in the steel will be prevented.

I often get the axe out of shape, so I trim it with a chisel, being sure to keep it hot



Illustrating the Wheel Bench.

when I am trimming. Of course, it requires more drawing after it has been trimmed. After I get the axe drawn out, and sharpened correctly, then I temper it, and this is the most particular part. I first have the tempering bath to suit me, by mixing it with salt.

I then heat the axe to a cherry red, and harden with the point up, three-quarters of an inch. I let the temper run down until I can file it a little, then dip in the bath again. Then I lay the axe aside and let it cool slowly, watching it to see that it don't get too soft. By letting it cool slowly, the steel is toughened, and kept from breaking. My motto is, "Read all I can; work all I can; charge what I think is right, and talk about nobody."

Digitized by Google

The Metal Turning Lathe

Part 1.—Every Blacksmith Should Know How To Use the Screw-Cutting Lathe, It Is a Valuable Tool

The most useful of all power-driven tools used for cutting metals is the turning lathe. There may be other power tools which the repairman will have to purchase before he invests in a lathe, but they are not many. He may have to buy small tools and perhaps a drill press before installing a lathe. However, small tools cannot be used to turn and shape metals, while a lathe will do a large percentage of the work done on a drill.

An engine lathe has but few power driven parts. The spindle in the headstock is the principal one. Its function is to provide rotation for the work in order that a tool may be held against the piece and metal removed. The work may be held on a face plate or in a chuck or between centers. In any of these cases it is the spindle that provides rotation. In fact, rotation of the work is, on the ordinary lathe, provided in no other way. The spindle then is a most vital part of the lathe.

Other moving parts of the lathe have to do with the lead screw. All the movements have to do with the feeding of the cutting tool to the work or the reverse. No rotations of the work are dependent upon the lead screw or related parts. Cutting tools are fed to the work, as a rule, either by the hand or by means of a tool holding device controlled by the hand. But whenever considerable force or great regularity of feed is sought, the power driven lead screw is naturally brought into service.

Relation of Lead Screw to Spindle.

Now it so happens that the lead screw is driven by the spindle or the mechanism concerned in driving the spindle. Moreover, in general, the rotation of the lead screw is absolutely controlled by the rotation of the spindle. The speed of the latter absolutely controls the speed of the former. Thus, when the spindle turns round once, the lead screw will turn round a certain definite number of turns—as three turns, two turns, one turn, or half a turn.

It may be gathered from the foregoing that the spindle and the lead screw are two vital parts of the moving mechanism of the lathe. This is true. If we are about to purchase a lathe, we will advantageously center a very large part of our attention upon these parts and the parts with which they connect.

The spindle is in the head stock and if it runs true and at desirable speeds, we know that a large part of the essentials of a first rate lathe have been covered.

In order that the spindle may run true and continue to do so in spite of wear, the following specifications should ordinarily be met. (1) The two bearings should be wide apart. If one wears faster than the other, the distance between the bearings will tend to minimize the effect upon the work. (2) The bearings should be broad. The inevitable wear will then be spread over a considerable surface with the result of lessening the depth of wear. This is what we want.

Figuring Spindle Speeds.

As to proper speeds. If the lathe spindle is driven by means of a cone-pulley, then the fastest speed will be secured when the belt is on the smallest step, and the slowest speed (in case there is no back gearing) when it is on the largest step. If there are four steps, we can very readily get a good range. Suppose the countershaft runs at 130 revolutions per minute (R. P. M.). It will not be difficult to determine the speeds of the spindle corresponding to the various possible positions of the belt.

Divide the diameter of the step of the countershaft cone-pulley by the diameter of the lathe cone-pulley and multiply the result by the number of revolutions per minute of the countershaft. Suppose, for example, that the smallest step of the lathe cone-pulley is 5 inches in diameter and that the corresponding step on the countershaft cone-pulley is 15 inches and that the countershaft speed is 130 R. P. M. We divide 15 by 5, giving 3 as a result and then multiply by 130. Then the spindle speed will be 390 R. P. M.

Let us now consider the slowest speed. Suppose the two steps have diameters of 7 and 14 inches, the countershaft cone being the smaller this time. We first divide 7 by 14, giving .5, then multiplying by 130 we find that the spindle will run at 65 turns per minute.

These speeds may be suitable or they may not. Note that the fastest speed is six times as fast as the slowest. We can't change this relation between the fastest and the slowest without changing the lathe or countershaft cone-pulleys. See Fig. 1.

However, if we simply want to make all the speeds of the spindle faster or all slower, we may do that without altering either cone-pulley. We may simply arrange to run the countershaft itself more rapidly or more slowly. We may do this by using a smaller or a larger simple pulley on the countershaft to correspond with the pulley on the line shaft.

It is important to have the speeds of the lathe right. If the lathe cannot be slowed down sufficiently, we may expect difficulty or

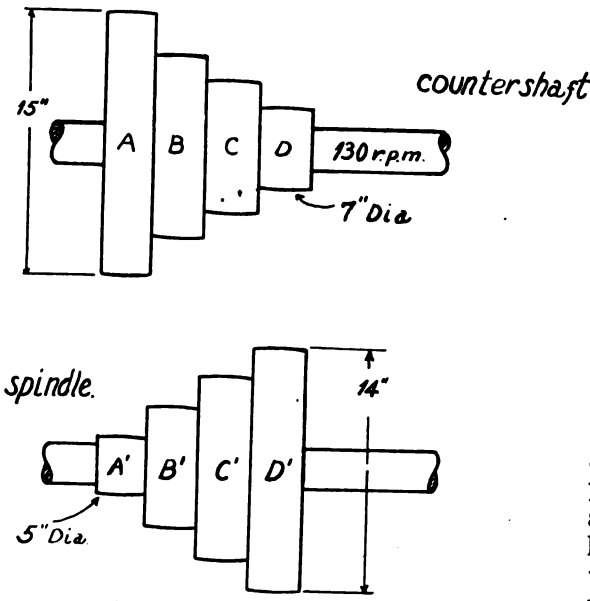


Fig. 1—Countershaft and Lathe Pulleys.

loss of time. Similarly, if it cannot be speeded up to the proper point.

If the slowest and fastest speeds are both right, then we may rest fairly content. The maker of the lathe will naturally arrange matters for suitable intermediate speeds. A four-step cone will give four speeds. For general use in an automobile shop, four speeds will be sufficient. Five steps will only serve to enable the workman to change a little less abruptly from one speed to the next. However, if the shop is going to do work where very slow speeds are required as well as the faster ones, then it may be well to consider the added expense of installing a lathe fitted with back gearing.

Back Gears.

Back gears arranged at the head stock of the lathe provide another set of speeds. If we can have a four-step cone, then with back gears we can obtain four slow speeds in addition to the four fast speeds. We have a complete new set of speeds. The back gears may be so arranged that we get a reduction of say one to eight. Or, it may be stated that the back gear ratio is 8. Either way, the meaning is the same. The new slow speeds are one-eighth as fast as the old fast ones without the gears. That is to say, we get a new slow speed for every position of the belt on the cone pulley.

It will be one-eighth as fast as the speed for the same position of the belt with no gears used. In the example we had before, the slowest speed was 65 R. P. M., obtained at the time when the belt is on the largest step on the lathe cone. If the back gears are now brought into action and the belt remains in the same place, then the new speed will be slightly over 8 R. P. M. (that is, 1/8 of 65). When the belt is on the smallest step, we get instead of 390 R. P. M., the speed of about 49 R. P. M.

In selecting a back-geared lathe, an important matter is the jump from the fastest back-gear speed to the slowest speed without gears. In the present case we have about 49 for the one and about 65 for the other. That is a big jump. Unless we absolutely know that this jump will not be too big a one, it will perhaps be better to obtain a lathe with back gears having a ratio of 7 instead of 8. With 7 (or 1 to 7) we shall now have new speeds that are one-seventh of these of the old set. Thus, corresponding to 390 and 65, we shall get with the gears 56 and 9 (about). The jump from 56, the fastest speed, with gear to 65, the slowest speed without gear, is a reasonable one—one that is a very great improvement over the jump from 49 to 65.

Let me summarize some main points. If the lathe in contemplation is driven by a cone pulley and does not have back gears, then we shall have exactly as many changes of speed as there are steps on the cone. If the lathe is back geared, we get an additional set. Find out what the fastest speed on the lathe is and also the slowest, when the countershaft is rotated at the speed at which you propose to rotate it.

If the fastest speed is not fast enough, or the slowest not slow enough, then consider what to do. It is possible that a change in the countershaft speed may give you what you desire. Make the calculations, or get some one to make them, and see whether the fastest and slowest speeds will now be satisfactory. If not, then leave that particular lathe alone. Further, if you are about to get a lathe with back gears, find out what kind of a jump in speed is made when you go from the slowest without gears to the fastest with gears.

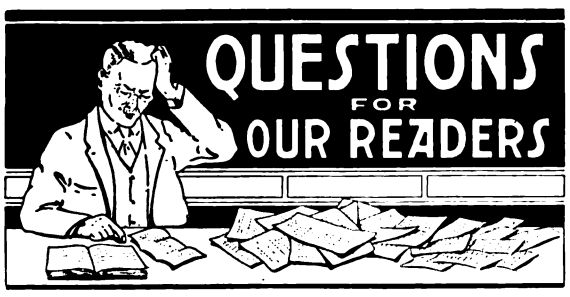
If it means a doubling or anything like a doubling of the speed, it will be well to consider before you buy. The jump may be a permissible one for you or it may not. At any rate, stop and consider. A back geared lathe costs considerable more money. It will be well to make sure you are getting what will prove satisfactory.

The speeds desirable on a lathe will depend upon the work to be done. Hard cast iron and tool steel will require comparatively slow speeds. Soft brass should be cut at a comparatively high rate of speed. Machine steel is properly cut at intermediate rates. We can vary the speed some, but not to a very great extent, if we propose to operate economically.

We must consider what kind of work we are going to do. If there is going to be a good deal of soft brass work of small diameter, then we will want some pretty rapid speeds. Soft brass should be cut at the rate of, say, 100 feet per minute. This means that the chip should come off at that rate. This is a different thing from 100 revolutions per minute. If the brass work on the lathe is 1 inch in diameter, then the chip taken off in one turn is about 3 1/7 inches long. To get 100 feet of chip, we will have to have as many turns as 3 1/7 inches go into 100 feet. One hundred feet is 1,200 inches. Dividing by 3 1/7 inches, we get 382 turns (about). If we want 100 feet of chip in 1 minute, then we will have to rotate the work fast enough to get 382 turns in 1 minute. From this it will be seen that the spindle speed of 390 R. P. M., mentioned a little while back, will not be too rapid. We obtained that speed from a countershaft speed of 130 and pulley steps of 15 and 5 inches on countershaft and lathe cones.

(To be continued.)

Digitized by Google



A short time ago we received a letter of distress from a Georgia reader, and we are thankful to say that the brothers were very loyal. We received a great number of answers from blacksmiths who were willing to help him out by giving him work. We give below a letter from one of our brothers of Canada. Perhaps someone will be able to solve his problem. Write to us if you can.

Can You Help?

From R. W. H., Canada.—The trade in this section of the West is just as bad as anything can be. Probably the hard times are due to the poor crop which was harvested this year. We have practically no work at all, and have had but little since the middle of the summer. I have had to beg in order to get food for my family of seven small children, and I do not like to do it because I am willing to work for my living.

The blacksmith in the Canadian West on the average is very poor, as I have found in my past three years of village shop work. I have had considerable experience and am able to do mechanical work and blacksmithing in the right way, but there seems to be little opportunity here to do it.

Power Hammer for Shop.

From B. H. Brooks, Texas—Will some brother tell me the best make of power hammer for a small shop? Also what is the best process for sharpening or rolling discs cold?

Will Answer Questions.

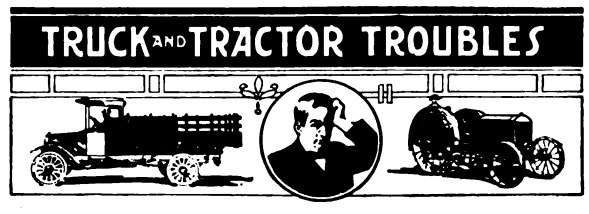
From L. F. Tarbell, New York.—I have had about 39 years' experience at doing blacksmith work in farming communities. I have also done lumbering and some carriage work. Have fashioned many of my own machine tools that are not generally used and found them convenient. I will be very glad to give my best judgment on questions referred to me by any of my brothers.

ANOTHER PRIZE CONTEST.

If you do any automobile work in your shop, don't fail to read the new prize contest announcement on our editorial page. Here is a chance for you to collect some easy money, and at the same time obtain a halftone cut of your shop. Every picture that we publish in our magazine we must reproduce on a copper plate. These plates are called "halftones" and can be used for printing letterheads, billheads, or advertising folders of any kind. The printer uses them just as he does type.

As soon as we have published the picture of your shop in our magazine we will return your original photograph together with the halftone which we used for printing it in our magazine. This does not cost you one cent and you will save quite a little money in making up billheads or folders for yourself.

You don't have to be a good writer to enter this contest. All you have to do is to send us a picture of your shop, providing you do automobile work, together with a short letter telling about your business, or the shop itself, or telling about how well you like the automobile business; whether you like it better than blacksmithing, or in fact telling anything that you think would interest your other brothers throughout the country. Now turn to the editorial page and read about the prizes.



Interested in Automobiles.

From Elmer Uren, Wisconsin.—I am very much interested in the automobile stories that are being printed every month in your magazine. One of these articles is worth double the price of the paper. I think that every blacksmith should try to do automobile and tractor repair work. These machines will furnish the big business for the blacksmith in the future.

I, myself, do a great deal of car repairing and sell tires, tubes, gasoline, cylinder oil, and keep a good supply of Ford extras on hand. My shop is equipped with a very good set of machine tools, an engine, a rip saw, an emery wheel, grindstone, disc sharpener, post drill and a free air outfit that cost me $100.

Personally I think that this is a good investment for anyone who sells tires and tools. Get into the automobile business, brothers. It is much better than breaking your back shoeing horses. I have often forged supply parts for cars when it was hard to get the supplies.

I weld many automobile springs. Anyone can weld them. I do not temper the springs at all, and they stand very well. Oftentimes people try to tell me that they cannot bore holes in automobile springs. That's easy; use turpentine on the drill instead of oil and the hole can be bored very easily.

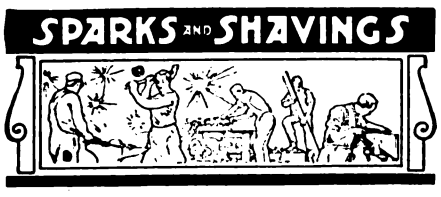
Wants Wiring Diagram.

From Tom Benner, Illinois.—I wish some one of my brother blacksmiths would send me the wiring diagram of an Oldsmobile model 53, six-cylinder car. This car is equipped with the Delco electric system and an Excide 24-cell battery. There are eight wires leaving the battery box.

Steel for Auto Springs.

We want to call the attention of our readers to the fact that no one has told us what kind of steel they use for automobile springs. One of our subscribers wants to know, and we shall hope to receive a letter telling him about it as soon as you have read this magazine.

Advertising Rates in The Blacksmith and Wheelwright
made known on Application



Phoenix Horse Shoes and Bull Dog Calks.

The Phoenix Horse Shoe Company of Chicago, Ill., manufactures a line of horse shoes and calks which is well known all over the world. This line includes the celebrated Phoenix horseshoes and the Bull Dog calks.

The constant demand for Phoenix horseshoes is perhaps the best proof of the high quality of this product. These shoes are practical to the highest degree and they are made of unexcelled material. The Bull Dog calks are warranted to hold firmly to the shoe, never to jump out, when set, and they are easy to drive and perfect in every detail. The Phoenix products are for sale by all dealers, but readers who are interested should write for samples and interesting literature direct to the manufacturers.

The Bush Car.

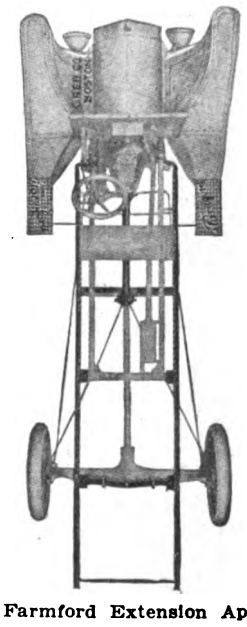
Many country blacksmiths are so situated that they could easily be successful as agents for automobiles, and it is quite practical to sell cars from illustrated catalogues instead of going to the expense of maintaining a regular salesroom.

The Bush car, manufactured by the Bush Motor Co., Bush Temple, Chicago, Ill., can be sold exclusively by country blacksmiths. This is a five-passenger, 35 H. P. car, having 116-inch wheel base, Goodrich tires, 32 x 3½, Delco ignition, Dyneto starting and lighting; in fact, a thoroughly up-to-date motor car.

Good agents are wanted throughout the United States, especially in the country towns. Some of the very best territory is still open. Prompt shipments are guaranteed. A live blacksmith can make good money on this proposition. In writing to the Bush Motor Co., address Dept. A-5.

Repair Shop Specialties.

We illustrate two live specialties for the auto repair man. The cut will give our readers a fair idea of the appearance of the Farmford extension, for making



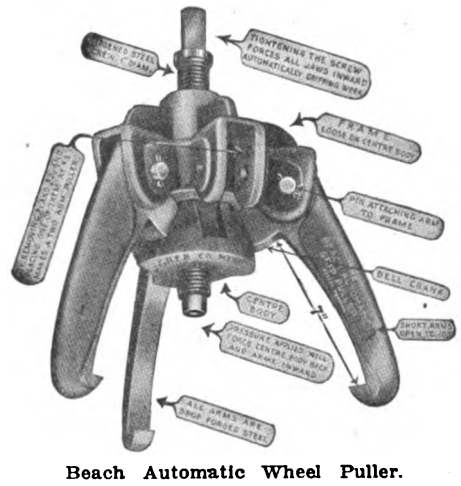
The Farmford Extension Applied.

any Ford car into a serviceable truck. With a Farmford extension unit you can quickly lengthen the wheel base of a Ford car to 115, 124 or 130 inches.

With this unit it is not necessary to even cut or alter the Ford frame in any way. Many blacksmiths can do a good business on this unit by changing Ford cars to serviceable trucks. Many farmers are buying high grade cars, and this would make an excellent use for their old Ford machines.

We also illustrate a good wheel or gear puller which is as indispensable in the garage as a hammer. It may be used in a great many ways. It is said to be practically the only tool with which a flywheel may be removed without the attendant danger of breaking the crankshaft. The Beach Automatic Grip Puller, as it is called, is built mechanically right, and when once the jaws are closed on the work and the screw is set against the shaft, it is impossible for them to unhook. Tightening the screw forces the jaws inward, automatically gripping the work, throwing pressure toward shaft or axle, making it more positive and requiring less pressure than the ordinary puller.

Positively removes wheels, gears,



Beach Automatic Wheel Puller.

flanges, couplings, universal joints, wrist pins and any number of other things. Quick, strong, durable, efficient and simple. It is complete with two sets of jaws: three 7½-inch jaws (open to ten inches) and three 12-inch jaws (open to eighteen inches). Either a two or three jaw combination may be used, as there is an extra jaw socket directly opposite one of the jaws. It is also made with a locking device by which the jaws may be set and locked in any position, which makes it a one-man puller.

Both of the specialties illustrated are manufactured by the Greb Company, 213 State Street, Boston, Mass., to whom all inquiries should be addressed. A liberal discount is given by this company to jobbers, dealers and garages. This discount will also apply to blacksmith shops.

Giant Grip Products.

Although this has been an unusually mild winter season so far, we may expect before spring to see considerable snow and ice, and of course this will mean a demand for calks and other winter horseshoeing supplies. The Giant Grip Horse Shoe Co. of Oshkosh, Wis., manufactures the well-known line of Giant Grip shoes, calks and tools. The quality of these products is well known, but readers who are not fully acquainted with the merits of this line should write direct to the manufacturers for interesting free literature.

Niehoff Defectometer.

The above is the name of a new testing instrument which has been put on the market by Paul G. Niehoff & Co., Inc., 232-242 East Ohio Street, Chicago, Ill. This instrument is guaranteed to locate shorts in a magneto. It is accurate and time saving, and will soon pay for itself in any garage or repair shop. Write for interesting free literature direct to the manufacturers.

Northwestern Horse Nails.

The Northwestern Horse Nails have been on the market for many years. These nails are made of the best quality material. They are perfect in form and finish and will hold the shoe firmly to the horse's foot. The re-enforced point makes this nail an easy one to drive and a safe one to use. Write for samples and descriptive circulars to the Union Horse Nail Co., Chicago, Ill.

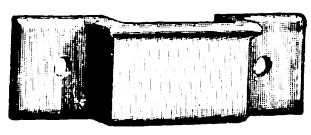
Digitized by Google

A Page of STAKE POCKETS made by

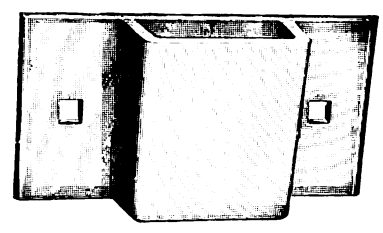
The Eberhard Manufacturing Co.

ORDER THROUGH YOUR JOBBER

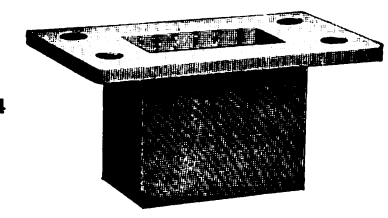
No. 5990



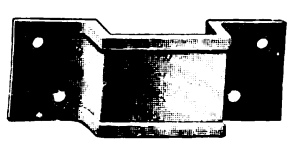
No. 6015



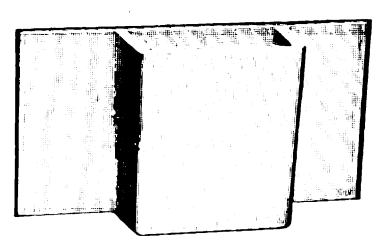
No. 6024



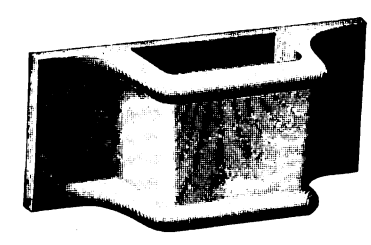
No. 5995



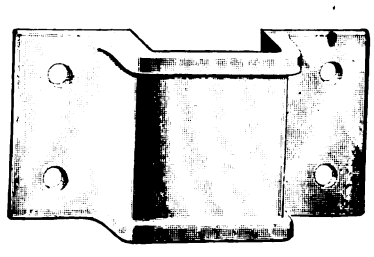
No. 6017



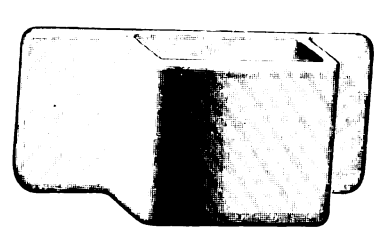
No. 6027



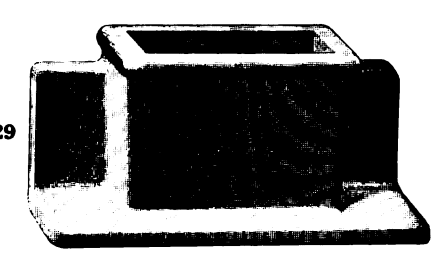
No. 6000



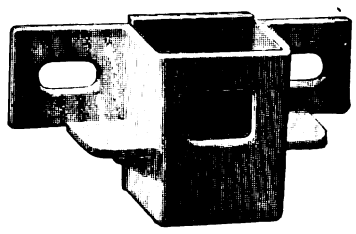
No. 6018



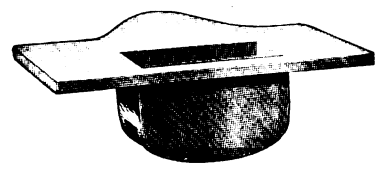
No. 6029



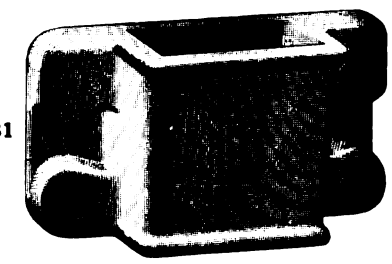
No. 6003



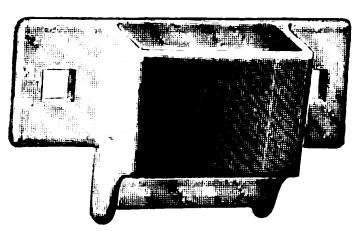
No. 6020



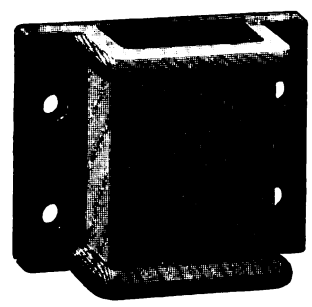
No. 6031



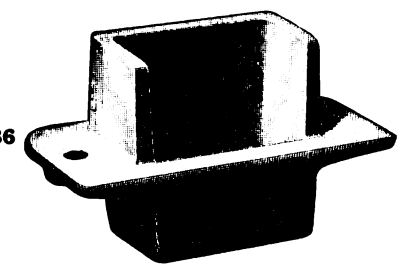
No. 6004



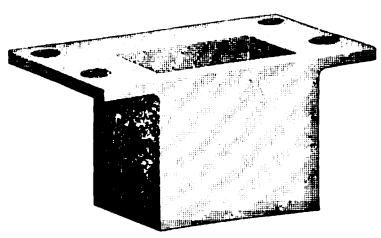
No. 6022



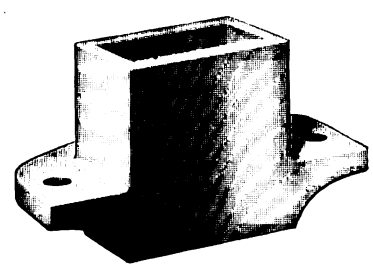
No. 6036



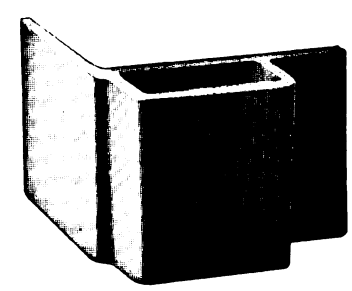
No. 6006



No. 6023



No. 6037



CLEVELAND, OHIO

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

An Instructive Book About Autos.

Thousands of blacksmiths throughout the United States have taken up automobile repair work, and many of these blacksmiths have been very successful in this branch of business.

The only trouble, however, is that many blacksmiths do not place sufficient confidence in their mechanical knowledge in regard to motor cars, and to meet this want, the American Technical Society, Dept. A-7641, Chicago, Ill., has brought out a set of books under the title "Automobile Engineering." This work consists of five profusely illustrated volumes giving full information in regard to every conceivable mechanical subject connected with motor cars and repairing same. A partial list of contents is as follows:

Explosion Motors
Welding.
Motor Construction and Repair
Carburetors and Settings
Valves, cooling
Lubrication.
Flywheels
Clutch
Transmission
Final Drive
Steering Frames
Tires
Vulcanizing
Ignition
Starting and Lighting Systems
Wiring Diagrams
Shop Kinks
Commercial Garage Design and Equipment.
Electrics
Storage Batteries—Care and Repair
Motorcycles
Commercial Trucks
Glossary

This valuable work will be sold to the readers of The Blacksmith and Wheelwright at a low price and on wonderfully easy terms. Any blacksmith can pay for this set of books at the rate of only seven cents a day. Remember this work is authoritative and by the very best mechanical experts, and the five volumes contain 2,400 pages (5½ x 8¾ inches), also 2,000 illustrations, tables and explanatory diagrams; in fact, this work is a complete automobile library, and any blacksmith by studying these books can particularly fit himself for expert repair work.

Readers who are interested should use the coupon which is attached to the advertisement of The American Technical Society appearing in this issue of our magazine.

Nicholson Files.

The files and horse rasps manufactured by the Nicholson File Co. of Providence, R. I., are favorably known all over the world. This is the largest concern in America manufacturing files, and their product is of standard quality. Ask your dealer or write for free literature direct to this company.

Wonder Disc Sharpeners.

With the large acreage of crops planted, there is certain to be an unusual demand during the coming season for agricultural implements of every description, and this will mean that the blacksmiths should put in a complete line of machinery for repairing agricultural implements and farm tools. The Wonder Disc Sharpeners are manufactured by A. E. Durner, Evansville, Wis., and are money-saving and money-making machines.

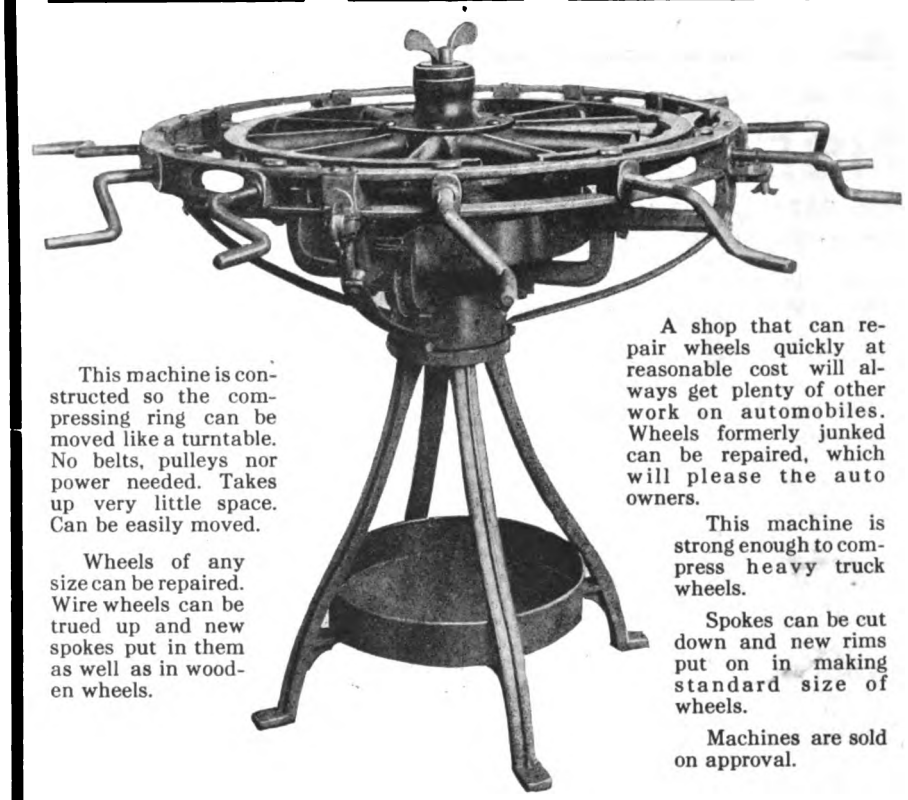
The Little Wonder Disc Sharpeners can be successfully used to sharpen plow discs of 22 inches or less. The Giant Wonder will sharpen any size from 12 to 32 inches in diameter. These machines are for sale by leading jobbers in United States, Canada, Mexico, Spain, Australia, Argentine Republic, South Africa and Fiji Islands, but readers who are interested should address all inquiries direct to the main office of A. E. Durner of Evansville, Wis.

Standard Horse Nails.

The Standard Horse Nail Co., New Brighton, Pa., manufactures a full line of horse nails, and readers who are likely to be interested should write to this company for catalogue, prices and samples.

A MONEY MAKER!

Universal Wheel Compressor



This machine is constructed so the compressing ring can be moved like a turntable. No belts, pulleys nor power needed. Takes up very little space. Can be easily moved.

Wheels of any size can be repaired. Wire wheels can be trued up and new spokes put in them as well as in wooden wheels.

A shop that can repair wheels quickly at reasonable cost will always get plenty of other work on automobiles. Wheels formerly junked can be repaired, which will please the auto owners.

This machine is strong enough to compress heavy truck wheels.

Spokes can be cut down and new rims put on in making standard size of wheels.

Machines are sold on approval.

The inventor of the UNIVERSAL WHEEL COMPRESSOR worked in a shop, and part of his work was to repair automobile wheels.

Any mechanic who has had anything to do with broken or loose automobile wheels knows that it is almost impossible to put in new spokes and do other repairs with ordinary shop tools and assure his customer that his wheel is as good as new.

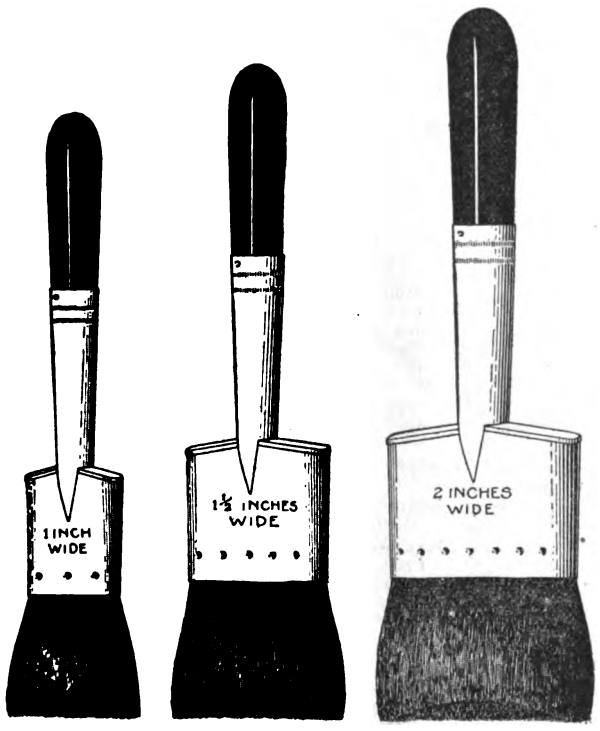
The primary objects of this invention are to provide a mechanism which is adjustable for all types of auto and truck wheels, and is so constructed that repair work may be done speedily and with ease. The wheel can be accurately set to give it the desired dish Each spoke can be pressed individually, and rim can be pressed on in a few minutes without use of ordinary clamps, which cause a lot of trouble and loss of time. The war is over—this machine will easily and handily make much more money for you than at first, you might believe—but you'll very soon thank us and praise it, too.

Write to us Today

Universal Wheel Compressor Co., Cedar Rapids, Iowa

IMPORTANT POINTS ABOUT PAINT AND VARNISH BRUSHES

A Set of Three Brushes and the Blacksmith and Wheelwright for One Year for $2.00.



Showing Brushes One-Half Actual Size.

Did it ever occur to you that there was much difference between a good paint or varnish brush and a poor one? Probably not. To most people a brush is just a brush. Yet an analysis shows that there is an almost measureless difference between a good brush and poor one.

For instance, a properly made Flowing Fitch brush is hermetically sealed, so as to keep the paint, or whatever may be used, from getting into the brush at the top and loosening the hairs. All such properly made brushes are solidly set in glue cement inside a leak-proof ferrule, and a whole row of neatly clinched nails are driven in at the end of the ferrule to give added security, and a guarantee that the hairs will not pull out.

A Fitch brush is *smooth, soft,* and *flowing,* and does not "mush" up or get flabby like a cheap brush, but holds its springiness. The trouble with cheap brushes is that the ferrule is nothing more than a single band of tin, open at the top, with a couple of nails jabbed through. When you use such a brush the cheap hair will pull out and scatter all over your work, because it is not held securely enough to stand the drag of the brush in painting or varnishing.

A brush may be washed with gasoline or kerosene oil, but to clean it thoroughly turpentine should be used. No brush used for painting should be used for varnishing.

We have recently made arrangements with one of the best manufacturers of these properly made brushes in New York to offer a set of Three in connection with a subscription to the BLACKSMITH AND WHEELWRIGHT for a year for an even $2.00. These brushes sell at retail for $1.40. It will be seen, therefore, that there is a substantial advantage in sending to us for the BLACKSMITH AND WHEELWRIGHT for a year, and for a set of these brushes.

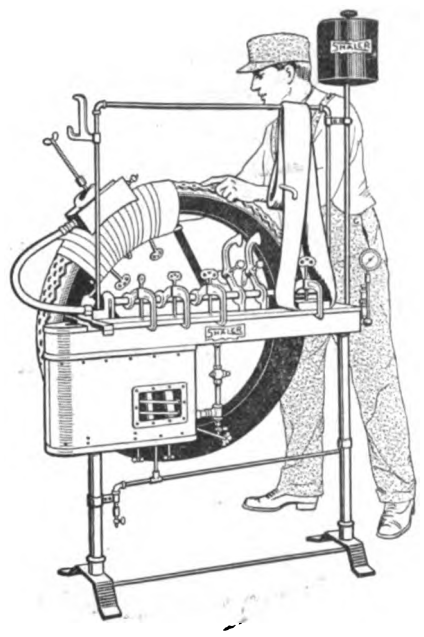
Present subscribers can have their subscriptions extended for a year, and secure a set of brushes, on the same terms. These brushes are guaranteed in every respect, and though they cost more than cheap brushes would cost, they are far cheaper in the end, because of their lasting qualities and the good work that can be done with them. No man can afford to waste expensive paint and varnish on any vehicle by using a cheap and poorly constructed brush, such as is usually to be found wherever brushes are sold. The ordinary dealer in brushes himself as a rule has very little knowledge of the quality of the brushes he sells.

Remit by check or money order, and your name will be entered as a subscriber to the BLACKSMITH AND WHEELWRIGHT for a year, and a set of these brushes, which are just the right size and shape (see illustration, which is exactly one-half the actual size of the brushes), will be sent to you, postage prepaid.

Address all orders to the

M. T. RICHARDSON COMPANY, Publishers

71-73 MURRAY STREET, NEW YORK



An Easy Way to Make Money

Don't be content to plod along on a small salary. Be *independent.* Go in business for yourself. Open a Tire Repair Shop, and be your own boss. Hundreds of men are making $200 to $500 a month clear profit. Many make $60 a week. One man made $45 the first day. No experience is needed. We teach you how. Very little capital required and expenses are small. But little risk as there is plenty of work and motorists are willing to pay liberal prices for good tire repairing. There is a good profit on the sale of automobile accessories also.

SHALER

Tire Repair Outfit

is a simple, easily operated steam vulcanizer that does as much and as perfect work as the large $250 to $500 vulcanizing outfits. It is the only vulcanizier that has ***Automatic Heat Control.*** It must vulcanize just right. Can't overcure or undercure the rubber. So simple that a boy can operate it. Requires no watching or regulating. Only takes a small space in corner of barn, garage or repair shop. You can learn to do expert tire repairing in half an hour. It's easy and the work is pleasant. Complete outfit—Shaler Steam Shop Vulcanizer with full instructions for tire repairing costs only $70—subject to trade discounts. Tools and materials are not expensive. Do you know any other business that pays such large profits on such a small investment?

FREE BOOK

"How to Open a Tire Repair Shop"

—gives full information, and describes the Shaler Wrapped Thread Method of tire repairing that is used by all tire manufacturers. Write quick before some hustler gets ahead of you. It's easy to make money repairing tires, and there is a big opportunity now, right in your town. Don't fail to write for free book.

C. A. Shaler Company

1809 Fourth Street Waupun, Wisconsin

Digitized by Google



CRESCENT Wood Working Machines

will always satisfy those particular users who want the highest quality at reasonable price.

Send today for catalog of band saws, saw tables, shapers, jointers, variety wood workers, planers, planers and matchers, swing saws, cut off table, disk grinder, borers, hollow chisel mortiser, Universal wood workers.

THE CRESCENT MACHINE CO.
203 Main Street
LEETONIA, OHIO, U.S.A.

For Sale

400 Sets of 1¼ Liggett Ball Bearing Axles Complete

Write for Prices and Full Details

Parry Mfg. Co.
Indianapolis, Ind.

Nicholson File Co., files and rasps 333
Ottawa Mfg. Co., engines 336
Oneida National Chuck Co., chucks 336
Parker, C. L., attorney 355
Parks Ball Bearing Machine Co., woodworking machinery ..... 2d cover
Peck, Stow & Wilcox Co., pincers 356
Phoenix Horseshoe Co., horseshoes and toe calks 334
Porter, H. K., bolt clipper ..... 4th cover
Prentiss Vise Co., vises ..... 4th cover
Root Health Mfg. Co., lawn mower grinders 351
Rosewater Electric Co., blowers 330
Rowe Calk & Chain Co., horseshoe calks, Front cover
Sampson & Murdock, directories 365
Savidge, A. C., lathes ..... 2d cover
Shaler, C. A., Co., vulcanizers 349
Sheldon Axle & Spring Co., axles 356
Standard Horse Nail Co., horseshoe nails, 4th cover
Standard Horseshoe Co., horseshoes, 3d cover
Star Mfg. Co., agricultural implements 353
Sterling Tire Corp., hoof pads 329
Stokes Bros. Mfg. Co., rasps ..... Front cover
Superior Oxy-Acetylene Machine Co., welding outfits 355
Thompson Tuyere Iron Co., tuyere iron, 4th cover
Union Horse Nail Co., horse nails ..... ?
Universal Wheel Compressor Co., wheel compressors 349
Western Newspaper Association, books 329
West Tire Setter Co., tire setters, hammers 355
Wheel B, Top & Hardware Co., supplies, Front cover
Whisler Mfg. Co., nut splitters, jointer heads ..... 4th cover and 355
Witte Engine Works, engines 355
Young, W. F., veterinary remedies 4th cover

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

will be inserted under this head at 3 cents a word, including the address, for each insertion, payable in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York.

PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT

Patents

PATENTS FOR INVENTIONS.

H. W. T. JENNER, patent attorney and mechanical expert, 622 F Street, Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trade-marks registered.

For Sale

FOR SALE.

New Machines. 9-inch Jointer, $50.00; 5-inch Jointer, $30.00; 5-inch Bench Jointer, $25.00. Cast iron and steel construction; quick, easy adjustable device for changing cut. Also circular and square style cutter heads for wood frame Jointers, 3 to 17-inch cut, from $7.50 to $40.00. Saw arbors, any size or style; emery grinder stands. Send for circular. W. L. SHERWOOD, Kirksville, Missouri.

FOR SALE.

One Defiance 60 ton Iron Frame Hydraulic Press; two Defiance 18" Broad Belt Polishing Machines; one Defiance No. 3 Hub Reaming and Boring Machine; one Defiance "Sharpsteen" Spoke Facing Machine; one Bentel & Margedant Rif or Felloe Polishing Machine; one Treavor & Company Double Spoke Equalizing Saw; one Gleason Disc Facer with Bentel & Margedant Spoke Equalizing Saw; one Gleason Disc Facer with Bentel & Margedant Spoke holding attachment; one Gleason Spoke Throating Machine. NESS BROTHERS & COMPANY, York, Pa.

FOR SALE, BLACKSMITH SHOP.

Located in good farming country; only one shop in town; surrounded by big territory; rare chance for man who understands his business. I have two 50 ft. lots; shop is L shaped, 30x60 and 18x30, cement floor; two gasoline engines, one 8 horse power, one 2 horse power, Little Giant trip hammer, one plow sharpener, 2 forges, 2 anvils, three large vises, emery stand, disc roller, turning lathe, cold tire setter, shears. Further particulars as to price, terms, will be sent on application. Address AUGUST NORDSTROM, Wausa, Nebraska. Reason for selling, old age.

For Sale

FOR SALE.

Blacksmith business; lot 200x220, brick shop 35x80, three forges, one frame building 25x50, concrete floor. Extra fine location, plenty of work, good prices. Four churches, fine school, good water, fine farming country. Good man can get rich here. Reason for selling, old age, want to retire. Fine stand for a garage, plenty of that kind of work here if a man wants that kind of work. Too old to do it myself. Address R. B. LINK, Marvell, Arkansas, Box 155.

FOR SALE.

Two anvils, two electric blowers, one new L. S. P. Calking Machine, and forty kegs of shoes. Address WALTER HARRIS, Fairfield, Iowa.

FOR SALE.

A rich Iowa community offers a live mechanic a general blacksmith business unequalled anywhere. Work for three or four men the year around. Get particulars at once from A. J. ULVESTAD, Lake City, Iowa.

FOR SALE.

One 2½ H. P. Gasoline engine and one 4 H. P. Gasoline engine, one tire bender. All in good order. Have put in motor. Will sell cheap. F. H. HERBST, Highland, Ill.

Tires

DOUBLE TREAD TIRES
GUARANTEED
SPECIAL OFFER TO AGENTS. Write for Catalogue
Get our special price on new tires
M. LIBEN & CO.
205-AK West 48th St. New York City

DOUBLE TREAD TIRES.

We carry a full line of new and used tires and tubes. GINSBERG & BERKOWITZ, 236 West 48th St., New York City.

Tires

Tires

BUY EARLY AND SAVE MONEY

Double Tread Tires and Tubes

GUARANTEED

Come to the Tire Clearing House—here are prices—clear cut and plain as daylight. We buy wholesale the best "try out" Tires—and you get the benefit—you want truthful tires, and truth is never crushed to earth if given a square deal—real truth is puncture proof—

SO ARE OUR TIRES.

Size	Plain	Non-Skid	Tubes
28x3	$4.40	$4.95	$2.00
30x3	5.50	6.05	2.00
30x3½	6.60	7.15	2.65
32x3½	7.15	7.70	—
34x3½	8.25	8.80	3.00
32x4	9.50	10.50	2.75
33x4	9.50	10.50	3.25
34x4	9.80	10.80	3.50
35x4	9.90	11.00	3.50

Get your order in quick for goods listed here—by all means get in touch with us for further information about our special process—it means money in your pocket. Get in right—write to-day—yes—to-day.

Look up rating in Dun's or Bradstreet's.

Size	Plain	Non-Skid	Tubes
36x4	$9.90	$11.00	$3.60
32x4½	9.90	11.00	3.60
34x4½	11.00	12.10	4.00
35x4½	11.00	12.10	4.10
36x4½	11.00	12.10	4.25
37x4½	12.10	13.20	4.35
34x5	11.00	12.10	4.50
35x5	13.20	14.30	5.00
36x5	13.20	14.30	5.00
37x5	13.75	14.85	5.00

For (non-skid) sizes up to 32x4, 50c extra; all other sizes $1.00 extra.
For rebuilding your old tires we charge you 60% of the above prices.

B. LIBEN & COMPANY
261-A West 54th Street NEW YORK CITY 112-A East 110th Street
THE HOME OF DOUBLE THREAD TIRES

Wanted

WANTED.

Blacksmith and horseshoer, steady. Electric power. Address WILL MADDOX, Palestine, Illinois.

OPPORTUNITY.

Splendid opening for blacksmith. One of the best agricultural districts in the state, good territory, no competition; can rent shop for ten dollars per month and no lack of work. Address, PRIMROSE COMMUNITY CLUB, Primrose, Nebraska.

Personal

PERSONAL.

TOBACCO HABIT may be easily overcome. Quit the terrible injury and expense. I'll gladly send necessary information. G. S. STOKES, Mohawk, Florida.

Index to Advertisers

Aetna Nut Co., horseshoe calks ..... Front cover
Akron-Selle Co., gears 355
American Calk Co., calks ..... Front cover
American Technical Society, books 333
Anti-Borax Compound Co., welding compounds ..... 4th cover
Armstrong Mfg. Co., bolt dies 353
Armstrong-Blum Mfg. Co., punches and shears ..... Front cover
Barcus Mfg. Co., horse stocks 351
Barnett, G. & H., Co., files and rasps, Front cover
Bertschy-Bermo Co., welding plants Front cover
Bradley, C. C., & Son, shaft coupler 353
Buchanan, C. G., Chemical Co., industrial chemicals ..... 4th cover
Buffalo Forge Co., blacksmiths' tools 335
Burden Iron Works, horseshoes ..... 3d cover
Bush Motor Co., motor cars 336
Butterfield & Co., taps, dies and screw plates 336
Campbell Iron Co., supplies 353
Canedy-Otto Mfg. Co., blacksmiths' tools 332
Capewell Horse Nail Co., horse nails, Front cover
Champion Blower & Forge Co., blowers 331
Champion Tool Co., blacksmiths' tools 2d cover
Chase, L. C., motor topping .....
Childs, S. D., & Co., steel stamps, Front cover
Columbus Forge & Iron Co., anvils 354
Columbian Hardware Co., vises 356
Cortland Welding Compound Co., welding compounds ..... 3d cover
Cray Bros., blacksmiths' tools 353
Crescent Machine Co., woodworking machinery 350
Diamond Calk Horseshoe Co., horseshoes 352
Durner, A. E., disc sharpeners 333
Eberhard Mfg. Co., stake pockets 348
Edwards, C. D., Mfg. Co., shears 355
Electric Blower Co., blowers 356
Electric Wheel Co., wheels ..... Front cover
Empire Mfg. Co., wheels 355
Felton, Sibley & Co., paints 329
Firestone Tire & Rubber Co., tires 330
Fisher & Norris, anvils and vises 336
Franklin Steel Works, toe calks ..... 3d cover
Giant Grip Horseshoe Co., horseshoes 355
Gogel Mfg. Co., tire heaters 353
Greenfield Tap & Die Corporation, screw plates and blacksmiths' machinery 330
Gwilliam Co., ball bearings ..... 4th cover
Hall Co., Sherwood, sleigh knees 353
Hart Mfg. Co., stocks and dies ..... 4th cover
Harvey Spring & Forging Co., auto springs ..... 4th cover
Hay-Budden Mfg. Co., anvils ..... 4th cover
Heller Bros., horse rasps, tools, etc 336
House Cold Tire Setter Co., tire setters, hollow and spoke augers ..... 4th cover
Jenner, H. W. T., patents 350
Kerrihard Co., hammers 330
Leonard-Morton & Co., shoes 351
Linde Air Products Co., oxygen 336
L. S. P. Calking Machine Co., calking machines 336
Macgowan & Finigan Cordage Co., hammers ..... 2d cover
Mayer Bros. Co., hammers 329
Ness, Geo. M., Jr., steel stamps ..... Front cover
Neversalp Works, The, horseshoe calks 332
Niehoff & Co., Paul G., defectometers Front cover

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co 353
Anvils
Columbus Forge & Iron Co 354
Fisher & Norris 336
Hay-Budden Mfg. Co ..... 4th cover
Attorneys
Parker, C. L 355
Automobile Springs
Harvey Spring & Forging Co ..... 4th cover
Axles
Sheldon Axle & Spring Co 356
Ball Bearings
Gwilliam Co. ..... 4th cover
Blacksmiths' Machinery
Greenfield Tap & Die Corporation 330
Blacksmiths' Tools
Buffalo Forge Co 335
Butterfield & Co 336
Canedy-Otto Mfg. Co 332
Champion Blower & Forge Co 331
Champion Tool Co ..... 2d cover
Cray Bros. 353
Heller Bros. Co 336
Nicholson File Co 333
Peck, Stow & Wilcox Co 356
Blowers
Buffalo Forge Co 335
Champion Blower & Forge Co 331
Champion Tool Co ..... 2d cover
Electric Blower Co 356
Rosewater Electric Co 330
Bolt Dies
Armstrong Mfg. Co 353
Bolt and Rivet Clippers
Porter, H. K ..... 4th cover
Books
American Technical Society 333
Western Newspaper Association 329
Calking Machines
L. S. P. Calking Machine Co 336
Calks, Horseshoe
Aetna Nut Co ..... Front cover
American Calk Co ..... Front cover
Diamond Calk Horseshoe Co 352
Calks, Toe
Franklin Steel Works ..... 3d cover
Chemicals (Industrial)
Buchanan, C. G., Chemical Co ..... 4th cover
Chisels
Champion Tool Co ..... 2d cover
Peck, Stow & Wilcox Co 356
Chucks
Buffalo Forge Co 335
Oneida National Chuck Co 336
Defectometers
Niehoff & Co., Paul G ..... Front cover
Directories
Simpson & Murdock Co 355
Disc Sharpeners
Durner, A. E 333
Mayer Bros. Co 329
Engines
Ottawa Mfg. Co 336
Witte Engine Works 355
Farriers' Tools
Barnett, G. & H., Co ..... Front cover
Champion Tool Co ..... 2d cover
Heller Bros. Co 336
Peck, Stow & Wilcox Co 356
Files and Rasps
Barnett, G. & H., Co ..... Front cover
Nicholson File Co 333
Stokes Bros. Mfg. Co ..... Front cover
Forges
Buffalo Forge Co 335
Champion Blower & Forge Co 331
Gasoline Engines
Witte Engine Works 355
Gears
Akron-Selle Co 355
Hammers
Champion Tool Co ..... 2d cover
Kerrihard Co 330
Macgowan & Finigan Cordage Co ..... 2d cover
Mayer Bros. Co 329
Peck, Stow & Wilcox Co 356
West Tire Setter Co 355
Hollow Augers
House Cold Tire Setter Co ..... 4th cover
Hoof Pads
Sterling Tire Corp 329
Hoof Parers
Champion Tool Co ..... 2d cover
Hoof Nippers
Champion Tool Co ..... 2d cover

Digitized by Google

"IDEAL" LAWN MOWER GRINDER

A BIG MONEY-MAKER.

Many of our customers make $300 in one season. You can do as well.



"You Grind It as You Find It."

Grinds all makes of Mowers perfectly in 15 minutes without removing wheels, ratchets or reel-knife. Has perfect Skate Sharpener Attachment for sharpening skates. Operated either by hand or power. Ball-bearing; easy running. Will do the work so much BETTER, QUICKER and EASIER you cannot afford to be without it. Nearly 10,000 in use. Fully guaranteed. Sold on easy-payment terms.

WRITE TODAY for catalog and full information.

Also makers of the "PEERLESS" Horse Lawn Mower Grinder.

THE ROOT-HEATH MANUFACTURING CO.

137-149 Bell Street, PLYMOUTH, OHIO

Don't Send a Penny

These Len-Mort work and outdoor shoes are such wonderful value that we gladly send them, **no money down.** You will find them so well-made and so stylish and such a big money saving bargain that you will surely keep them. So don't hesitate. Just fill out and mail the coupon. We will send a pair of your size. No need for you to pay higher prices when you can buy direct from us—and know what you are getting before you pay even a penny. Why pay out $5.00 and $6.00 for shoes not near so good? Act now. Mail the coupon today while this special offer holds good.

Great Shoe Offer

We can't tell you enough about these shoes here. This shoe is built to meet the demand of an outdoor city workers' shoe as well as for the modern farmer. Send and see for yourself what they are. Built on stylish lace Blucher last. The special tanning process makes the leather proof against the acid in milk, manure, soil, gasoline, etc. They outwear 3 ordinary pairs of shoes. Your choice of wide, medium or narrow. Very flexible, soft and easy on the feet. Made by a special process which leaves all the "life" in the leather and gives it wonderful wear-resisting quality. Double leather soles and heels. Dirt and waterproof tongue. Heavy chrome leather tops. Just slip them on and see if they are not the most comfortable, easiest, most wonderful shoes you ever wore. Pay $3.85 for shoes on only $3.85 arrival. If, after careful examination, you don't find them all you expect, send them back and we will return your money. No obligation on you. This is at our risk, not yours.



Send →

Only the coupon—no money. That brings these splendid shoes to you. You are to be the judge of quality, style and value. Keep them only if satisfactory in every way. Be sure to give size and width. Mail the coupon now. Order by No. X15012.

Leonard-Morton & Co.
Dept X 1380 Chicago

Leonard-Morton & Co.
Dept. X 1380 Chicago

Send the Len-Mort Shoes No. X15012. I will pay $3.85 for shoes on arrival, and examine them carefully. If I am not satisfied, will send them back and you will refund my money.

Size..... Width.....

Name.....

Age..... Married or single.....

Address.....

Hoof Shears
Champion Tool Co. ..... 2d cover
Horseshoes
Burden Iron Works ..... 3d cover
Diamond Calk Horseshoe Co. 352
Giant Grip Horseshoe Co. 355
Phoenix Horseshoe Co. 334
Horseshoe Calks
Diamond Calk Horseshoe Co. 352
Neverslip Works, The 332
Rowe Calk & Chain Co. ..... Front cover
Horseshoe Nails
Capewell Horse Nail Co. ..... Front cover
Standard Horse Nail Co. ..... 4th cover
Union Horse Nail Co. ....
Horse Stocks
Barcus Mfg. Co. 351
Kerosene Engines
Witte Engine Works 355
Lathes
Savidge, A. C. ..... 2d cover
Lawn Mower Grinders
Root-Heath Mfg. Co. 351
Motor Cars
Bush Motor Co. 336
Motor Topping
Chase, L. C. ....
Nut Splitters
Whisler Mfg. Co. ..... 4th cover and 355
Oxygen
Linde Air Products Co. 336
Paints and Varnishes
Felton, Sibley & Co. 329
Patents
Jenner, H. W. T. 350
Parker, C. L. 355
Pincers
Peck, Stow & Wilcox Co. 356
Punches
Champion Blower & Forge Co. 331
Punches and Shears
Peck, Stow & Wilcox Co. 356
Screw Plates
Butterfield & Co. 336
Champion Blower & Forge Co. 331
Greenfield Tap & Die Corporation 330
Buffalo Forge Co. 335
Champion Blower & Forge Co. 331
Shaft Coupling
Bradley, C. C., & Son 353
Shears
Edwards, C. D., Mfg. Co. 355
Shoes
Leonard-Morton & Co. 351
Sleigh Knees
Hall Co., Sherwood 353
Spoke Augers
House Cold Tire Setter Co. ..... 4th cover
Stake Pockets
Eberhard Mfg. Co. 348
Steel Stamps
Childs, S. D., & Co. ..... Front cover
Ness, George M., Jr. ..... Front cover
Stocks and Dies
Butterfield & Co. 336
Champion Blower & Forge Co. 331
Hart Mfg. Co. ..... 4th cover
Supplies
Campbell Iron Co. 353
Wheel B, Top & Hardware Co. ..... Front cover
Swages
Champion Blower & Forge Co. 331
Tires
Firestone Tire & Rubber Co. 330
Tire Bending Machines
Buffalo Forge Co. 335
Champion Blower & Forge Co. 331
Tire Heaters
Gogel Mfg. Co. 353
Tire Setters
Buffalo Forge Co. 335
House Cold Tire Setter Co. ..... 4th cover
West Tire Setter Co. 355
Tire Shrinkers
Buffalo Forge Co. 335
Champion Blower & Forge Co. 331
Tongs
Champion Tool Co. ..... 2d cover
Tool Grinders
Phoenix Horseshoe Co. 334
Trucks
Akron-Selle Co. 355
Tuyere Irons
Buffalo Forge Co. 335
Champion Blower & Forge Co. 331
Thompson Tuyere Iron Co. ..... 4th cover
Veterinary Remedies
Young, W. F. ..... 4th cover
Vises
Butterfield & Co. 336
Columbian Hardware Co. 256
Fisher & Norris 336
Prentiss Vise Co. ..... 4th cover
Vulcanizers
Shaler, C. A., Co. 349
Wagons
Akron-Selle Co. 355
Welding Compounds
Anti-Borax Compound Co. ..... 4th cover
Cortland Welding Compound Co. ..... 3d cover
Welding Outfit
Superior Oxy-Acetylene Machine Co. 355
Welding Plant
Bertschy-Bermo Co. ..... Front cover
Welding Supplies
Linde Air Products Co. 336
Wheel Compressors
Universal Wheel Compressor Co. 349
Wheel Dishers
House Cold Tire Setter Co. ..... 4th cover
Wheels
Electric Wheel Co. ..... Front cover
Empire Mfg. Co. 355
Woodworking Machinery
Buffalo Forge Co. 335
Crescent Machine Co. 350
Parks Ball Bearing Machine Co. ..... 2d cover
Wrenches
Champion Tool Co. ..... 2d cover
Wrenches (Knife Handle and Pipe)
Peck, Stow & Wilcox Co. 356

Would You Sell Your Life For $65?

You wouldn't part with even an arm or a leg for that figure, would you?

Yet every vicious horse you shoe is likely to do more damage in the twinkling of an eye than can be repaired at several times the cost of **Barcus Stocks.**

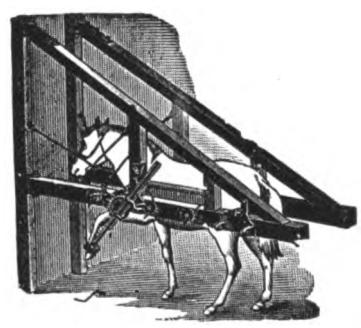
When you place a horse in a Barcus Stock, he is harmless—he cannot hurt either you or himself. Costing only $65 it is cheap insurance, indeed.

BARCUS STOCKS not only furnish the logical way to observe "Safety First," but they are also a positive aid to good shoeing. The BARCUS is a modern Stock—automatic working parts instead of the bothersome ropes, straps and blocks that made the old style stock almost more of a nuisance than a help.

If you don't know about **Barcus Stocks** you owe it to yourself and your family to write **at once** for the complete details.

The Barcus Mfg. Co.,

Wabash, Ind.



Please send me full particulars regarding your Horse Stocks without any obligation on my part.

Name.....

Town..... *State*.....

Digitized by Google



Our Calks Don't Fall Out

And you can't pick up a handful off the street either.

They stay in the shoe, where they belong, because the shanks and the calk holes are made so accurately that they do not vary so much as a hair in diameter. They fit absolutely tight all over and can't fall out.

DIAMOND Calks

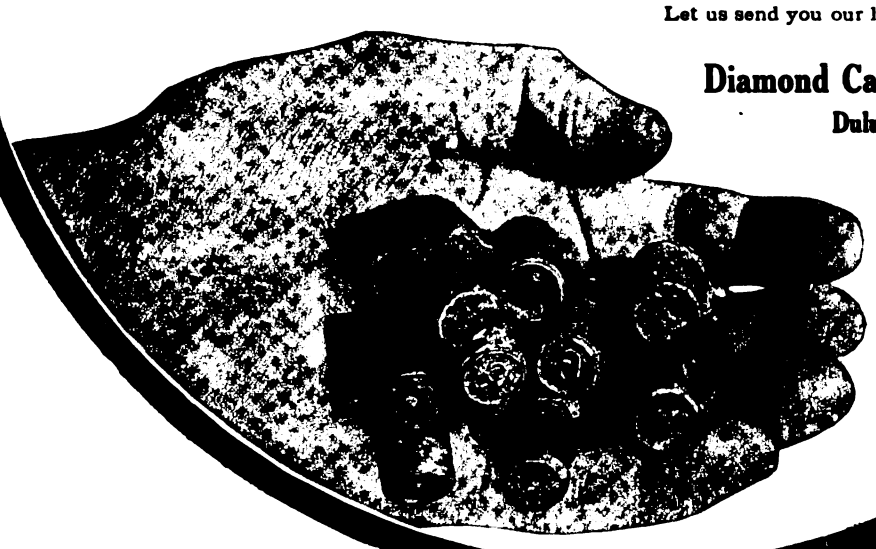
and Shoes are scientifically made in every particular. Our dies are kept true to the 1/10,000 of an inch.

Nothing is "good enough" to carry the DIAMOND trade mark unless it is as perfect as science and money can produce.

DIAMOND Calks and Shoes are the most economical because they give the very best service, and—

There's a DIAMOND Calk for every purpose

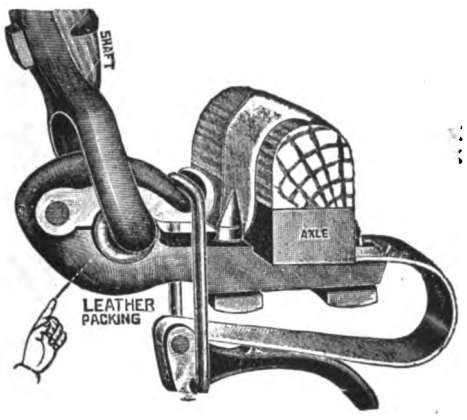
Let us send you our latest Illustrated Catalogue.



Diamond Calk Horseshoe Co.
Duluth, Minn.

Digitized by Google

BRADLEY

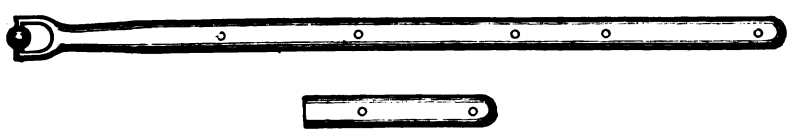


Ball-Bearing

Carriage Couplers and Long Shaft Irons

BEAR IN MIND

That we furnish both "Ball Bearing" and "Holdfast" in short or stub lengths and in full length Shaft Irons to your pattern.



An illustration (greatly reduced) of a full length Shaft Iron and T Piece

Write for Free Booklet

C. C. BRADLEY & SON, Inc.
SYRACUSE, N. Y.



Free 512 PAGES OF BARGAINS
POST PAID

WE WANT TO SEND YOU THIS 512 PAGE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

Tells how you can work up a profitable auto supply and repair business.

Serves as a price guide on all supplies.

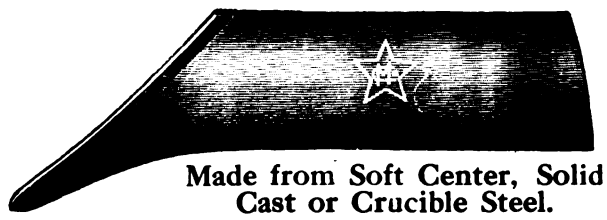
Saves you money on anything you need.

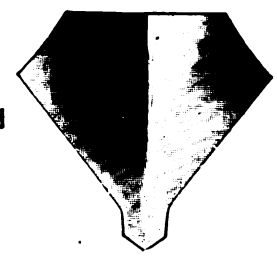
Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories
1117 W. 11th Street, Cleveland, Ohio, U. S. A.

STAR STEEL SHAPES
ARE A GUARANTEE OF QUALITY

PLOWSHARES — SHOVEL POINTS
LISTERSHARES — DRILL POINTS
MOLDBOARDS — PLOW POINTS
SUBSOILERS — SEEDER POINTS
LANDSIDE POINTS — LANDSIDE PLATES
CULTIVATOR SHOVELS





Made from Soft Center, Solid Cast or Crucible Steel.

BEST MATERIAL AND WORKMANSHIP.

STAR MANUFACTURING CO.
CARPENTERSVILLE, ILL.

Campbell Iron Company
WHOLESALE SUPPLIES

Still carry a complete stock of Wagon, Blacksmith Materials, Farrier Supplies, as well as Tools, Hardware Specialties, and Duplicate Parts for Fords.
Write for General Catalogue.
817 Cass Avenue St. Louis, Mo.

Steel Wheels.

A complete line of steel wheels to fit any axle, plain or grooved, is manufactured by the Electric Wheel Co., Box N, Quincy, Ill. The same company also manufactures steel or hickory axles of any size and a full line of wood and steel farm trucks with either steel or wood wheels. Readers who are interested should write for the interesting free catalogue which is issued by this company.

Chase Drednaut Motor Topping.

Many of our readers are doing automobile repair work, and in all blacksmith shops where such work is done, more or less top material is required for making new tops and reupholstering old cars. The Chase Drednaut motor topping is highly recommended for this purpose, as this material "defies time and the elements."

This fabric is manufactured by L. C. Chase & Co., Boston, Mass., and readers who are interested should write for particulars and free samples of this durable and reliable top material.

F. W. S. Roller Bearings.

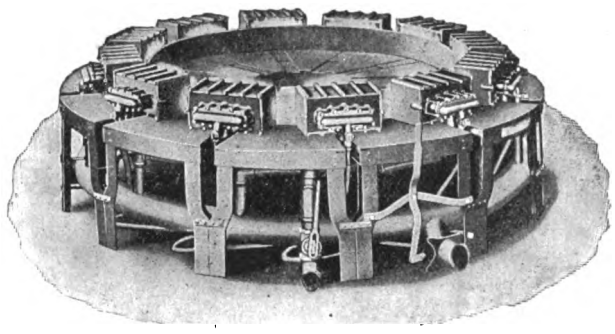
Ever since the Ford car was placed upon the market many years ago, car owners and repairmen have been in search of some sort of a bearing to replace the ball bearings in the front wheels of this car. F. W. Stewart, 1406 Michigan Ave., Chicago, Ill., in putting on the market the F. W. S. improved roller bearing, answered the problem.

This roller bearing can be used both in Ford and Chevrolet front wheels as a replacement part for the old fashioned ball bearing. The inner race or cone is made of a specially prepared steel carefully hardened and ground to the correct size.

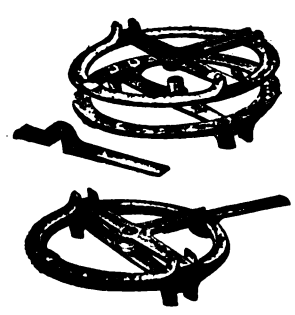
This part fits upon the Ford or Chevrolet front wheel spindle in place of the regular cone. Upon it are mounted the large rollers which are contained in a strong steel cage, which is reinforced by a heavy turned edge. Surrounding the roller and cage assembly is the outside race or ring which, like the inside cone, is carefully ground and hardened.

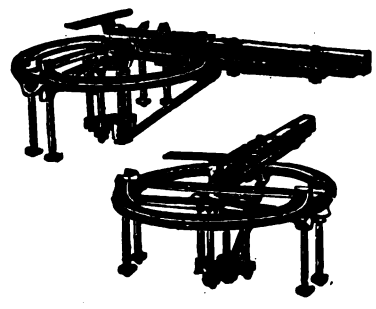
Autoists who find that the ball bearing in the front wheels of their Ford or Chevrolet cars are rapidly destroyed by wear, should investigate these bearings. The cost is low and satisfaction is guaranteed.

Subscribe for THE BLACKSMITH AND WHEELWRIGHT $1.00 a Year.



TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas, Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.
OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.

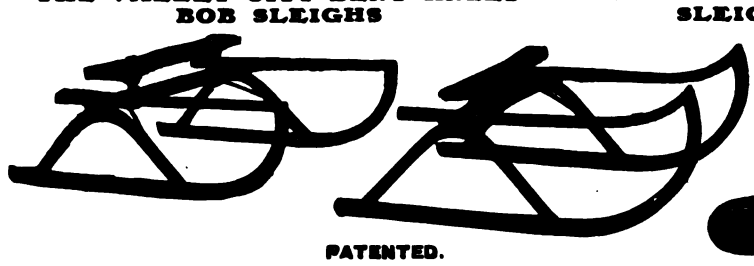




Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE COCEL MFG. CO., TOLEDO, OHIO.

THE VALLEY CITY BENT KNEES BOB SLEIGHS

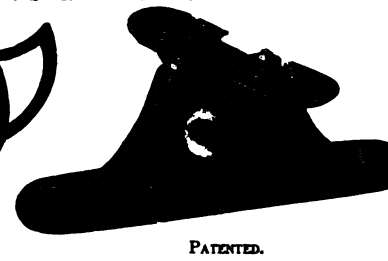


PATENTED.

For pleasure, delivery, express, grocery, or, in fact, any work where a light, strong sleigh is needed.
The strongest, neatest and best Bobs made in the world, in three sizes, for 1¼, 1¼ and 1½ shoes. These Bobs are all ironed except draw irons and shoes.

Write for farther particulars and Price List.

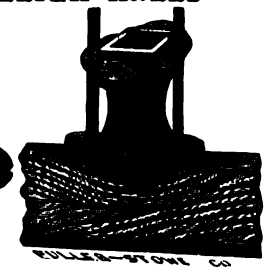
SUCCESS OSCILLATING SLEIGH KNEES



PATENTED.

BEST IN THE WORLD.
TRY SAMPLE SET.
For farm, road, and lumbering Bobs. Made in sizes 1¼, 1¾, 2, 2¼, 3 and 3½ runners.

BROWN'S OSCILLATING SLEIGH KNEES



These knees need no recommendation, having been on the market a number of years. They give perfect satisfaction. Sizes, 1¼, 1¼, 1¼, 2, 2¼, 3, 3½.

SHERWOOD HALL CO., Ltd., Manufacturers, Grand Rapids, Mich.

THE ARMSTRONG MFG. COMPANY
BRIDGEPORT CONN., U.S.A. **NEW YORK OFFICE 248 CANAL STREET**

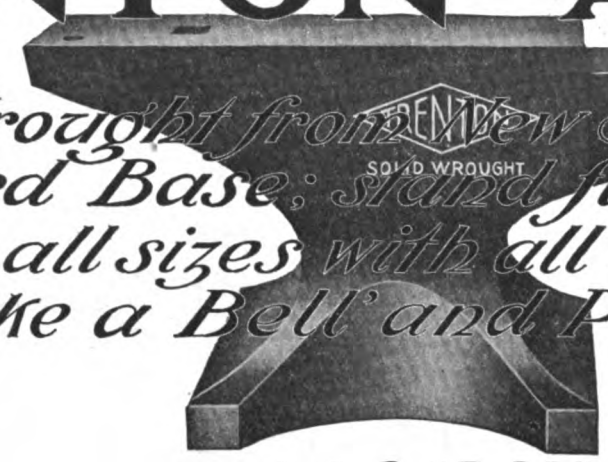
like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



"Makers of the Genuine ARMSTRONG Stocks and Dies."

Digitized by Google

TRENTON ANVILS



Solid Wrought from New Steel; not cast.
Recessed Base; stand firmly on the block
Made in all sizes with all desirable Clips.
Ring like a Bell and Perfect in Shape.

BOKER CUTLERY & HARDWARE CO., Inc., Sole Sales Agents,
101-103 Duane Street, New York City

THE COLUMBUS FORGE & IRON CO. COLUMBUS, O.



JUST PUBLISHED

AUTOMOBILE WELDING

WITH THE OXY-ACETYLENE FLAME

By M. KEITH DUNHAM

167 Pages — **Price $1.00** — Fully Illustrated

Sent Postpaid to Any Part of the World.

This is the only complete book on the "Why" and "How" of Welding.

EXPLAINS in a simple manner apparatus to be used, its care, and how to construct necessary shop equipment. Proceeds then to the actual welding of all automobile parts, in a manner understandable by everyone.

Gives principles never to be forgotten. Aluminum, cast iron, steel, copper, brass, bronze and malleable iron are fully treated, as well as a clear explanation of the proper manner to burn the carbon out of the combustion head.

AUTOMOBILE OWNERS. GARAGE AND SERVICE STATIONS, BLACKSMITHS AND MACHINE SHOPS, as well as industries using the oxy-acetylene flame, will find this book of the utmost value, since the perplexing problems arising when metal is heated to a melting point are fully explained and the proper methods to overcome them shown.

CONTENTS

CHAPTER I.—APPARATUS KNOWLEDGE.
Oxygen Supply—Care of Oxygen Cylinder—Acetylene Generator—Care of Generator—Regulators—Care of Regulators—Creeping Regulators—Gauges—Care of Gauges—Welding Torch—Care of Welding Torch—Effects of Heat—Hose and Goggles.

CHAPTER II.—SHOP EQUIPMENT AND INITIAL PROCEDURE.
Preheating Agencies—Welding Table—Location of Welding Outfit—Starting the Welding Outfit—Adjustment of Flame—Principle of Welding—General Welding Knowledge—Welding Rods and Fluxes—Choice of Tip—Expansion and Contraction.

CHAPTER III.—CAST IRON.
Simple Welding—How to Hold the Flame—Hard Cast Iron—Pin Holes and Blow Holes—Lug on Cylinder—Water Outlet—Cylinder Welding—Compression Head—Finishing and Testing—Scored Cylinders—Cylinder Parts—Fly Wheels—Pistons—Crank Cases—Babbitted Bearings—Valve Guides—Preserving Threads—Conclusion of Cast Iron.

CHAPTER IV.—ALUMINUM.
Use of—Welding Knowledge—Puddle System—Flux System—Comparison of Systems—Welding Rod—Preparation of the Weld—Inlet Manifold—Arm of Crank Case—Welding the Arm Without Taking Out the Motor—Break in the Body of Case Welding Cold—Wrong Method of Setting Up—Lug or Boss Welding—Preheating the Case—Gas Preheating Flame—One Side or Both—Collapse of Weld—Broken Bearings—Direction of Welding—Shrinkage Cracks—Missing Parts—Finishing—Die Mould Castings—Body—Other Parts.

CHAPTER V.—STEEL
Welding Knowledge—What the Flame Does to Steel—The Welding Rod—Simple Welding—Position of Flame—Reinforcing the Weld—Frame Welding—Lengthening the Chassis—Tube Housings—Worn Parts—Gear Welding—Case Hardening—Light Metal Welding—Gasoline Tank—Welding Adjacent to Rivets—Shaft Welding—Construction of Parts.

CHAPTER VI.—MALLEABLE IRON, COPPER, BRASS, BRONZE.
How to Detect Malleable Iron—Brazing Malleable Iron—Real Housing—Reinforcing the Braze—Brazing Tube to Housing—Building Up Worn Parts—Copper—Brass and Bronze—Silver Soldering.

CHAPTER VII.—CARBON BURNING AND OTHER USES OF OXYGEN AND ACETYLENE.
Principle of Carbon Burning—Method of Operation—Lead Burning—Soldering—Case Hardening—Heating Uses.

CHAPTER VIII.—HOW TO FIGURE COST OF WELDING.
Oxygen Consumption—Dissolved Acetylene Consumption—Torch Consumption Test—Acetylene Generator Consumption—Cost Card—Conclusion.

ADDRESS ALL ORDERS TO

M. T. RICHARDSON COMPANY, 71-73 Murray St., NEW YORK

THE SCREW-CUTTING LATHE

How to select, set up, adjust and operate

By JAMES F. HOBART, M. E.

THIS book is a concise and exhaustive treatise on everything pertaining to the SCREW-CUTTING LATHE, including costs, erection, operation and adaptability. It is written by one who thoroughly understands his subject in all its details, and is so copiously illustrated that everything in it will be readily understood.

It will be found invaluable to those desiring to know just how a Screw-Cutting Lathe should be run.

There are ***92 illustrations,*** and the book is substantially bound in cloth. ***Price, $2.00.*** A copy will be sent postage prepaid to any address on receipt of price.

M. T. RICHARDSON CO.
PUBLISHERS
71-73 Murray St., New York

916 Pages instead of 824 — **1919 - EIGHTH EDITION** — 3362 Illustrations instead of 2000

$3.82 prepaid — ## DYKE'S AUTO ENCYCLOPEDIA — $3.82 prepaid

Entirely re-written, hundreds of illustrations and many new subjects added. Practically a new book. A non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 50 Instructions—Simplified and Practical.

3362 Illustrations—the kind you understand at a glance.

2 Supplements, part printed in two colors, treating on the construction, operation, repairing and adjusting of the FORD and PACKARD—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.

778 illustrations and 279 pages on Electric Ignition, Electric Starters and Generators, etc.

51 pages and 79 illustrations on the Delco system alone.

60 pages and 254 illustrations on Adjustments, Tests, etc., of leading Electric Systems.

154 pages and 1189 illustrations on Repairing.

Oxy-Acetylene welding. Axle, Differential and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.

27 pages and 180 illustrations on Tires and Tire Repairing.

44 pages and 119 illustrations on Carburetion.

89 pages and 291 illustrations on Engines and Parts.

16 pages on Digest of Troubles.

6000 lines to the Index. This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. Index begins on colored paper, easy to refer to.

Dictionary is also included, which gives the meaning of motoring terms.

Inserts: There are five—printed in colors. New features you never before saw or heard of in one of the inserts.

Additions to the Eighth Edition:

TRUCKS, TRACTORS, MOTORCYCLES, AIRPLANES AND AIRPLANE ENGINES

HOW TO BECOME AN EXPERT AUTOMOBILE MECHANICIAN

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion subject so thoroughly, you can adjust any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

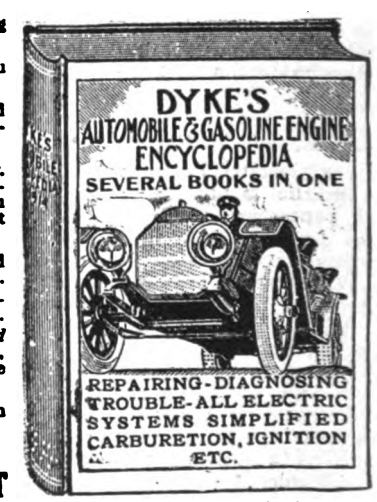
You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical Automobile book in America. Price $3.82, prepaid.

Address all orders to

THE BLACKSMITH & WHEELWRIGHT
73 MURRAY STREET NEW YORK



It's worth ten times its cost if only placed on the shelf and used as a reference.

Digitized by Google

FOCUS YOUR EYE ON THIS MACHINE!

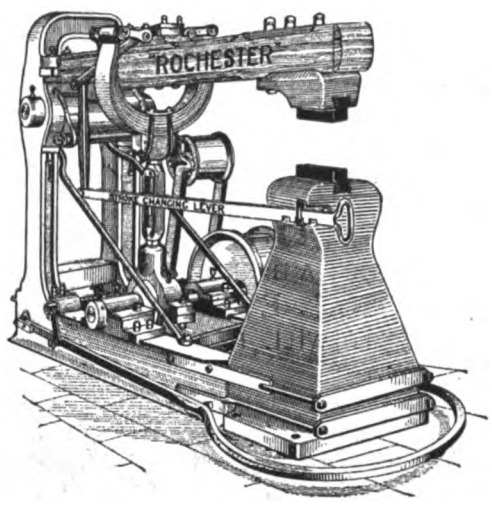
These Helve Hammers are made in six sizes–Two styles of Frames. There is one for you. *Therefore,* do as they're all doing,—install a

Rochester Helve Hammer

THE SUPERIOR TOOL

You can't afford to be without it. Get the Helve Hammer Book and be convinced.

6 SIZES
2 Styles of Frames



WEST HYDRAULIC TIRE SETTERS

SEND A CARD TO THIS ADDRESS FOR OUR CATALOGUE AND PRICES

WEST TIRE SETTER CO.
ROCHESTER, NEW YORK

Advertising Rates in The Blacksmith and Wheelwright made known on application.

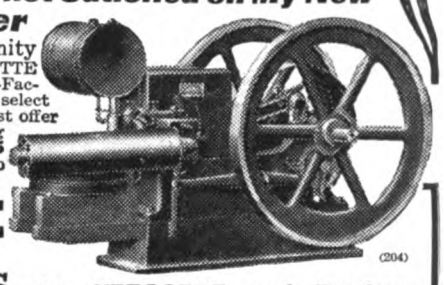


DIRECT TO YOU *from* WITTE

Money Back if not Satisfied on My New 90-Day Offer

Don't miss this opportunity to get a High-Grade WITTE Engine at a Direct-From-Factory price. Before you select **any** engine, get my latest offer and new book showing how I can save you **$15 to $200** on engines 2 to 30 Horse-Power.

Get My New Factory Offer ALL CASH PART CASH OR NO CASH as arranged for



(204)

WITTE KEROSENE ENGINES Use KEROSENE and Produce Power at Lowest Cost

90 Days to Decide

Sensible 5-year guarantee protects you against **defect** of material or workmanship — the **quantity** of fuel required and the **horse-power** of your engine. 32 years of success building engines **exclusively** is **best proof** that you should own a WITTE. I cannot begin to tell you everything in this ad, but **I can tell you why** the WITTE is **better** if you will send me your name and address. **Do this today.**



Write For My New FREE Book

"HOW TO JUDGE ENGINES"—The greatest of all engine books—the **best** illustrated and printed—the most **widely** read, most **talked** about, and most extensively **copied.** Be sure to read this original, instructive, valuable and **true engine factory book.** It will open your eyes and **save you money.** Send postal card or coupon.—ED. H. WITTE, Pres.

WITTE ENGINE WORKS,
2442 Oakland Ave., Kansas City, Mo.
2442 Empire Bldg. Pittsburgh, Pa.

Just Send Name and Address
Before you decide on any make of engine be sure to get my latest and best factory book mailed FREE.
Name.....
Town.....
State.....
R.F.D.....

Edwards Shears

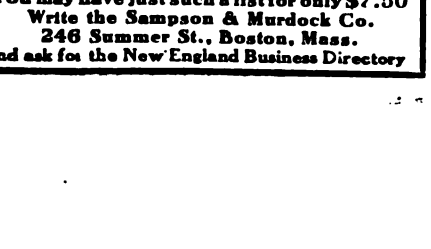
For twenty-four years the **Two Leading Low Priced Shears** in the U. S., representing the **Greatest Value** for the **Least Money.**

No. 5, weighs 200 lbs., cuts 4x½ inch soft steel.
No. 10, weighs 430 lbs., cuts 4x¾ inch soft steel.

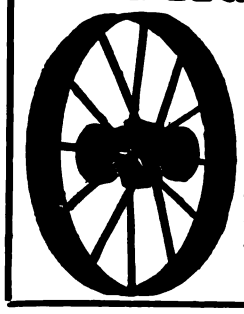
At their price you should have had one long ago. **Order one** from the first iron man that calls on you. **They All Sell Them.**

Write for descriptive circular and prices.

C. D. EDWARDS MFG. CO.
Albert Lea, Minn.



EMPIRE STEEL WHEELS



Plain or Grooved Tire To Fit Any Wagon.

FARM TRUCKS
All Standard Types

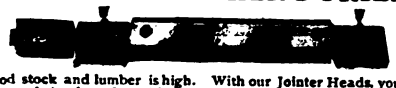
Write today for Proposition to Blacksmiths

EMPIRE MFG. CO.
P. O. B. 209
QUINCY, ILL.

PATENTS

C. L. PARKER
Ex-Member Examining Corps, U. S. Patent Office
Attorney-at-Law and Solicitor of Patents
American and foreign Patents secured. Trade marks registered. Searches made to determine patentability, validity and infringement. Patent suits conducted. Pamphlet of instructions sent upon request.
McGill Building WASHINGTON, D. C.

THE WOOD WORKER'S FRIEND



Wood stock and lumber is high. With our Jointer Heads you can buy rough lumber of any kind and dress it to suit your job. Saves time, money and lumber. Would this be any object to you? If so, get circulars and prices. Sold on 30 days' trial. Mfd. by
Whisler Mfg. Co., Gibson, Iowa

"GEARS AND WAGONS"

Selle Gears Forty years of success has placed **"Selle Gears"** and Wagons in the hands of the largest wagon users in the world. Express and Transfer Companies, Department Stores, etc., specify **"Selle Gears"** and will take no other after once tried. **230 Page Catalog Free.**
THE AKRON-SELLE CO. Akron, Ohio

ATTENTION, BLACKSMITHS!

BE SURE IT'S A SUPERIOR Welding and Cutting Outfit you purchase. ACETYLENE GENERATORS. Welding Supplies. Price Popular. Service Immediate. Quality Superior. Write for catalog and price list.
Agents wanted.
SUPERIOR OXY-ACETYLENE MACHINE CO.
Manufacturers of Everything for the Welder
HAMILTON, OHIO

What is it worth to you to have a correct list of over 300,000 Business Firms in New England?
You may have just such a list for only $7.50
Write the Sampson & Murdock Co.
246 Summer St., Boston, Mass.
and ask for the New England Business Directory

YOU CAN COUNT ON EVERY GIANT GRIP



1. Faultless Shanks. 2. Correct Blades. 3. Perfectly Tempered. 4. Uniform Size. 5. Sturdily Reinforced.

The Quality Is Uniform

Quality is moulded in every Giant Grip Shoe and Calk. And the quality is uniform. The closest inspection is given every Giant Grip Shoe and Calk, and if it doesn't measure up to our requirements, it never leaves our plant.

This uniform quality means much to you. It is this dependability that satisfies customers and brings them back.

The Winter rush is on and Giant Grips are in big demand.

Write for catalog and prices

Giant Grip Horse Shoe Company
Oshkosh - - Wisconsin

Digitized by Google

WAGON BUILDING

"Build me a wagon that will last forever."

"Sorry, Sir, but 'axle troubles' (due to wear—wear on the spindle, or on the box, or both) make it impossible."

You've often received a specification like that and been obliged to give that answer—haven't you?

The Sheldon "TON-DON"—an axle that will not wear, run hot or break—allows your meeting the requirements of the man who wants a wagon to last forever, **and we have told him so.**

The Sheldon "TON-DON" was originally made for buggies and carriages. Its success was so instantaneous and pronounced that we were deluged with requests for an axle embodying the same principle for use on Delivery, on Business and on Express Wagons.

Hence, the "TON-DON" CONCORD EXPRESS.
In EFFICIENCY—The HIGHEST.
In CONSTRUCTION—The SIMPLEST.
In SERVICE—The MOST SATISFACTORY.

The Spindle of the Sheldon Ton-Don Axle

Ordinary axles wear flat on the bottom of the spindle because the bottom side is the point of contact and where the wear of the spindle is concentrated. It takes a spindle of unusual hardness to resist this wear—greater hardness than any ordinary axle affords. The spindle of the "TON-DON" is hardened by a special process, producing a wearing surface of such hardness that a fine file makes no impression on it—yet the center remains soft or "natural."

The Phosphor-Bronze Lined Box

The peculiarity of this box lining is that while somewhat softer than the spindle, there is no perceptible wear after thousands of miles of running, but becomes harder and more wear-resisting with use.

Phosphor-Bronze (of a mixture which increases its toughness, smoothness under friction, and wear-resisting qualities) is a metal used for making the propellers of ocean steamships, bearings for locomotives, crank-shaft bearings for automobiles and other fine machinery. Imagine what a metal must be to meet such conditions, and you will grasp the advantages of applying such metal to axle purposes.

THESE AXLES CARRIED IN STOCK BY THE FOLLOWING JOBBERS AND CAN BE OBTAINED AT MANUFACTURERS' PRICES.

Baltimore, Md. ..... E. Scott Payne Co.	Providence, R. I. .. Congdon & Carpenter Co.
Boston, Mass. ..... E. P. Sanderson Co.	Rochester, N. Y. ..... Burke Iron & Steel Co.
Buffalo, N. Y. ..... H. D. Taylor Co.	San Francisco, Cal. .... Waterhouse & Lester Co.
Chicago, Ill. ..... E. D. Kimball Co.	Scranton, Pa. ..... Bittenbender & Co.
Cincinnati, O. ..... G. B. Schulte Sons Co.	Seattle, Wash. ..... Gray Bros. Co.
Indianapolis, Ind. ..... W. J. Holliday & Co.	Springfield, Mass. ..... Chas. C. Lewis & Co.
Los Angeles, Cal. ..... Percival Iron Co.	St. Louis, Mo. ..... Sligo Iron Store Co.
Milwaukee, Wis. .. Shadbolt & Boyd Iron Co.	Washington, D. C. ..... Louis Hartig
Pittsburgh, Pa. ..... McLean & McGinness	Wilmington, Del. .... Delaware Hardware Co.
Portland, Oregon ..... J. E. Haseltine & Co.	Bridgeport, Conn. ..... Chapman & Bangs Co.
Ft. Wayne, Ind. ..... Mossman, Yarnelle & Co.	San Antonio, Texas .. Heusinger Hardware Co.
New Orleans, La. ..... Jos. Schwartz & Co.	

SHELDON

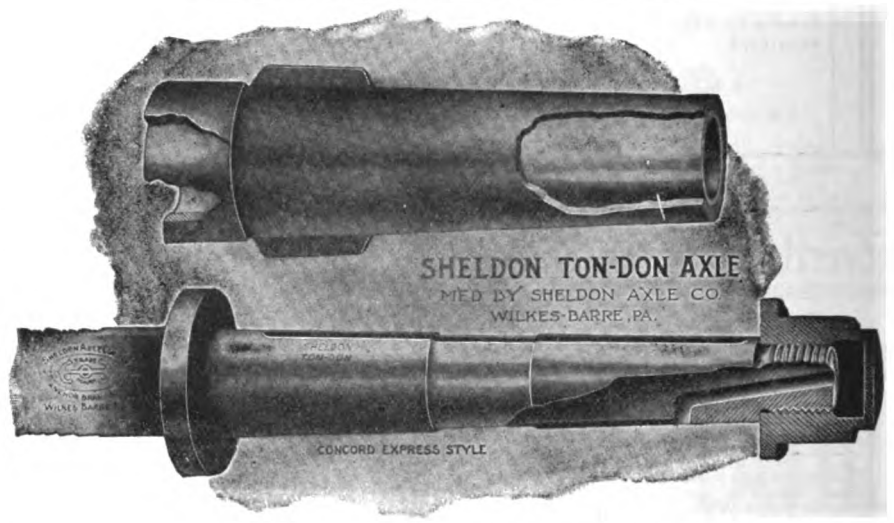
"TON-DON"

CONCORD EXPRESS STYLE

NOT A BALL OR ROLLER BEARING—BUT

ANTI-FRICTION—EVERLASTING—INTERCHANGEABLE

IT WILL NOT CUT, HEAT OR STICK

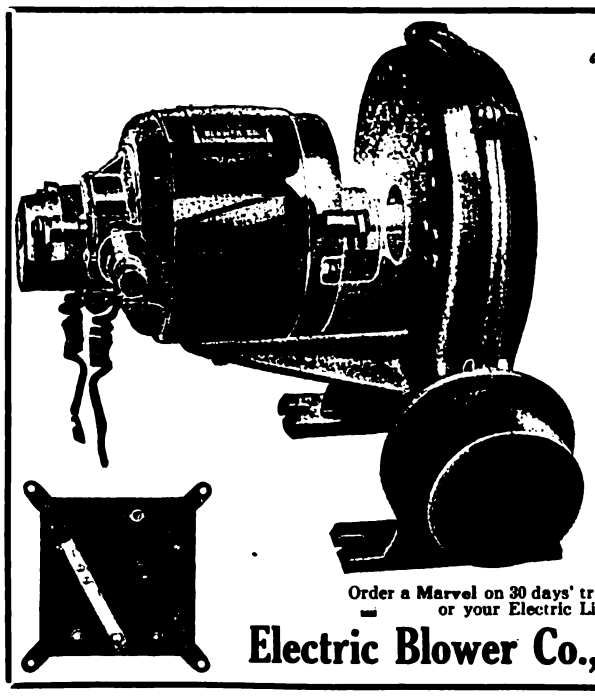


NOTICE THE PATENTED OILING DEVICE
HAS ALL THE ADVANTAGES OF FRICTION AND ANTI-FRICTION AXLES
WITHOUT THEIR DISADVANTAGES
"TON-DON" MEANS KNOWN QUALITY WITHOUT FANCY PRICE

MADE ALSO FOR BUGGIES AND SURRIES

SHELDON AXLE & SPRING CO.,
WILKES-BARRE, PA.

LARGEST AXLE FACTORY IN THE WORLD.



"One Fire" Marvel

A. C. or D. C.
or
UNIVERSAL MOTORS

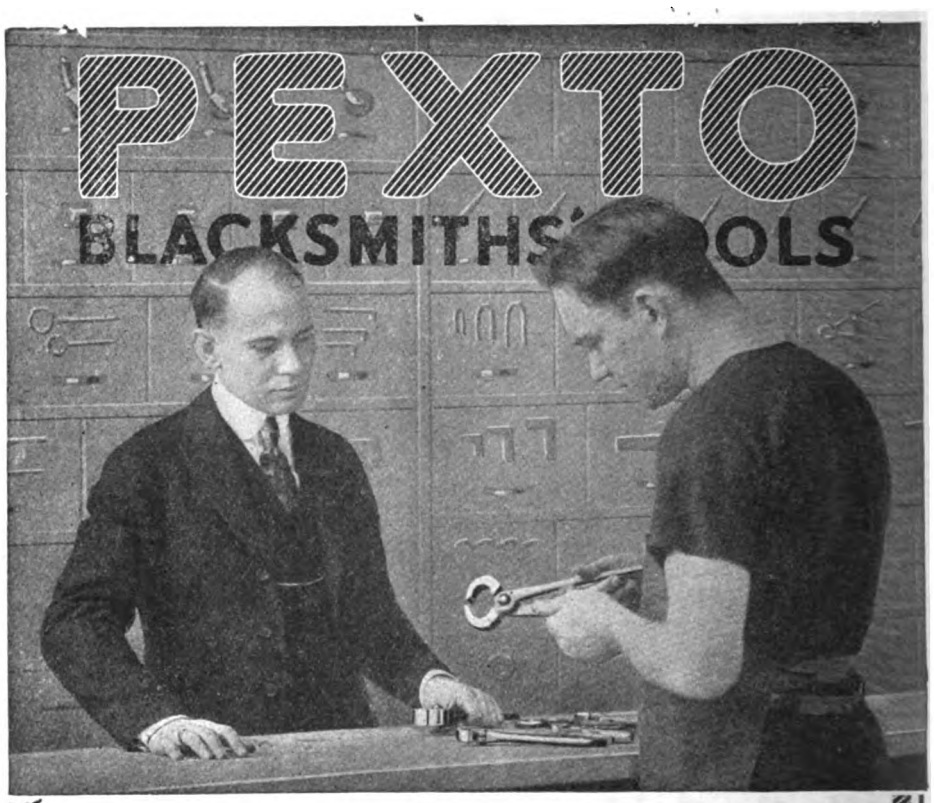
Extra Large Ring Oil Bearings

Case Hardened Armature Shaft

$38.00 Net

Order a Marvel on 30 days' trial through your Dealer, or your Electric Light Company

Electric Blower Co.,
352 Atlantic Avenue BOSTON, MASS.



How Can You Tell?

You're buying a pair of shoeing pincers or hoof parers and the salesman spreads out an assortment of different kinds on the counter. How can you tell which is the best buy?

Appearances are not a safe guide, for poor tools often masquerade behind a handsome exterior.

Price is not a safe guide, for inferior tools often cost you more than good ones.

But there is a safe guide, and that is to know who made the tool.

When the salesman says "This is a pair of PEXTO Shoeing Pincers" or "PEXTO Hoof Parers," you know that they have been made by a responsible concern with 100 years of tool-making experience and with a reputation for the excellence of its product.

Buy tools by name and see that the name is Pexto. If your dealer can't supply you, write us.

The Peck, Stow & Wilcox Co.

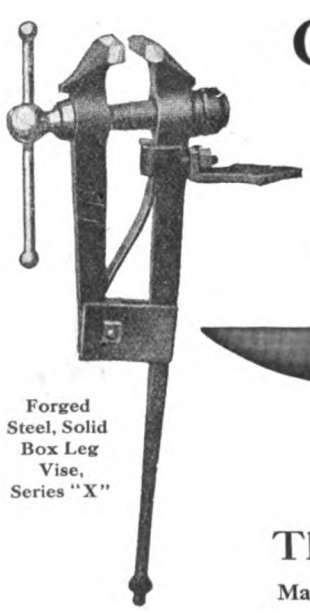
PEXTO Mfrs. Mechanics' Hand Tools, Tinsmiths' and Sheet Metal Workers' Tools and Machines, Builders' and General Hardware.

Southington, Conn. **Cleveland, Ohio**

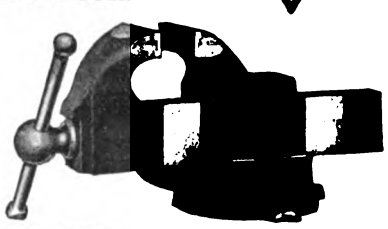
Address correspondence to
209 W. Center St., Southington, Conn.

Columbian

Vises and Anvils



Forged Steel, Solid Box Leg Vise, Series "X"



Malleable Iron, Series 600



Standard Weldless One-Piece Anvil

The Columbian Hardware Co.

Manufacturers — **Cleveland, Ohio**

Digitized by Google

NEW YORK PUBLIC LIBRARY 1919

ESTABLISHED 1880 — The Pioneer Journal of its Class

THE BLACKSMITH & WHEELWRIGHT

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U. S. Patent Office.

Entered as Second-class Matter March 4, 1880, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Published Monthly.

Vol. LXXIX. No. 2 — NEW YORK, FEBRUARY, 1919 — TERMS: One Dollar a Year. Foreign, $1.50. (6s. 3d.)

The Capewell Calendar
For 1919

Sent free to all parts of the world.

Many thousands have been mailed. If your copy has not arrived and you care for one, just send your request on a postal card. It will be mailed promptly.

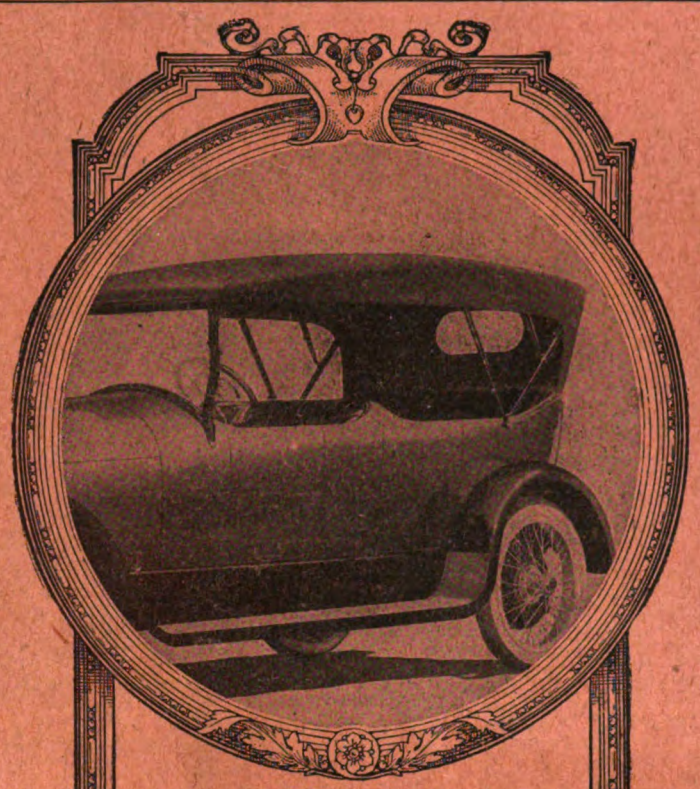
The size of the Calendar is 9" x 16" and is printed in five colors.

"The Capewell"



Easiest Horse Nail to Drive

The Capewell Horse Nail Co.
Hartford, Conn.
Leading Horse Nail Makers of the World



CHASE
DREDNAUT
Motor
Topping

"Defies Time and the Elements"

Write for Particulars — L. C. CHASE & CO., BOSTON — NEW YORK DETROIT SAN FRANCISCO CHICAGO — Write for Samples



HORSESHOES
In Stock
Ask for Stock List

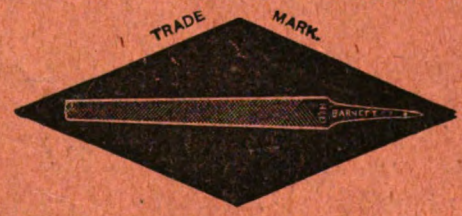


ROWE CALKS
Screw and Drive
ROWE CALK & CHAIN CO.
Plantsville, Conn.

STEEL STAMPS
LETTERS and FIGURES
For Marking Your Tools and Your Product
NAME PLATES OF ALL KINDS
S. D. CHILDS & CO.
DEPT. 2
136 S. CLARK ST. CHICAGO

THE TEETH IN
BLACK DIAMOND RASPS
ARE MINGLED
So as to Cut Clean and Free and Leave no Furrows in the Work

Twelve Medals of Award by Jurors



At International Expositions

C. & H. BARNETT COMPANY
Black Diamond File Works, PHILADELPHIA, PA.
Owned and Operated by NICHOLSON FILE CO.
Copy of Catalog sent Free to any interested file users upon application.

SEND US YOUR NAME
and Address and you'll get information worth while regarding this splendid Shear and Punch.



THE MARVEL
A Double Lever Machine.
One man does all the machine is capable of and he faces his work all the time.
ARMSTRONG-BLUM MFG. CO.
340 N. FRANCISCO AVE., CHICAGO, ILL.

NOW Cheaper Power
OTTAWA Kerosene Gasoline ENGINES
90-Day Trial
10-Year Guarantee
You get more power from a gallon of 12 cent Kerosene than from a gallon of 25 or 35 cent gasoline in any gasoline engine. No cranking, no batteries. Easy to start. Easy to operate. All Sizes and Styles, 1½ H-P. to 22 H-P.
Free Book Before you arrange to try any engine, read my latest and finest 3-color book. Tells all what you want to know about engines. Written so you can understand it. Write for low prices now.
OTTAWA MFG. CO.
1786 King St. Ottawa, Kans.

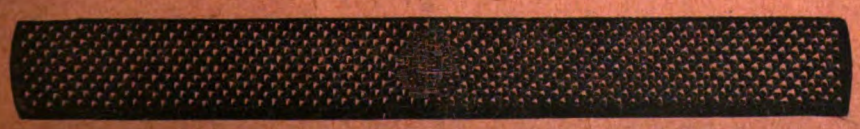


AETNA STEEL TOE CALKS
Made by THE AETNA NUT CO., Southington, Conn.
BLACK HORSE BRAND
BEST SHAPE
BEST SPUR TO DRIVE
BEST STEEL



TOE AND HEEL CALKS
SOLD BY ALL DEALERS

Stokes Bros.' Improved Horse Rasps
Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A

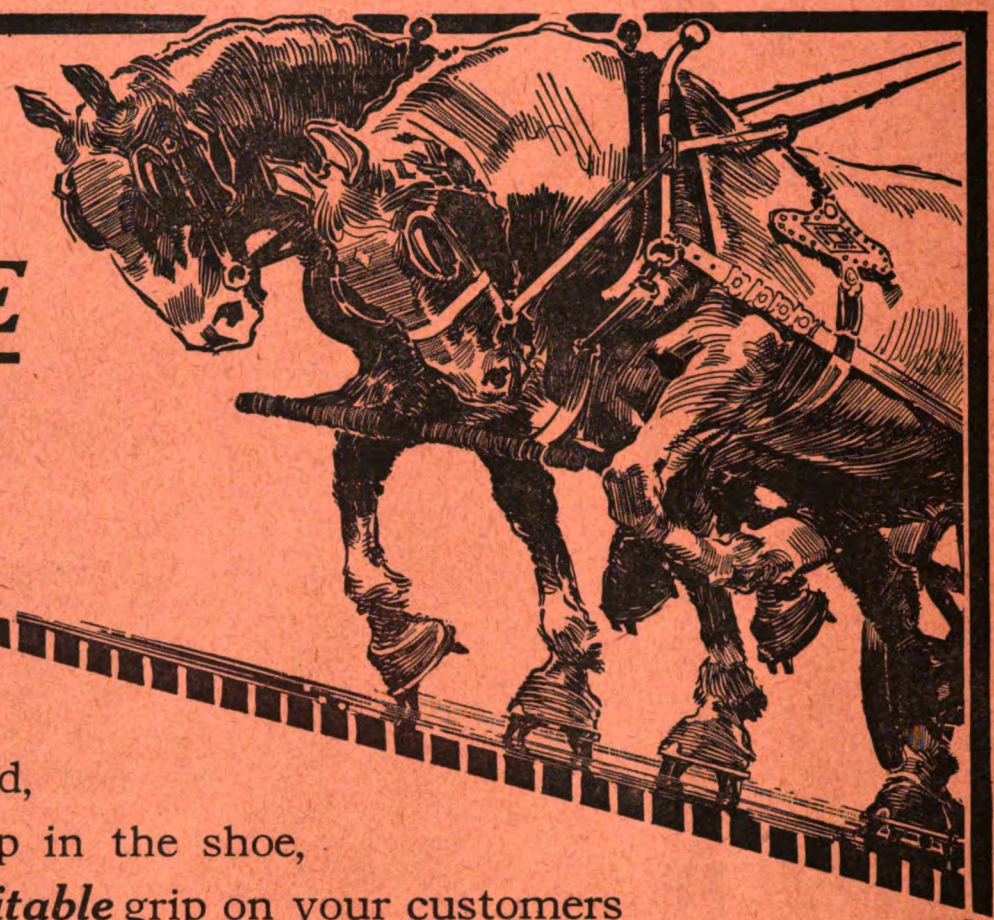
STEEL STAMPS
BURNING BRANDS
RUBBER STAMPS
STENCILS
C. M. NESS, JR.
61 F ST. NEW YORK
Send for price list.



SUREGRIP CALKS
American Calk Co.
DETROIT, - - MICH.

Digitized by Google

A SURE GRIP



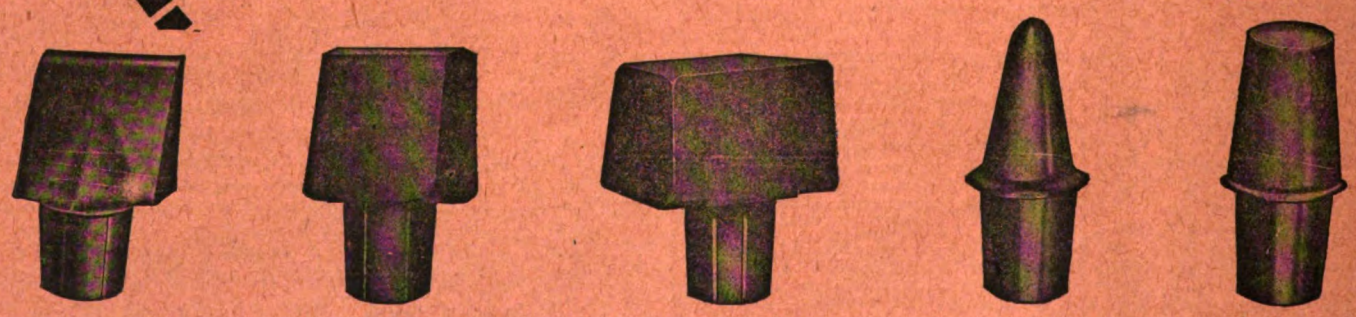
on the road,
a ***tight*** grip in the shoe,
and a ***profitable*** grip on your customers
are assured by using

DIAMOND CALKS

because they're made of the hardest and toughest steel. Longest wearing, and don't break off. Scientifically shaped. Absolutely tight fitting and won't twist in the shoe or fall out.

Made in five shapes and with varying sized blades.
There's a Diamond Calk for every purpose.
Retailed only through horseshoers.
Ask for new illustrated price list.

DIAMOND CALK HORSESHOE CO.,
DULUTH, MINN.



Digitized by Google

"F-S" PAINTS



A Good Reputation is an Asset. Everyone Speaks Well of "F-S" Products

"F-S" Carriage and Automobile Top Dressing makes old tops look like new and turns water like "a duck's back." Easily applied—dries quickly — won't crack — can't injure leather. Try it on the next job.

FELTON, SIBLEY & CO., Inc.

Manufacturers of Colors, Paints, Varnishes since 1863

136-140 North Fourth Street, Philadelphia

(146)

Don't Send a Penny

These Len-Mort work and outdoor shoes are such wonderful value that we gladly send them, **no money down.** You will find them so well-made and so stylish and such a big money saving bargain that you will surely keep them. So don't hesitate. Just fill out and mail the coupon. We will send a pair of your size. No need for you to pay higher prices when you can buy direct from us—and know what you are getting before you pay even a penny. Why pay out $5.00 and $6.00 for shoes not near so good? Act now. Mail the coupon today while this special offer holds good.

Great Shoe Offer

We can't tell you enough about these shoes here. This shoe is built to meet the demand of an outdoor city workers' shoe as well as for the modern farmer. Send and see for yourself what they are. Built on stylish lace Blucher last. The special tanning process makes the leather proof against the acid in milk, manure, soil, gasoline, etc. They outwear 3 ordinary pairs of shoes. Your choice of wide, medium or narrow. Very flexible, soft and easy on the feet. Made by a special process which leaves all the "life" in the leather and gives it wonderful wear-resisting quality. Double leather soles and heels. Dirt and waterproof tongue. Heavy chrome leather tops. Just slip them on and see if they are not the most comfortable, easiest, most wonderful shoes you ever wore. Pay $3.85 for shoes on only $3.85 arrival. If, after careful examination, you don't find them all you expect, send them back and we will return your money. No obligation on you. This is at our risk, not yours.



Send →

Only the coupon—no money. That brings these splendid shoes to you. You are to be the judge of quality, style and value. Keep them only if satisfactory in every way. Be sure to give size and width. Mail the coupon now. Order by No. X15012.

Leonard-Morton & Co.
Dept X 7035 Chicago

Leonard-Morton & Co.
Dept. X 7035 Chicago

Send the Len-Mort Shoes No. X15012. I will pay $3.85 for shoes on arrival, and examine them carefully. If I am not satisfied, will send them back and you will refund my money.

Size.....Width.....

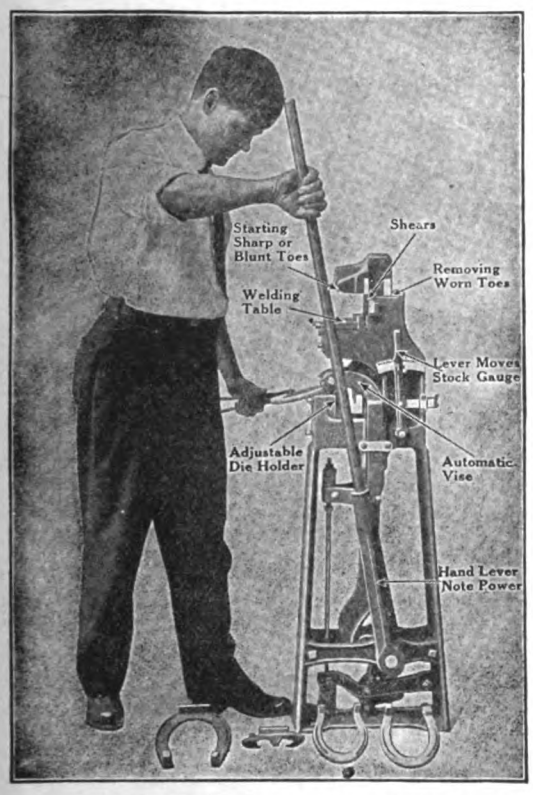
Name.....

Age.....Married or single.....

Address.....

1919 MODEL
THE L. S. P. CALKING MACHINE

The Greatest Time and Labor Saving Machine On Earth



1919 MODEL—Fully covered with Patents

OUR 1919 Model is the same as our 1918. We agree with the users and so would you, that it cannot be improved.

Do not mistake this for a machine which makes toe calks or a foot vise. This machine is for turning heel calks, both Blunt and Sharp, sticking and welding toe calks, clipping and trimming ends of shoes. IT CALKS SHOES, doing the work just the same as you do by hand with the hammer, only it is done much better and easier, and in a fraction of the time.

In turning heels, you can turn up just as much stock as you wish, upset or stoveup to make as heavy as you like and square up the calks without use of hammer. There is no losing of toes when you weld on the L. S. P.

It is a strong, handsome, well made machine and will last, as you might say, a life time, fully warranted for one year. It is in use in the best shops in the United States, users claiming more for it than we do.

Write at once for full information and prices.

L. S. P. CALKING MACHINE CO.

P. O. Box 225 **WYALUSING, PA., U. S. A.**

NATIONAL MACHINE CO., Brighton, Ontario, Canada



Bringing Down the Vulture

American mechanical genius and America's workers and fighters have clipped the Raider's wings. Now in Peace—we have a World to be remade.

Nicholson Files

contributed greatly to our waging of aggressive American warfare. Great in war, they are as great in peace—the World's Smoothest Cutting Files—a file for every purpose.

Write for File Filosophy—a fifty-years' education in Files and Filing in an hour's reading.

NICHOLSON FILE COMPANY

Providence, Rhode Island, U. S. A.

Digitized by Google

UNIFORMITY

SHELDON AXLES AND SPRINGS

HAVE LONG BEEN

INTERNATIONALLY FAMOUS

For Their Superiority In

DESIGN, MATERIALS and WORKMANSHIP

REASON:

Sheldon Took Guesswork Out of Axle and Spring Manufacturing

which means

UNIFORMITY OF PRODUCT

Sheldon Axle & Spring Co., Wilkes-Barre, Pa.

Higher Prices But Bigger Cash Saving





If you're John Wiseman, you used STANDARD Toe Calks last year and copped the saving.

If you're Bill from Missouri, now is the time to admit that you have been shown.

You make about *twice* the *cash saving* this year that John Wiseman made last year by using STANDARD Toe Calks.

Prices are up on steel products—hence the greater cash saving and the added necessity for saving every cent.

You don't buy the Calk Box. You buy the Calks in the box and there are more Standard Toe Calks in the box. And there's just one quality—THE BEST.



STANDARD TOE CALKS

Buy from your dealer. He can get STANDARD CALKS for you

NO. 1

FRANKLIN STEEL WORKS

Joliet, Ill. Cambridge, Mass.
Hamilton, Ont.

"E-Z" WELDING COMPOUND

is the best **BECAUSE**

- It works Equally good on all Kinds of steel.
- It welds at **lower heat** than any other.
- It **sticks** to metal at a **very low** heat.
- It leaves **no scale.**

USE IT ONCE AND YOU WILL ALWAYS WANT IT

Crescent Welding Compound

MAKES SMOOTHER WELDS THAN ANY OTHER

It is fine for plow work or where parts are fastened together before welding, or for making split welds, finishing heats, or for welding under dies, etc., etc.

CRESCENT WELDING COMPOUND TRADE MARK

It insures smooth finish and perfect welds on Toe Calks.

"Money back" from any jobber if "E-Z" or Crescent does not give perfect results.

We will send samples free of charge.

MADE ONLY BY

Anti-Borax Compound Co.

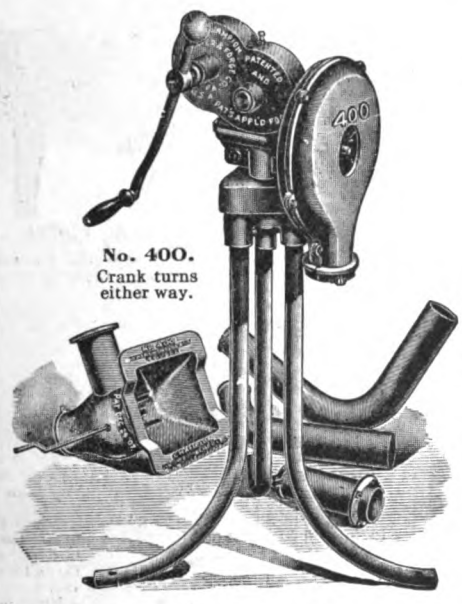
FT. WAYNE, IND.

Digitized by Google

THE FAMOUS CHAMPION BLACKSMITH TOOLS

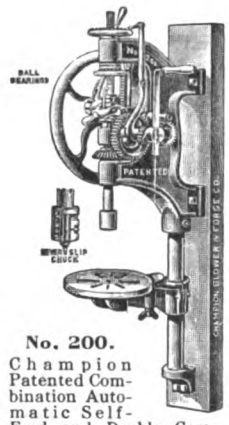
CHAMPION BLACKSMITH TOOLS HELPED TO WIN THE WAR



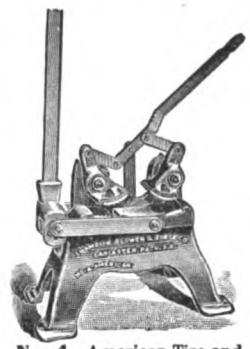


No. 400. Crank turns either way.

FAMOUS 400



No. 200. Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



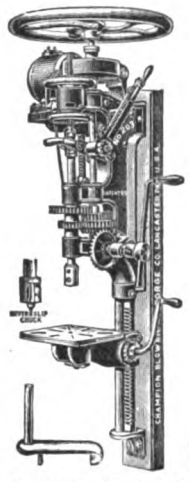
No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



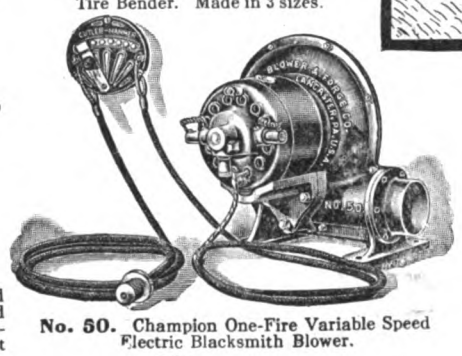
The Champion "Columbian" Tire Bender. Made in 3 sizes.



No. 408. Steel Blacksmith's Forge.



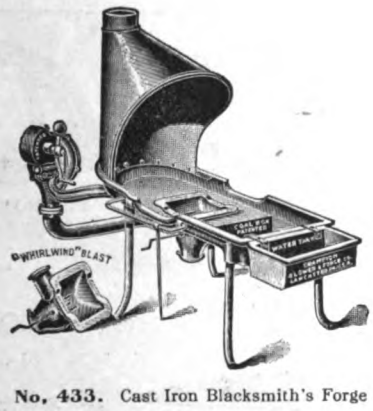
No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.



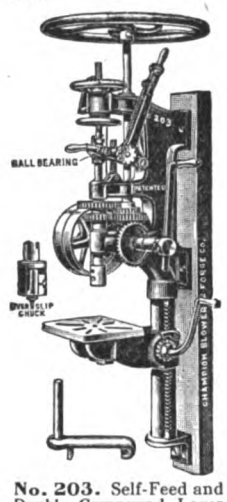
No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower.

Don't Fail to Get Our 1918 Catalog

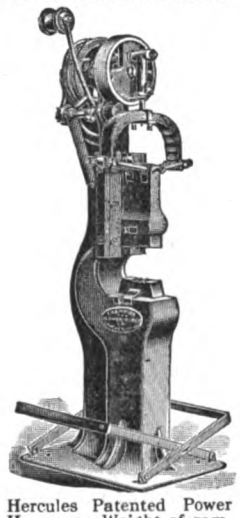
Before purchasing a Hand Blower Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



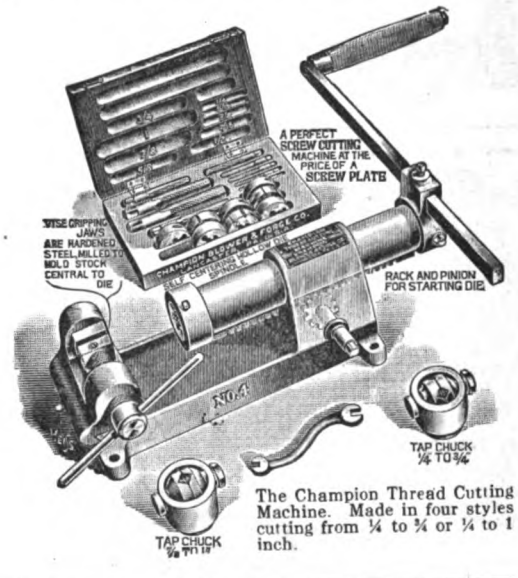
No, 433. Cast Iron Blacksmith's Forge



No. 203. Self-Feed and Double Compound Lever Feed Drill.



Hercules Patented Power Hammer. Weight of ram, 65 pounds.



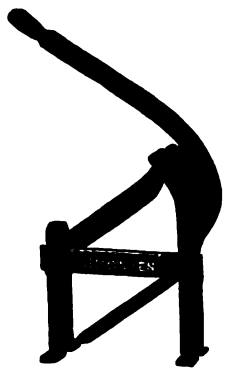
The Champion Thread Cutting Machine. Made in four styles cutting from ¼ to ¾ or ¼ to 1 inch.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

Digitized by Google

THE SIMONSEN HOT TRIMMING SHEAR SAVES ALL THE WORK AND NEARLY ALL THE TIME.



Hot Trimming Shear.

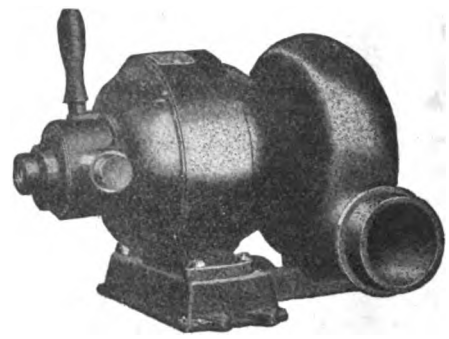
Think of cutting out plow points, or trimming cultivator shovels, etc., without a sledge or helper, and doing a neater job too!

The SIMONSEN HOT TRIMMER is designed especially for hot cutting and in actual saving will pay for itself several times over the first season.

Is made entirely of wrought material and in two sizes. No. 1 cuts hot plow steel 5/16x6. No. 2 cuts hot plow steel 5/16x8. Hold the work with one hand in plain sight and operate shear with the other hand.

Sold by leading jobbers. Write us for free circular and testimonials, mentioning jobber's name when writing.

SIMONSEN IRON WORKS, SIOUX RAPIDS, IOWA



100 OR MORE DIFFERENT SPEEDS IN THE "KAZOO" Variable Speed Blower

Mr. Blacksmith,—Do you know of any other blower that will give these results? The "KAZOO" is made right and stays right. No outside rheostat or resistance—hence you are free of those troubles. It has any desired speed. You stop, start, increase or decrease the speed by simply moving the handle. You actually save current, as it varies with the speed. All enclosed dust-tight, genuine bronze bearings and ABSOLUTELY NOISELESS RING OILERS.

Alternating Current Only

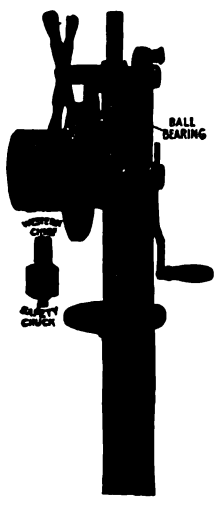
R. P. WARNER ELECTRIC CO., KALAMAZOO, MICHIGAN

The Better Your Equipment The Bigger Your Profits

Buy CANEDY-OTTO

AND INCREASE YOUR INCOME

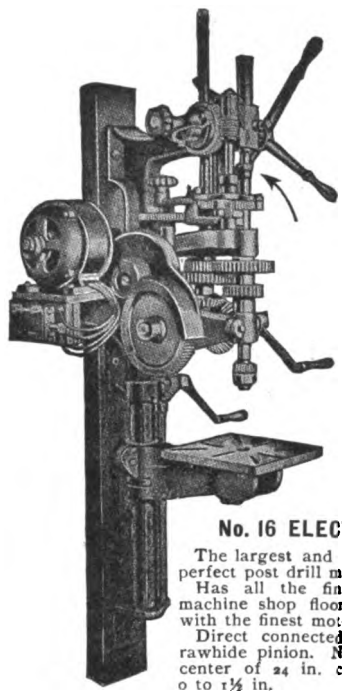
Once Tried, Always Used : There's a Reason—Quality



No. 19 DRILL

A low-priced combined hand and power self-feed drill.

Drills to center of 16½ in. circle.



No. 16 ELECTRIC DRILL

The largest and most mechanically perfect post drill manufactured.

Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.

Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1½ in.

OVER 200 DIFFERENT STYLES

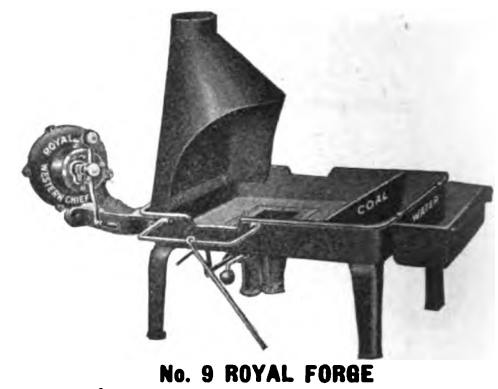
SEND FOR CATALOGUE No. 12



No. 100 ROYAL FORGE

The most popular forge ever made.

Fan, 12 in. Hearth, 31½x45½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x50 in. Blower, 12 in.



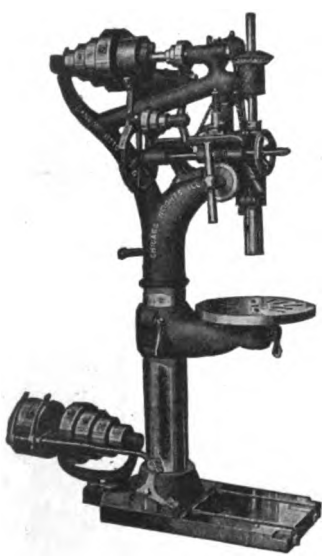
Blower, 12" Wt., 135 lbs. Height, 47"

ROYAL BLOWER

(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.

Fire pot is 8x9 in inside.



No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.

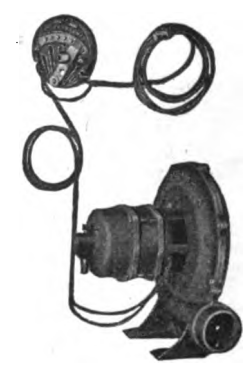
All machines are tested before leaving the factory, and guaranteed in every respect.

Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.



No. 1 1/2 SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



No. 8 ELECTRIC BLOWER

The best outfit money can buy.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

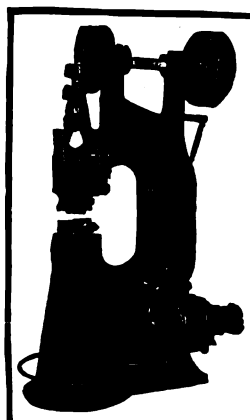
Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS

Little Giant Power Hammers

25, 50, 100, 250 and 500 lb. Models.

BELT OR MOTOR DRIVEN.



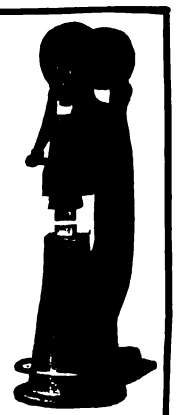
MOTOR DRIVEN

The Boys in Khaki and Sailor Blue Will Be the Farmers of the Future.

Their war equipment has been the most modern, and when they return home the old out-of-date methods will no longer satisfy them.

They will insist on their farm equipment being kept in first class repair and they will take their work to the blacksmith who has up-to-date shop equipment.

No blacksmith shop is modern unless it has a Little Giant Power Hammer. Either of our models will pay for itself in a few months on our easy payment terms, and continue to repay for itself for many years after.



BELT DRIVEN

The first Little Giant Power Hammer made 26 years ago and every one since sold,—some 8,000 in all,—are still in use. There is no wear-out to them.

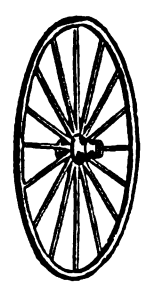
Average annual repair sales on all Little Giant Power Hammers in use, large and small, from oldest to latest, is 48¢ each or less than 2/5 of 1% of original cost to user.

Any Belt Driven Little Giant Power Hammer can be quickly changed to a Motor Driven Outfit. Ask your power plant superintendent for current, voltage, phase and cycles of motor required. Send this information to us and we will quote prices.

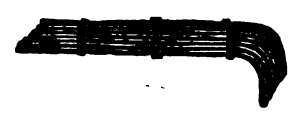
Little Giant Power Hammers are guaranteed FOREVER against defective material and workmanship, and are shipped on 30 days' trial.

Write Your Jobber, or Direct To Us

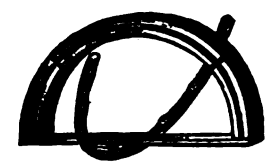
Little Giant Company, Established 1876. **103 Rock Street, MANKATO, MINN., U. S. A.**



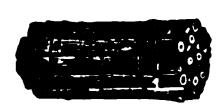
SARVEN WHEELS
$11.90 Per Set and Up



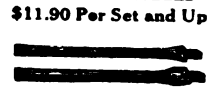
FINISHED BUGGY SHAFTS
$10.00 Per Bundle of 6 Pairs



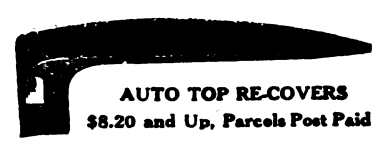
PLAIN HICKORY RIMS
$2.15 Per Set and Up



OAK WAGON SPOKES
$3.65 Per Set and Up.



REPAIR GRADE SARVEN SPOKES
$2.50 Per 100



AUTO TOP RE-COVERS
$8.20 and Up, Parcels Post Paid

Auto Tires

Non Skid

30 x 3½ $14 75

Other Sizes in proportion

Wheel Top & Hardware Co.

Dep't. W2 (Get our Catalogue) **Cincinnati, O.**

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers. ad payable

Digitized by Google

DO IT RIGHT!

Outside of story books, ladders are climbed one step at a time, and one solid step upward doesn't mean that you have skipped half a dozen rungs.

Brooks Welding and Cutting Apparatus

Is Now the Most Important Part of the Tool Equipment in a Metal Working Shop for Both Repairing and Manufacturing

Unless you are sure that your welding equipment affords absolutely full and complete protection to the operator—unless the feed is simple, automatic, very durable and exceedingly constant, you are leaning on a broken reed.

Brooks acetylene welding equipment displaces all the old slip-shod methods and does the work RIGHT!

The real man who buys Brooks equipment isn't shopping for the lowest priced machine—but demands THE BEST—also, he knows Brooks equipment isn't going to be any cheaper tomorrow—he's sure, therefore, that he's buying right.

Brooks Equipment is Bought Because it Works Right

Not because it looks right. Brooks equipment is sold for what it is—not what it pretends to be. The belief that a real sale is made on any other basis is dead so far as Brooks Equipment is concerned.

The brooks Generators are all equipped with the well-known Brooks Flash-Back exhaust safety valve which is located on top of the dry chamber pipe at the side of the generator tank. This flash-back safety valve eliminates all chanches of bursting the dry pipe, if a back-fire should occur from operating the welding or cutting torch. It opens and releases the force the same as the exhaust valve on a gas engine. It is the greatest safety device ever put on an Acetylene Generator.

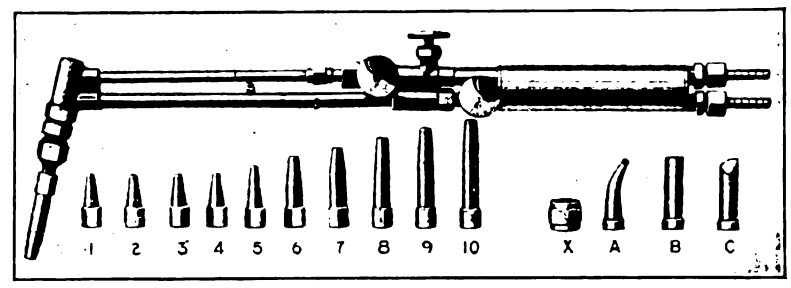
The Brooks Machine Co. manufactures welding and cutting torches, automatic acetylene pressure generators, both portable and stationary. This means complete equipment to take care of any and all kinds of welding and cutting. If you can tell us the nature and quality of your work, we can advise you fully as to the size and kind of equipment to meet your requirements best.

All products manufactured by the Brooks Machine Co. are guaranteed for one year against defective workmanship and to be made of first-class material and to do all we claim for them.

Brooks Portable Automatic Acetylene Generators

25 and 50 lb. Carbide Capacity, with Welding Equipment

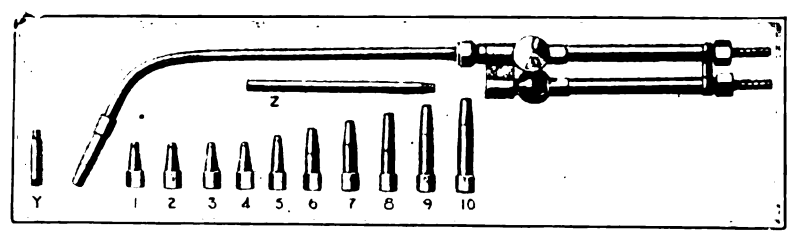




Brooks Universal Welding and Cutting Torch

10 Welding and 3 Cutting Tips

This Torch is made in lengths of 20 inches over all. With it, either welding or cutting can be done by simply changing tips. This Torch is adapted to all classes of welding and cutting of metals within range of the Oxy-Acetylene welding or cutting process.



Brooks Commercial Welding Torch

8 Welding Tips and 1 Extra Extension. Larger tips furnished on request

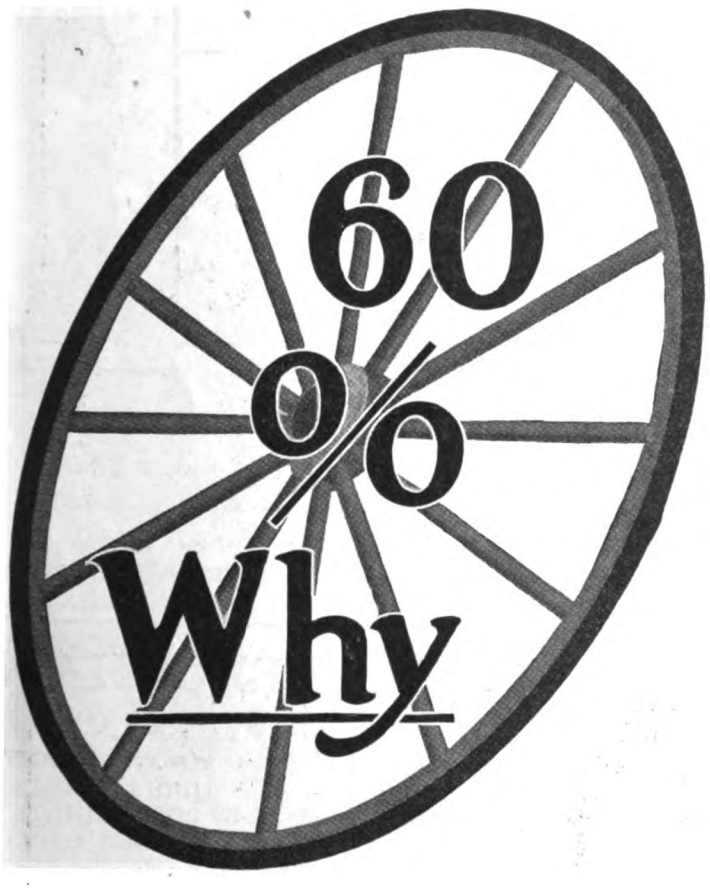
The above cut shows Torch made up to 21 inches over all. It can be lengthened or shortened, according to the requirements of the work, by changing blow pipes. One extra blow pipe is furnished regularly which makes the torch 28 inches long. On request, blow pipes of any length may be furnished.

By taking off the tip elbow head and screwing the welding tip on direct to the short extension, it can be converted into a straight torch, which is often convenient.

The Brooks Commercial Torch will handle all welding work within the limit of the process. This Torch is especially well adapted for pipe line, boiler and machine shop welding.

Write to Us Today

The Brooks Machine Co., 219-229 W. Lewis St., Wichita, Kansas



60% of all carriages are equipped with Firestone Tires, because—

Firestone made the first successful tire, the tire which remains supremely efficient to this day.

Firestone was the first successful tire cured in continuous lengths. No joints, no weakness, no *waste*.

Firestone invented the present design of channels, accepted standard for the industry.

Firestone invented the present method of brazing wires, a convenience to the customer, a profit to the dealer. Write us for further information.

FIRESTONE TIRE & RUBBER COMPANY
FIRESTONE PARK AKRON, OHIO
BRANCHES AND DEALERS EVERYWHERE

Firestone Carriage Tires

Digitized by Google

WAGON BUILDING

"Build me a wagon that will last forever."

"Sorry, Sir, but 'axle troubles' (due to wear—wear on the spindle, or on the box, or both) make it impossible."

You've often received a specification like that and been obliged to give that answer—haven't you?

The Sheldon "TON-DON"—an axle that will not wear, run hot or break—allows your meeting the requirements of the man who wants a wagon to last forever, **and we have told him so.**

The Sheldon "TON-DON" was originally made for buggies and carriages. Its success was so instantaneous and pronounced that we were deluged with requests for an axle embodying the same principle for use on Delivery, on Business and on Express Wagons.

Hence, the "TON-DON" CONCORD EXPRESS.
In EFFICIENCY—The HIGHEST.
In CONSTRUCTION—The SIMPLEST.
In SERVICE—The MOST SATISFACTORY.

The Spindle of the Sheldon Ton-Don Axle

Ordinary axles wear flat on the bottom of the spindle because the bottom side is the point of contact and where the wear of the spindle is concentrated. It takes a spindle of unusual hardness to resist this wear—greater hardness than any ordinary axle affords. The spindle of the "TON-DON" is hardened by a special process, producing a wearing surface of such hardness that a fine file makes no impression on it—yet the center remains soft or "natural."

The Phosphor-Bronze Lined Box

The peculiarity of this box lining is that while somewhat softer than the spindle, there is no perceptible wear after thousands of miles of running, but becomes harder and more wear-resisting with use.

Phosphor-Bronze (of a mixture which increases its toughness, smoothness under friction, and wear-resisting qualities) is a metal used for making the propellers of ocean steamships, bearings for locomotives, crank-shaft bearings for automobiles and other fine machinery. Imagine what a metal must be to meet such conditions, and you will grasp the advantages of applying such metal to axle purposes.

THESE AXLES CARRIED IN STOCK BY THE FOLLOWING JOBBERS AND CAN BE OBTAINED AT MANUFACTURERS' PRICES.

Baltimore, Md. ..... E. Scott Payne Co.	Providence, R. I. .. Congdon & Carpenter Co.
Boston, Mass. ..... E. P. Sanderson Co.	Rochester, N. Y. ..... Burke Iron & Steel Co.
Buffalo, N. Y. ..... H. D. Taylor Co.	San Francisco, Cal. .... Waterhouse & Lester Co.
Chicago, Ill. ..... E. D. Kimball Co.	Scranton, Pa. ..... Bittenbender & Co.
Cincinnati, O. ..... G. B. Schulte Sons Co.	Seattle, Wash. ..... Gray Bros. Co.
Indianapolis, Ind. ..... W. J. Holliday & Co.	Springfield, Mass. ..... Chas. C. Lewis & Co.
Los Angeles, Cal. ..... Percival Iron Co.	St. Louis, Mo. ..... Sligo Iron Store Co.
Milwaukee, Wis. .. Shadbolt & Boyd Iron Co.	Washington, D. C. ..... Louis Hartig
Pittsburgh, Pa. ..... McLean & McGinness	Wilmington, Del. .... Delaware Hardware Co.
Portland, Oregon ..... J. E. Haseltine & Co.	Bridgeport, Conn. ..... Chapman & Banga Co.
Ft. Wayne, Ind. ..... Mossman, Yarnelle & Co.	San Antonio, Texas .. Heusinger Hardware Co.
New Orleans, La. ..... Jos. Schwartz & Co.	

SHELDON

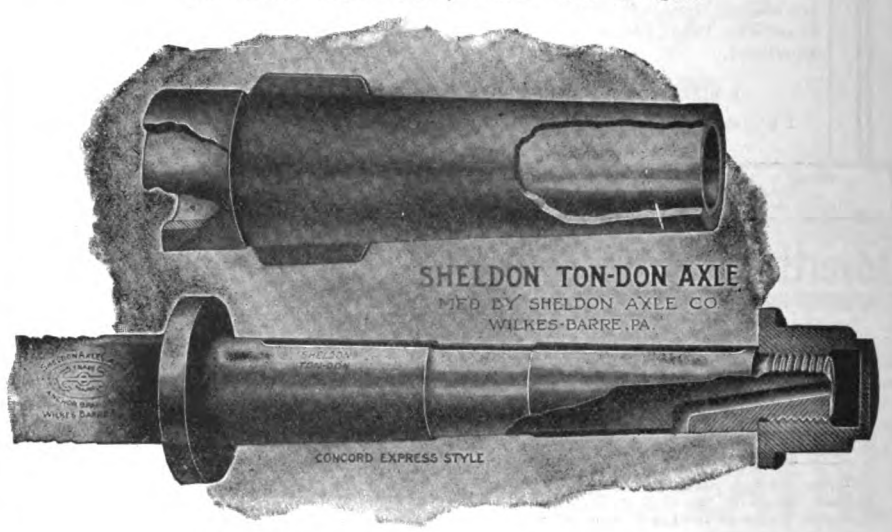
"TON-DON"

CONCORD EXPRESS STYLE

NOT A BALL OR ROLLER BEARING—BUT

ANTI-FRICTION—EVERLASTING—INTERCHANGEABLE

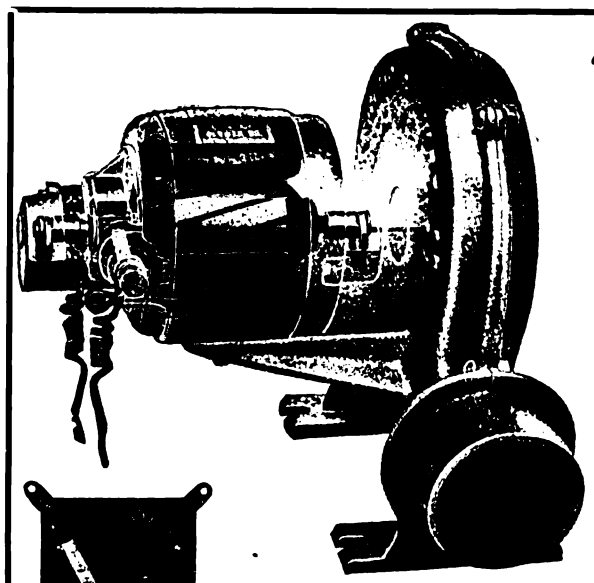
IT WILL NOT CUT, HEAT OR STICK



NOTICE THE PATENTED OILING DEVICE
HAS ALL THE ADVANTAGES OF FRICTION AND ANTI-FRICTION AXLES
WITHOUT THEIR DISADVANTAGES
"TON-DON" MEANS KNOWN QUALITY WITHOUT FANCY PRICE
MADE ALSO FOR BUGGIES AND SURRIES

SHELDON AXLE & SPRING CO.,
WILKES-BARRE, PA.

LARGEST AXLE FACTORY IN THE WORLD.



"One Fire" Marvel

A. C. or D. C.
or
UNIVERSAL MOTORS

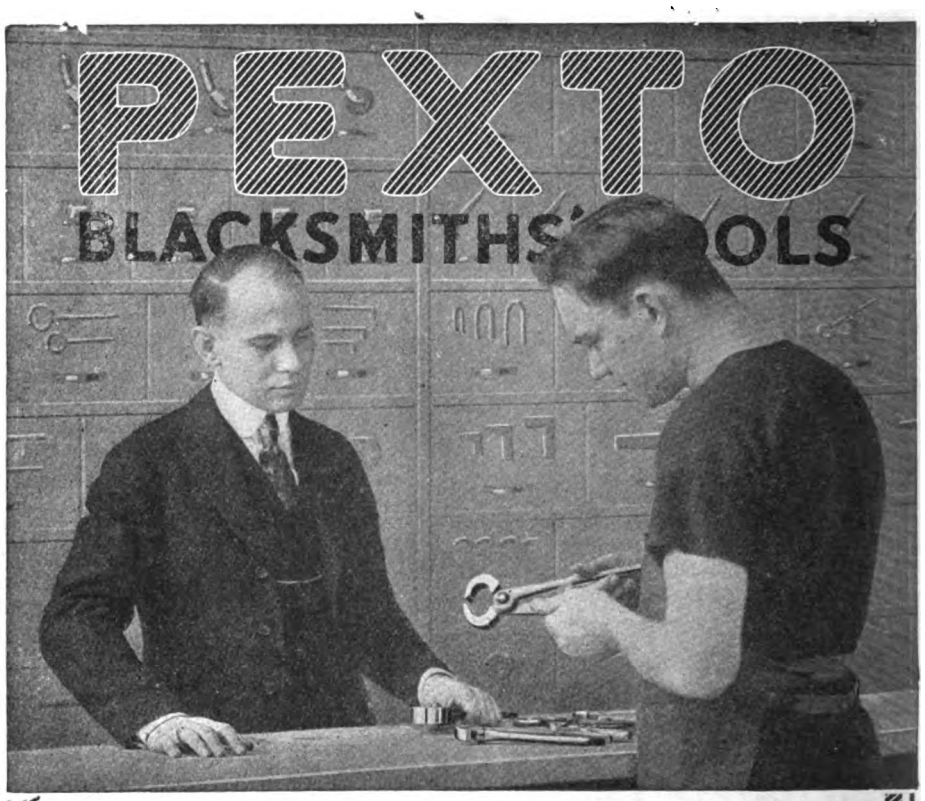
Extra Large
Ring Oil Bearings

Case Hardened
Armature Shaft

$38.00 Net

Order a Marvel on 30 days' trial through your Dealer, or your Electric Light Company

Electric Blower Co., 352 Atlantic Avenue BOSTON, MASS.



How Can You Tell?

You're buying a pair of shoeing pincers or hoof parers and the salesman spreads out an assortment of different kinds on the counter. How can you tell which is the best buy?

Appearances are not a safe guide, for poor tools often masquerade behind a handsome exterior.

Price is not a safe guide, for inferior tools often cost you more than good ones.

But there is a safe guide, and that is to know who made the tool.

When the salesman says "This is a pair of PEXTO Shoeing Pincers" or "PEXTO Hoof Parers," you know that they have been made by a responsible concern with 100 years of tool-making experience and with a reputation for the excellence of its product.

Buy tools by name and see that the name is Pexto. If your dealer can't supply you, write us.

The Peck, Stow & Wilcox Co.

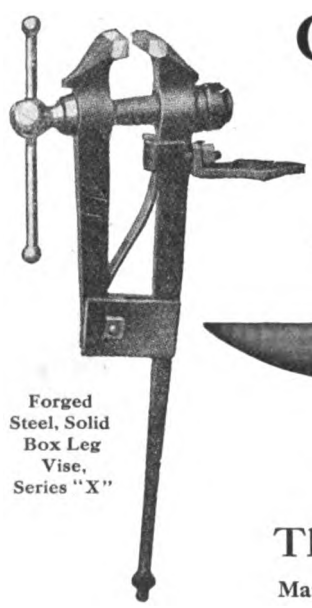
PEXTO Mfrs. Mechanics' Hand Tools, Tinsmiths' and Sheet Metal Workers' Tools and Machines, Builders' and General Hardware.

Southington, Conn. Cleveland, Ohio

Address correspondence to 209 W. Center St., Southington, Conn.

Columbian

Vises and Anvils



Forged Steel, Solid Box Leg Vise, Series "X"



Malleable Iron, Series 600



Standard Weldless One-Piece Anvil

The Columbian Hardware Co.

Manufacturers Cleveland, Ohio

Digitized by Google

THE NEW YORK PUBLIC LIBRARY 1919

ESTABLISHED 1880

The Pioneer Journal of its Class

THE BLACKSMITH & WHEELWRIGHT

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers. 71-73 Murray St., New York. Registered in U. S. Patent Office.

Entered as Second-class Matter March 4, 1880, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Published Monthly.

Vol. LXXIX. No. 2 NEW YORK, FEBRUARY, 1919 TERMS: One Dollar a Year. Foreign, $1.50. (6s. 3d.)

BUYERS' GUIDE AND INDEX TO ADVERTISEMENTS, PAGE 24.

The Capewell Calendar
For 1919

Sent free to all parts of the world.

Many thousands have been mailed. If your copy has not arrived and you care for one, just send your request on a postal card. It will be mailed promptly.

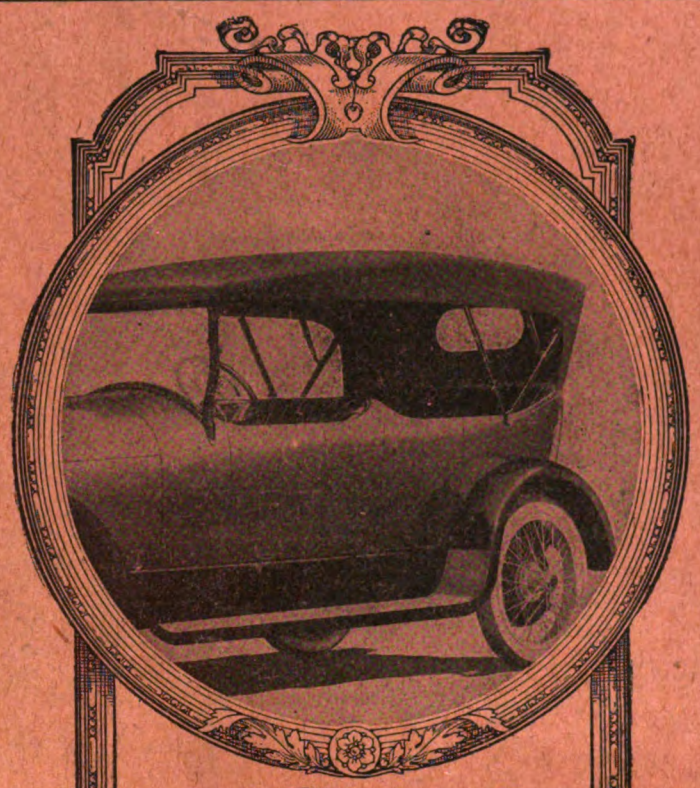
The size of the Calendar is 9" x 16" and is printed in five colors.

"The Capewell"



Easiest Horse Nail to Drive

The Capewell Horse Nail Co.
Hartford, Conn.
Leading Horse Nail Makers of the World



CHASE DREDNAUT Motor Topping

"Defies Time and the Elements"

Write for Particulars — L. C. CHASE & CO., BOSTON — NEW YORK DETROIT SAN FRANCISCO CHICAGO — Write for Samples



HORSESHOES In Stock
Ask for Stock List

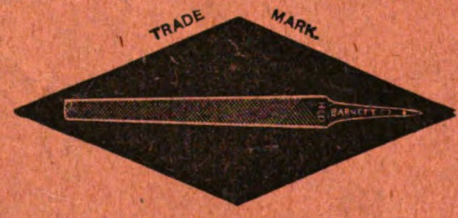


ROWE CALKS
Screw and Drive
ROWE CALK & CHAIN CO.
Plantsville, Conn.

STEEL STAMPS
LETTERS and FIGURES
For Marking Your Tools and Your Product
NAME PLATES OF ALL KINDS
S. D. CHILDS & CO.
DEPT. 2
136 S. CLARK ST. CHICAGO

THE TEETH IN
BLACK DIAMOND RASPS
ARE MINGLED
So as to Cut Clean and Free and Leave no Furrows in the Work

Twelve Medals of Award by Jurors



At International Expositions

C. & H. BARNETT COMPANY
Black Diamond File Works, PHILADELPHIA, PA.
Owned and Operated by NICHOLSON FILE CO.
Copy of Catalog sent Free to any interested file users upon application.

SEND US YOUR NAME and Address and you'll get information worth while regarding this splendid Shear and Punch.



THE MARVEL
A Double Lever Machine.
One man does all the machine is capable of and he faces his work all the time.
ARMSTRONG-BLUM MFG. CO.
340 N. FRANCISCO AVE., CHICAGO, ILL.

NOW Cheaper Power
OTTAWA Kerosene Gasoline ENGINES
90-Day Trial
10-Year Guarantee
You get more power from a gallon of 12 cent Kerosene than from a gallon of 25 or 35 cent gasoline in any gasoline engine. No cranking, no batteries. Easy to start. Easy to operate. All Sizes and Styles, 1½ H-P. to 22 H-P.
Free Book Before you arrange to try any engine, read my latest and finest 3-color book. Tells all what you want to know about engines. Written so you can understand it. Write for low prices now.



OTTAWA MFG. CO.
1786 King St. Ottawa, Kans.

AETNA STEEL TOE CALKS
Made by THE AETNA NUT CO., Southington, Conn.
BLACK HORSE BRAND
BEST SHAPE
BEST SPUR
TO DRIVE
BEST STEEL



TOE AND HEEL CALKS
SOLD BY ALL DEALERS

Stokes Bros.' Improved Horse Rasps
Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A

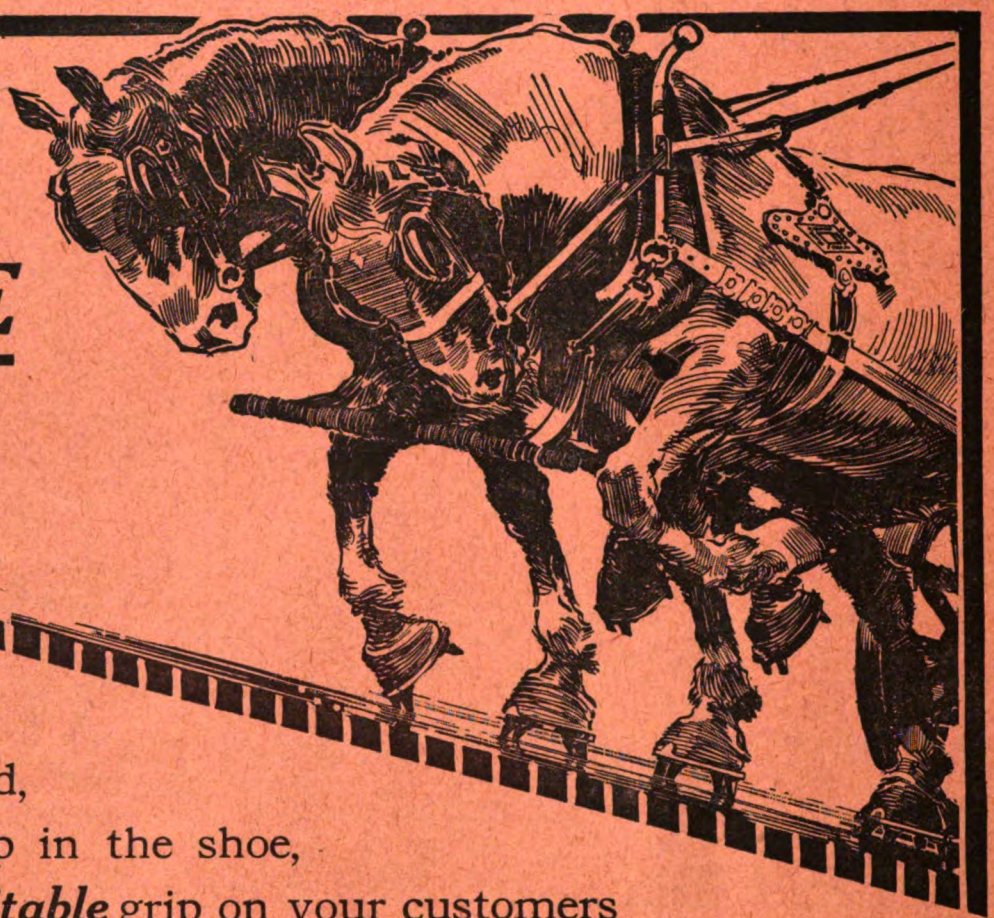
STEEL STAMPS
BURNING BRANDS
RUBBER STAMPS
STENCILS
C... M. NESS, JR.
61 F... ST. NEW YORK
...and for price list.



SUREGRIP CALKS
American Calk Co.
DETROIT, - - MICH.

Digitized by Google

A SURE GRIP



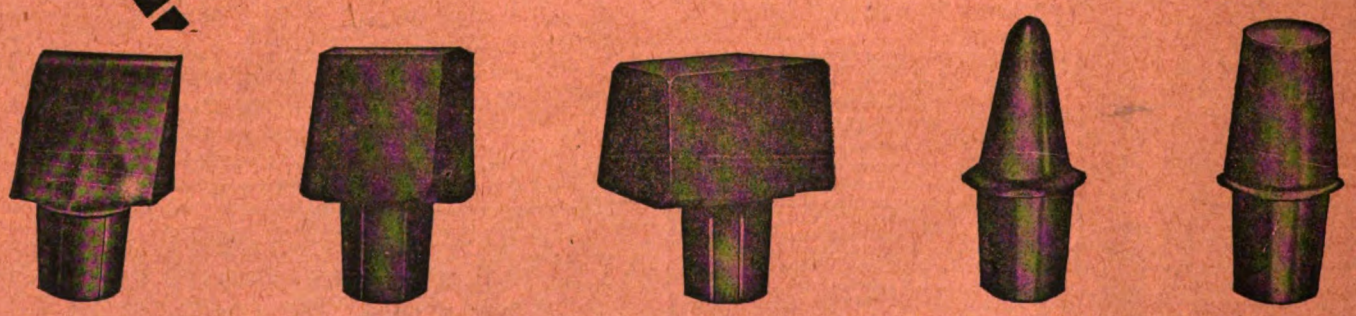
on the road,
a ***tight*** grip in the shoe,
and a ***profitable*** grip on your customers
are assured by using

DIAMOND CALKS

because they're made of the hardest and toughest steel. Longest wearing, and don't break off. Scientifically shaped. Absolutely tight fitting and won't twist in the shoe or fall out.

Made in five shapes and with varying sized blades.
There's a Diamond Calk for every purpose.
Retailed only through horseshoers.
Ask for new illustrated price list.

DIAMOND CALK HORSESHOE CO.,
DULUTH, MINN.



Digitized by Google

"F-S" PAINTS



A Good Reputation is an Asset. Everyone Speaks Well of "F-S" Products

"F-S" Carriage and Automobile Top Dressing makes old tops look like new and turns water like "a duck's back." Easily applied—dries quickly — won't crack — can't injure leather. Try it on the next job.

FELTON, SIBLEY & CO., Inc.

Manufacturers of Colors, Paints, Varnishes since 1863

136-140 North Fourth Street, Philadelphia

(146)

Don't Send a Penny

These Len-Mort work and outdoor shoes are such wonderful value that we gladly send them, **no money down.** You will find them so well-made and so stylish and such a big money saving bargain that you will surely keep them. So don't hesitate. Just fill out and mail the coupon. We will send a pair of your size. No need for you to pay higher prices when you can buy direct from us—and know what you are getting before you pay even a penny. Why pay out $5.00 and $6.00 for shoes not near so good? Act now. Mail the coupon today while this special offer holds good.

Great Shoe Offer

We can't tell you enough about these shoes here. This shoe is built to meet the demand of an outdoor city workers' shoe as well as for the modern farmer. Send and see for yourself what they are. Built on stylish lace Blucher last. The special tanning process makes the leather proof against the acid in milk, manure, soil, gasoline, etc. They outwear 3 ordinary pairs of shoes. Your choice of wide, medium or narrow. Very flexible, soft and easy on the feet. Made by a special process which leaves all the "life" in the leather and gives it wonderful wear-resisting quality. Double leather soles and heels. Dirt and waterproof tongue. Heavy chrome leather tops. Just slip them on and see if they are not the most comfortable, easiest, most wonderful shoes you ever wore. Pay $3.85 for shoes on only arrival. If, after careful examination, you don't find them all you expect, send them back and we will return your money. No obligation on you. This is at our risk, not yours.



Send →

Only the coupon—no money. That brings these splendid shoes to you. You are to be the judge of quality, style and value. Keep them only if satisfactory in every way. Be sure to give size and width. Mail the coupon now. Order by No. X15012.

Leonard-Morton & Co.
Dept X 7035 Chicago

Leonard-Morton & Co.
Dept. X 7035 Chicago

Send the Len-Mort Shoes No. X15012. I will pay $3.85 for shoes on arrival, and examine them carefully. If I am not satisfied, will send them back and you will refund my money.

Size.....Width.....

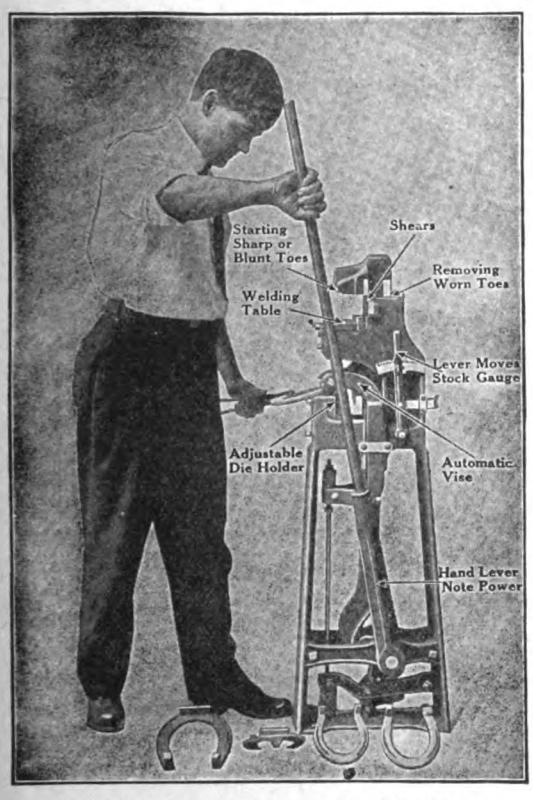
Name.....

Age.....Married or single.....

Address.....

1919 MODEL
THE L. S. P. CALKING MACHINE

The Greatest Time and Labor Saving Machine On Earth



1919 MODEL—Fully covered with Patents

OUR 1919 Model is the same as our 1918. We agree with the users and so would you, that it cannot be improved.

Do not mistake this for a machine which makes toe calks or a foot vise. This machine is for turning heel calks, both Blunt and Sharp, sticking and welding toe calks, clipping and trimming ends of shoes. IT CALKS SHOES, doing the work just the same as you do by hand with the hammer, only it is done much better and easier, and in a fraction of the time.

In turning heels, you can turn up just as much stock as you wish, upset or stoveup to make as heavy as you like and square up the calks without use of hammer. There is no losing of toes when you weld on the L. S. P.

It is a strong, handsome, well made machine and will last, as you might say, a life time, fully warranted for one year. It is in use in the best shops in the United States, users claiming more for it than we do.

Write at once for full information and prices.

L. S. P. CALKING MACHINE CO.

P. O. Box 225 WYALUSING, PA., U. S. A.

NATIONAL MACHINE CO., Brighton, Ontario, Canada



Bringing Down the Vulture

American mechanical genius and America's workers and fighters have clipped the Raider's wings. Now in Peace—we have a World to be remade.

Nicholson Files

contributed greatly to our waging of aggressive American warfare. Great in war, they are as great in peace—the World's Smoothest Cutting Files—a file for every purpose.

Write for File Filosophy—a fifty-years' education in Files and Filing in an hour's reading.

NICHOLSON FILE COMPANY

Providence, Rhode Island, U. S. A.

Digitized by Google

UNIFORMITY

SHELDON AXLES AND SPRINGS

HAVE LONG BEEN

INTERNATIONALLY FAMOUS

For Their Superiority In

DESIGN, MATERIALS and WORKMANSHIP

REASON:

Sheldon Took Guesswork Out of Axle and Spring Manufacturing

which means

UNIFORMITY OF PRODUCT

Sheldon Axle & Spring Co., Wilkes-Barre, Pa.

Higher Prices But Bigger Cash Saving





If you're John Wiseman, you used STANDARD Toe Calks last year and copped the saving.

If you're Bill from Missouri, now is the time to admit that you have been shown.

You make about *twice* the *cash saving* this year that John Wiseman made last year by using STANDARD Toe Calks.

Prices are up on steel products—hence the greater cash saving and the added necessity for saving every cent.

You don't buy the Calk Box. You buy the Calks in the box and there are more Standard Toe Calks in the box. And there's just one quality—THE BEST.



STANDARD TOE CALKS

Buy from your dealer. He can get STANDARD CALKS for you

NO. 1

FRANKLIN STEEL WORKS

Joliet, Ill. Cambridge, Mass.
Hamilton, Ont.

"E-Z" WELDING COMPOUND

is the best **BECAUSE**

It works Equally good on all Kinds of steel.

It welds at **lower heat** than any other.

It **sticks** to metal at a **very low** heat.

It leaves **no scale.**

PAT. MAY 27, 1902

USE IT ONCE AND YOU WILL ALWAYS WANT IT

Crescent Welding Compound

MAKES SMOOTHER WELDS THAN ANY OTHER

It is fine for plow work or where parts are fastened together before welding, or for making split welds, finishing heats, or for welding under dies, etc., etc.

CRESCENT WELDING COMPOUND TRADE MARK

It insures smooth finish and perfect welds on Toe Calks.

"Money back" from any jobber if "E-Z" or Crescent does not give perfect results.

We will send samples free of charge.

MADE ONLY BY

Anti-Borax Compound Co.

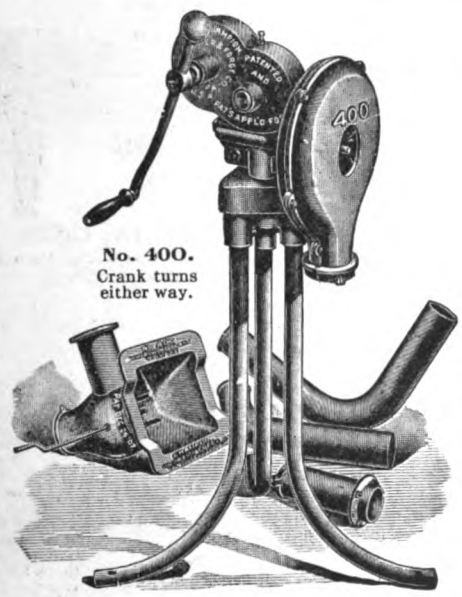
FT. WAYNE, IND.

Digitized by Google

THE FAMOUS CHAMPION BLACKSMITH TOOLS

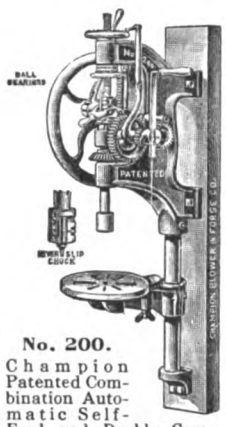
CHAMPION BLACKSMITH TOOLS HELPED TO WIN THE WAR



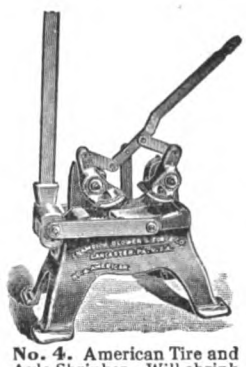


No. 400. Crank turns either way.

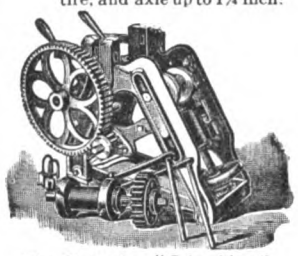
FAMOUS 400



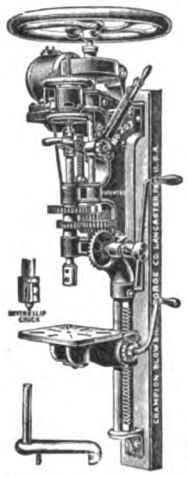
No. 200. Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



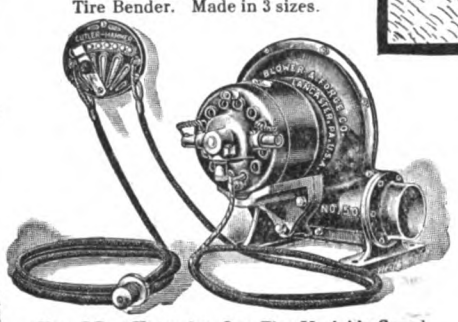
No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



The Champion "Columbian" Tire Bender. Made in 3 sizes.



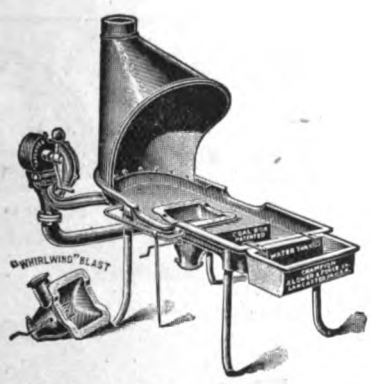
No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.



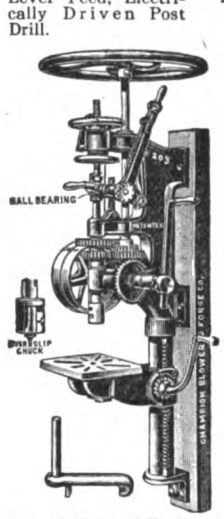
No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower.



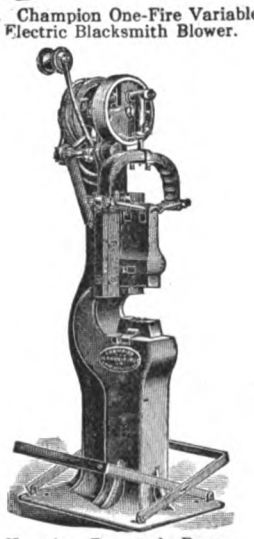
No. 408. Steel Blacksmith's Forge.



No, 433. Cast Iron Blacksmith's Forge



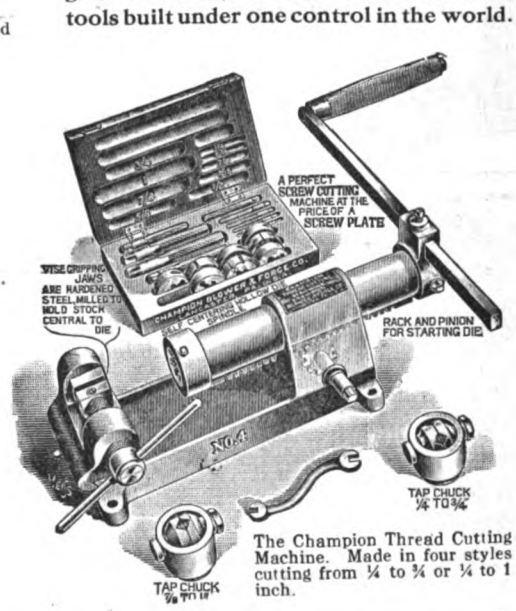
No. 203. Self-Feed and Double Compound Lever Feed Drill.



Hercules Patented Power Hammer. Weight of ram, 65 pounds.

Don't Fail to Get Our 1918 Catalog

Before purchasing a Hand Blower Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



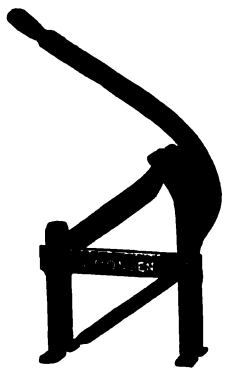
The Champion Thread Cutting Machine. Made in four styles cutting from ¼ to ¾ or ¼ to 1 inch.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

Digitized by Google

THE SIMONSEN HOT TRIMMING SHEAR SAVES ALL THE WORK AND NEARLY ALL THE TIME.



Hot Trimming Shear.

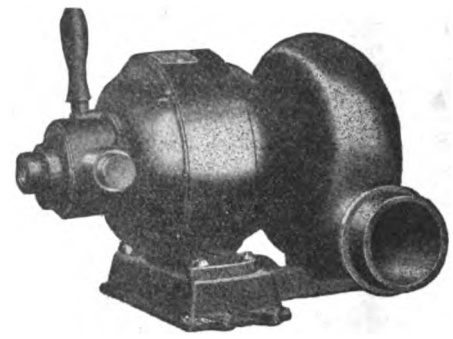
Think of cutting out plow points, or trimming cultivator shovels, etc., without a sledge or helper, and doing a neater job too!

The SIMONSEN HOT TRIMMER is designed especially for hot cutting and in actual saving will pay for itself several times over the first season.

Is made entirely of wrought material and in two sizes. No. 1 cuts hot plow steel 5/16x6. No. 2 cuts hot plow steel 5/16x8. Hold the work with one hand in plain sight and operate shear with the other hand.

Sold by leading jobbers. Write us for free circular and testimonials, mentioning jobber's name when writing.

SIMONSEN IRON WORKS, SIOUX RAPIDS, IOWA



100 OR MORE DIFFERENT SPEEDS IN THE "KAZOO" Variable Speed Blower

Mr. Blacksmith,—Do you know of any other blower that will give these results? The "KAZOO" is made right and stays right. No outside rheostat or resistance—hence you are free of those troubles. It has any desired speed. You stop, start, increase or decrease the speed by simply moving the handle. You actually save current, as it varies with the speed. All enclosed dust-tight, genuine bronze bearings and ABSOLUTELY NOISELESS RING OILERS.

Alternating Current Only

R. P. WARNER ELECTRIC CO., KALAMAZOO, MICHIGAN

The Better Your Equipment The Bigger Your Profits

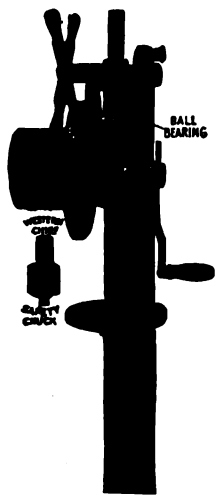
Buy CANEDY-OTTO

AND INCREASE YOUR INCOME

Once Tried, Always Used : There's a Reason—Quality

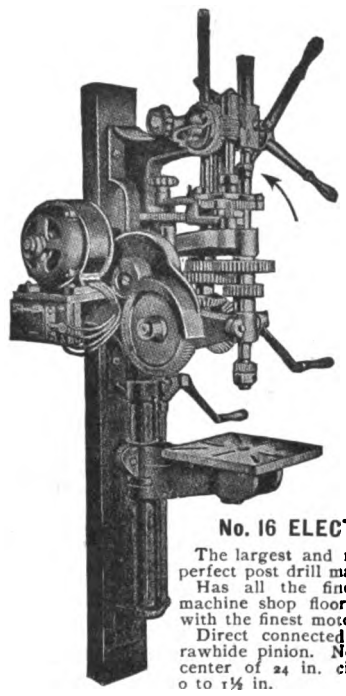
OVER 200 DIFFERENT STYLES

SEND FOR CATALOGUE No. 12



No. 19 DRILL

A low-priced combined hand and power self-feed drill.
Drills to center of 16¼ in. circle.



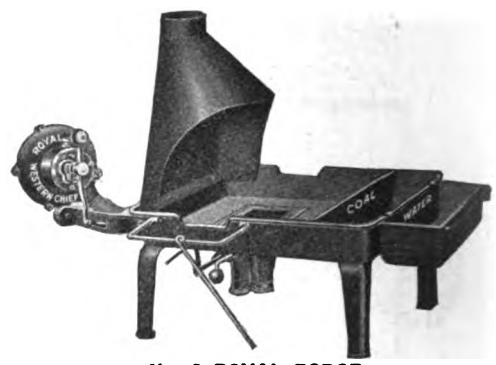
No. 16 ELECTRIC DRILL

The largest and most mechanically perfect post drill manufactured.
Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.
Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1½ in.



No. 100 ROYAL FORGE

The most popular forge ever made.
Fan, 12 in. Hearth, 31½x45½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x30 in. Blower, 12 in.



Blower, 12"
Wt., 135 lbs.
Height, 47"

ROYAL BLOWER

(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.
Fire pot is 8x9 in. inside.



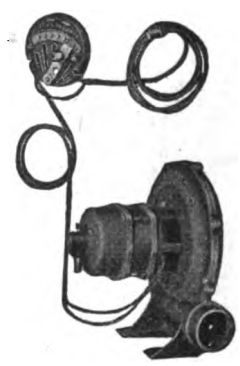
No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.
All machines are tested before leaving the factory, and guaranteed in every respect.
Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.



No. 1 1/2 SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



No. 8 ELECTRIC BLOWER

The best outfit money can buy.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

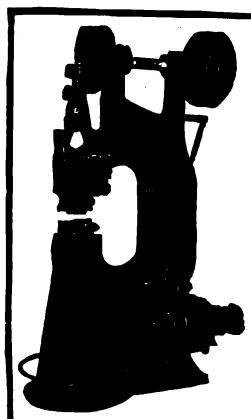
Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS

Little Giant Power Hammers

25, 50, 100, 250 and 500 lb. Models.

BELT OR MOTOR DRIVEN.



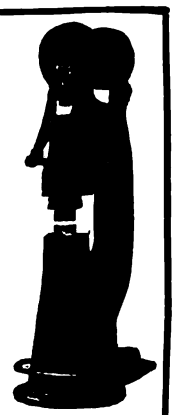
MOTOR DRIVEN

The Boys in Khaki and Sailor Blue Will Be the Farmers of the Future.

Their war equipment has been the most modern, and when they return home the old out-of-date methods will no longer satisfy them.

They will insist on their farm equipment being kept in first class repair and they will take their work to the blacksmith who has up-to-date shop equipment.

No blacksmith shop is modern unless it has a Little Giant Power Hammer. Either of our models will pay for itself in a few months on our easy payment terms, and continue to repay for itself for many years after.



BELT DRIVEN

The first Little Giant Power Hammer made 26 years ago and every one since sold,—some 8,000 in all,—are still in use. There is no wear-out to them.

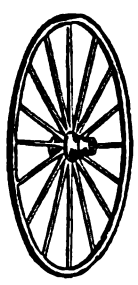
Average annual repair sales on all Little Giant Power Hammers in use, large and small, from oldest to latest, is 48¢ each or less than 2/5 of 1% of original cost to user.

Any Belt Driven Little Giant Power Hammer can be quickly changed to a Motor Driven Outfit. Ask your power plant superintendent for current, voltage, phase and cycles of motor required. Send this information to us and we will quote prices.

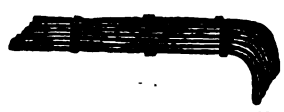
Little Giant Power Hammers are guaranteed FOREVER against defective material and workmanship, and are shipped on 30 days' trial.

Write Your Jobber, or Direct To Us

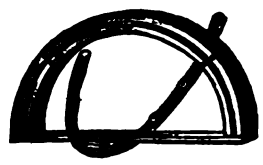
Little Giant Company, Established 1876. **103 Rock Street,** MANKATO, MINN., U. S. A.



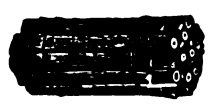
SARVEN WHEELS
$11.90 Per Set and Up



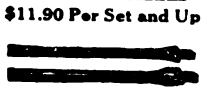
FINISHED BUGGY SHAFTS
$10.00 Per Bundle of 6 Pairs



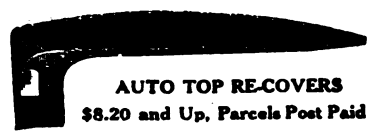
PLAIN HICKORY RIMS
$2.15 Per Set and Up



OAK WAGON SPOKES
$3.65 Per Set and Up.



REPAIR GRADE SARVEN SPOKES
$2.50 Per 100



AUTO TOP RE-COVERS
$8.20 and Up, Parcels Post Paid

Auto Tires

Non Skid

30 x 3½ $14.75

Other Sizes in proportion

Wheel Top & Hardware Co.

Dep't. W2 (Get our Catalogue) **Cincinnati, O.**

Digitized by Google

DO IT RIGHT!

Outside of story books, ladders are climbed one step at a time, and one solid step upward doesn't mean that you have skipped half a dozen rungs.

Brooks Welding and Cutting Apparatus

Is Now the Most Important Part of the Tool Equipment in a Metal Working Shop for Both Repairing and Manufacturing

Unless you are sure that your welding equipment affords absolutely full and complete protection to the operator—unless the feed is simple, automatic, very durable and exceedingly constant, you are leaning on a broken reed.

Brooks acetylene welding equipment displaces all the old slip-shod methods and does the work RIGHT!

The real man who buys Brooks equipment isn't shopping for the lowest priced machine—but demands THE BEST—also, he knows Brooks equipment isn't going to be any cheaper tomorrow—he's sure, therefore, that he's buying right.

Brooks Equipment is Bought Because it Works Right

Not because it looks right. Brooks equipment is sold for what it is—not what it pretends to be. The belief that a real sale is made on any other basis is dead so far as Brooks Equipment is concerned.

The brooks Generators are all equipped with the well-known Brooks Flash-Back exhaust safety valve which is located on top of the dry chamber pipe at the side of the generator tank. This flash-back safety valve eliminates all chanches of bursting the dry pipe, if a back-fire should occur from operating the welding or cutting torch. It opens and releases the force the same as the exhaust valve on a gas engine. It is the greatest safety device ever put on an Acetylene Generator.

The Brooks Machine Co. manufactures welding and cutting torches, automatic acetylene pressure generators, both portable and stationary. This means complete equipment to take care of any and all kinds of welding and cutting. If you can tell us the nature and quality of your work, we can advise you fully as to the size and kind of equipment to meet your requirements best.

All products manufactured by the Brooks Machine Co. are guaranteed for one year against defective workmanship and to be made of first-class material and to do all we claim for them.

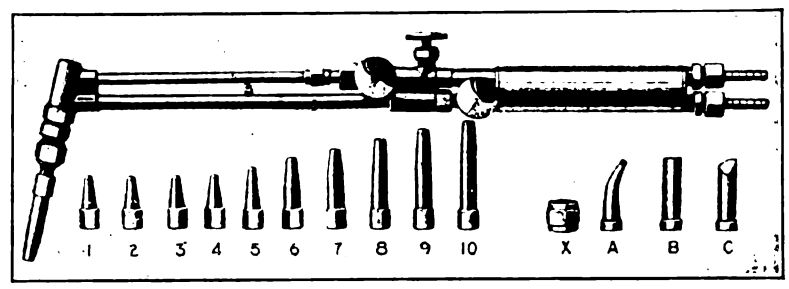
Write to Us Today

The Brooks Machine Co., 219-229 W. Lewis St., Wichita, Kansas

Brooks Portable Automatic Acetylene Generators

25 and 50 lb. Carbide Capacity, with Welding Equipment

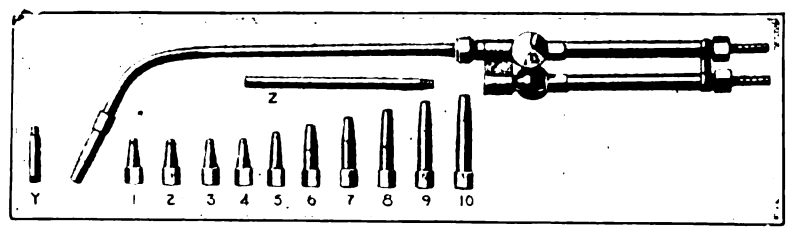




Brooks Universal Welding and Cutting Torch

10 Welding and 3 Cutting Tips

This Torch is made in lengths of 20 inches over all. With it, either welding or cutting can be done by simply changing tips. This Torch is adapted to all classes of welding and cutting of metals within range of the Oxy-Acetylene welding or cutting process.



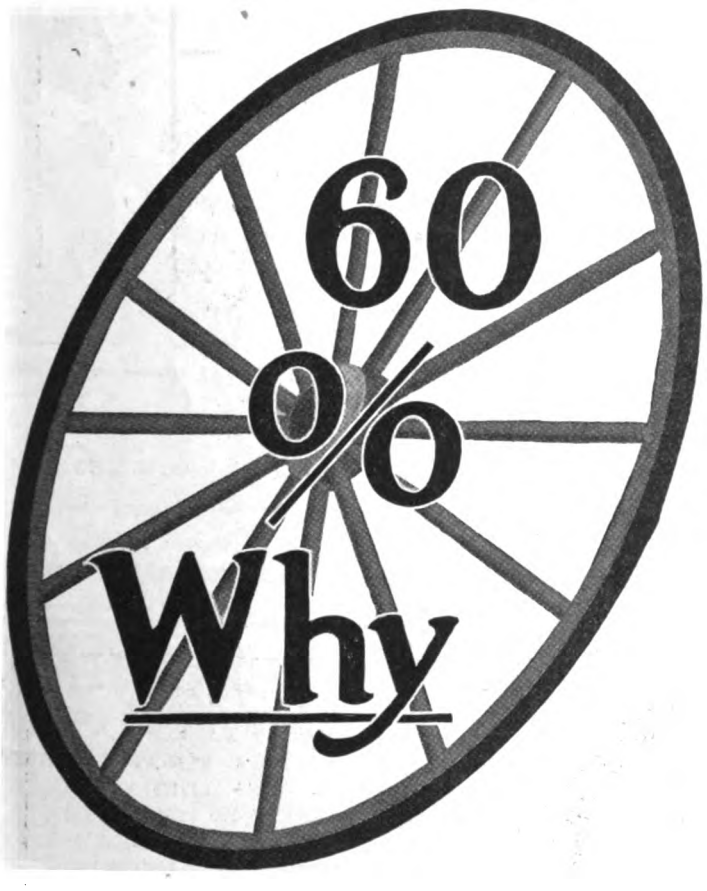
Brooks Commercial Welding Torch

8 Welding Tips and 1 Extra Extension. Larger tips furnished on request

The above cut shows Torch made up to 21 inches over all. It can be lengthened or shortened, according to the requirements of the work, by changing blow pipes. One extra blow pipe is furnished regularly which makes the torch 28 inches long. On request, blow pipes of any length may be furnished.

By taking off the tip elbow head and screwing the welding tip on direct to the short extension, it can be converted into a straight torch, which is often convenient.

The Brooks Commercial Torch will handle all welding work within the limit of the process. This Torch is especially well adapted for pipe line, boiler and machine shop welding.



60% of all carriages are equipped with Firestone Tires, because—

Firestone made the first successful tire, the tire which remains supremely efficient to this day.

Firestone was the first successful tire cured in continuous lengths. No joints, no weakness, no *waste.*

Firestone invented the present design of channels, accepted standard for the industry.

Firestone invented the present method of brazing wires, a convenience to the customer, a profit to the dealer. Write us for further information.

FIRESTONE TIRE & RUBBER COMPANY
FIRESTONE PARK AKRON, OHIO
BRANCHES AND DEALERS EVERYWHERE

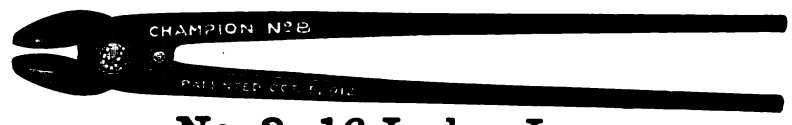
Firestone Carriage Tires

Digitized by Google

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge

Nothing to get out of order.



Will hold securely any size of shoe.

No. 8 16 Inches Long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

Weights, 1¼ to 3 lbs.

This Hammer is the most popular Sharpening Hammer on the market.

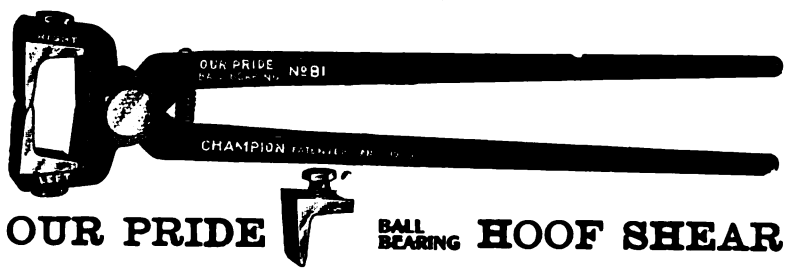


Corrugated Pein.

IT GIVES RESULTS.

No. 12 ELECTRIC SHARPENING HAMMER

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.



OUR PRIDE BALL BEARING HOOF SHEAR

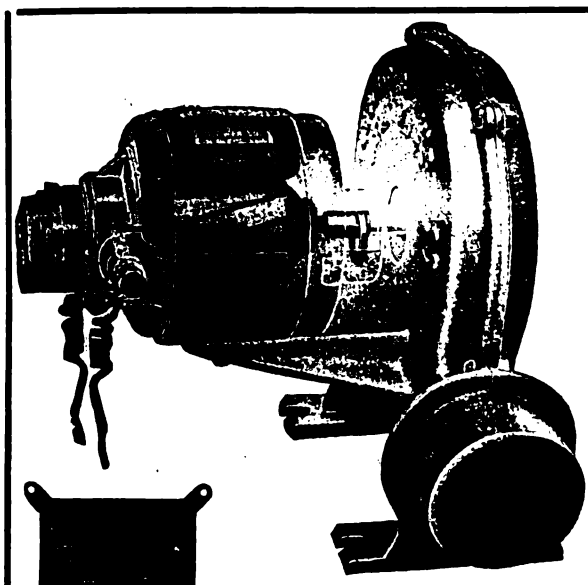
Blades easily replaced when worn out.

All parts interchangeable.

Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY, - Meadville, Pa., U. S. A.

THE LIVINGSTON CO., 131 E. 23rd Street, NEW YORK, Eastern Representatives



"One Fire" Marvel

A. C. or D. C.
or
UNIVERSAL MOTORS

Extra Large Ring Oil Bearings

Case Hardened Armature Shaft

$38.00 Net

Order a Marvel on 30 days' trial through your Dealer, or your Electric Light Company

Electric Blower Co., 352 Atlantic Avenue BOSTON, MASS.

UNLESS YOU KNOW

the value of each moment as an investment, each day that passes is only a stumbling block.

Why waste more time?

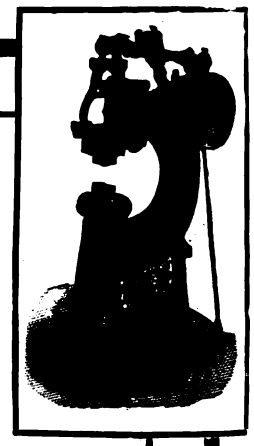
Put in that

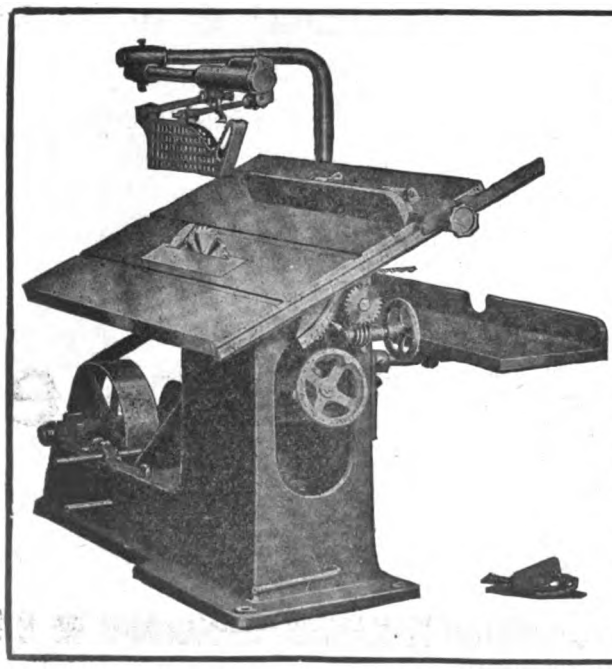
Kerrihard Power Hammer

and stop wondering whether it will pay or not—of course it pays—it does the work of four men.

Write for Full Particulars

THE KERRIHARD CO., Kerrihard Station, Red Oak, Iowa, U. S. A.





CRESCENT Wood Working Machines

will always satisfy those particular users who want the highest quality at reasonable price.

Send today for catalog of band saws, saw tables, shapers, jointers, variety wood workers, planers, planers and matchers, swing saws, cut off table, disk grinder, borers, hollow chisel mortiser, Universal wood workers.

THE CRESCENT MACHINE CO.
203 Main Street
LEETONIA, OHIO, U.S.A.

STAR STEEL SHAPES

ARE A GUARANTEE OF QUALITY

PLOWSHARES	SHOVEL POINTS
LISTERSHARES	DRILL POINTS
MOLDBOARDS	PLOW POINTS
SUBSOILERS	SEEDER POINTS
LANDSIDE POINTS	LANDSIDE PLATES

CULTIVATOR SHOVELS



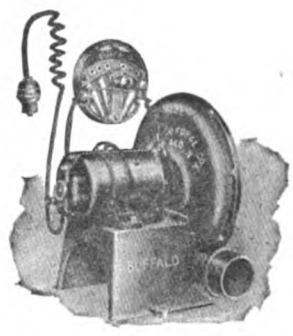
Made from Soft Center, Solid Cast or Crucible Steel.

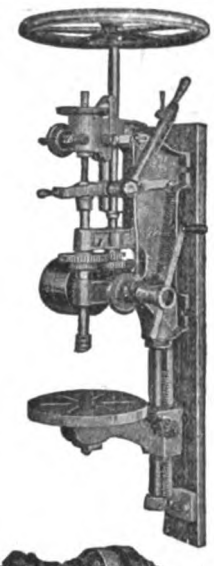
BEST MATERIAL AND WORKMANSHIP.

STAR MANUFACTURING CO.
CARPENTERSVILLE, ILL.

Digitized by Google







Modern Shop Efficiency

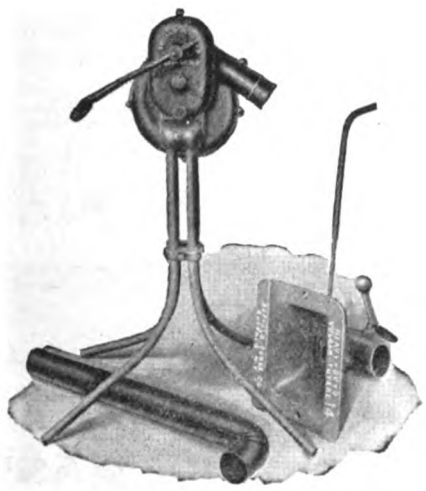
BLACKSMITHS AND GARAGEMEN are determined to have the best that may be had in Blacksmith Shop Equipment.

The work of the modern shop demands modern efficient tools—tools that will stand up under severe service.

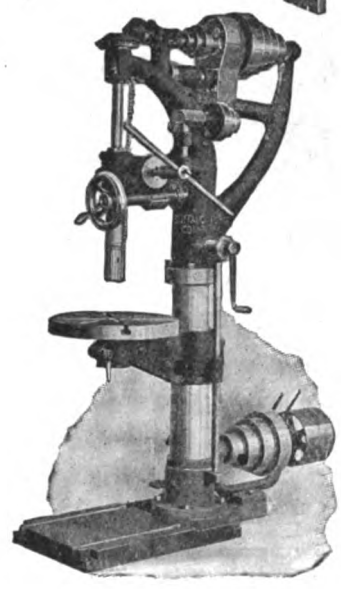
Forges; electric blowers; drills—floor and post type; shears—for cutting angles, bars and sheets—and of every size from the little bench type hand power shear to the heaviest power shear made—these are the tools you should know about.

Write Dept. 6 for Catalog

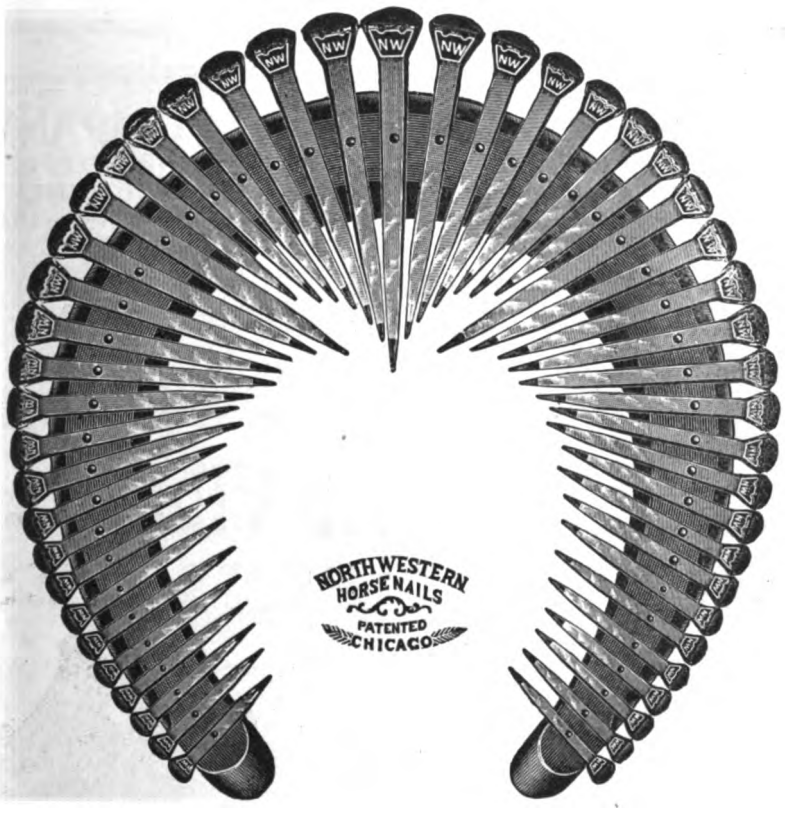
Buffalo Forge Company, Buffalo, N. Y.



"Buffalo"



NORTHWESTERN HORSE NAILS



MADE OF THE BEST QUALITY MATERIAL

The most perfect in form and finish and will hold a shoe longer than any other nail made.

THE RE-ENFORCED POINT makes it the easiest to drive and the safest to use.

UNION HORSE NAIL COMPANY

Manufacturers

CHICAGO ILLS.

Service

CAR owners will generally estimate the quality of your service by the quality of the product you sell.

Satisfaction to car owners—satisfaction and profit to dealers—that is the ultimate aim of Harvey Service.



THERE'S A HARVEY JOBBER NEAR YOU

Our new catalogue giving complete measurements of over 900 styles of Springs is yours on request

HARVEY SPRING & FORGING CO.

919 - 17th Street, RACINE, WIS.

Digitized by Google

LINDE OXYGEN

From Coast to Coast 65 Producing Plants and Distributing Stations provide an unlimited supply of Linde Oxygen for users everywhere.

LINDE SERVICE means no investment except for oxygen actually received—no expensive overhead or upkeep charges.

Linde Oxygen may be obtained from any of the following Linde Plants and Distributing Stations where a large suppply of charged 100 to 200 cu. ft. cylinders is kept on hand constantly to insure immediate shipments.

Mail or telephone your order to THE LINDE AIR PRODUCTS CO., at the nearest point. Shipments will be made on day order is received.

PRODUCING PLANTS AND WAREHOUSES

Alabama
*Birmingham
10th Ave. & 28th St.
California
*Emeryville, Oakland
*Los Angeles
1405 Mission Road
Colorado
*Denver
S. B'way & Exposition Ave.
Connecticut
Hartford
1095 Main Street
District of Columbia
Washington
9th & Maryland Ave., S. W.
Georgia
*Alanta
Plyant St. & Southern R. R.
Savannah
OgeecheeCanal,So.of BaySt.
Illinois
*Chicago
3633 Wall Street
East St. Louis
6th & Walnut Ave.
Peoria
721-731 So. Washington St.
Indiana
*East Chicago
S.E.Cor. Kennedy& 145th St.
Fort Wayne
414 E. Columbia Street
*Indianapolis
2819 Roosevelt Ave.
Iowa
Davenport
118 Harrison Street
Des Moines
117 W. 5th Street
Kansas
Wichita
Rock Island Ave. & 2nd St.
Kentucky
Louisville
126 East Main St.
Louisiana
New Orleans
831 Fulton Street
Maryland
*Baltimore
25th & Montebello Ave.
Massachusetts
Cambridge
25 Waverly Street
Springfield
Napier Street
*Worcester
961 Southbridge St.
Michigan
*Detroit
St. Aubin Ave. & Newton St.
Grand Rapids
Pearl Street by the Bridge
Minnesota
Duluth
Seventh Ave., West
*Minneapolis
1809 Hennepin Ave.
Missouri
*North Kansas City
14th & Charlotte St.
*St. Louis
4218 Forest Park Blvd.
Nebraska
Omaha
1007 Jones Street
New Jersey
*Elizabeth
Linden Ave.
Newark
354 Plane Street
New York
Albany
Montgomery & Colonie Sts.
*Brooklyn
475 Driggs Ave.
*Buffalo
Broadway and Ideal Sts.
*Utica
Walnut & Schuyler Sts.
Ohio
*Cleveland
802 East 72nd Street
*Cincinnati
Stanton & Mellish Aves.
Columbus
310 Dublin Ave.
Dayton
521 E. First Street
Lima
338 East High Street
Ohio
Toledo
441 South Erie Street
*Youngstown
601-621 Jones Street
Oklahoma
Oklahoma City
27 E. Grand Ave.
Tulsa
1 North Boulder St
Oregon
Portland
15th & Hoyt Streets
Pennsylvania
Erie
1502 Sassafras Street
*Norristown
*No. Philadelphia
18th & Cambria Streets
Pittsburgh
16th &Pike Streets
*Trafford
Tennessee
Chattanooga
212-238 King Street
Memphis
203 Washington St.
Texas
*Dallas
Harwood and Coombs St.
Houston
Cedar & Baker Sts.
San Antonio
512 Dolorosa St.
Utah
Salt Lake City
112 West Second St., South
Virginia
*Norfolk
22nd St. and Colonial Ave.
Richmond
1709 E. Carey Street
Washington
*Seattle
Henrietta St. & 8th Ave., So.
Spokane
121-123 S. Madison St.
Wisconsin
Manitowoc
810 Quay Street
*Milwaukee
36th St. & National Ave.

(Star) * Designates Plants.

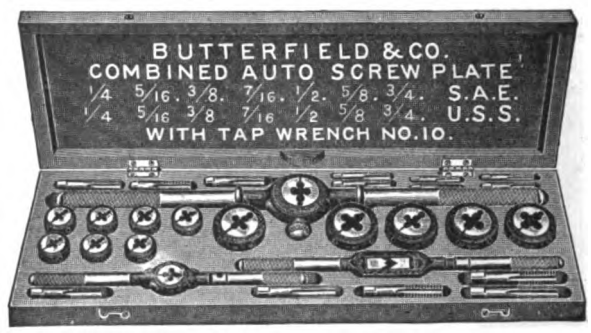
Other Plants and Distributing Stations are planned for other industrial centers throughout the country and will be established as fast as and wherever the local demand for oxygen warrants.

THE LINDE AIR PRODUCTS COMPANY

Largest Producers of Pure Oxygen in America

Forty-Second St. Building **NEW YORK**

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.
New York Store: 126 Chambers Street

The Horse Rasp of Quality



Ask your Dealer for the

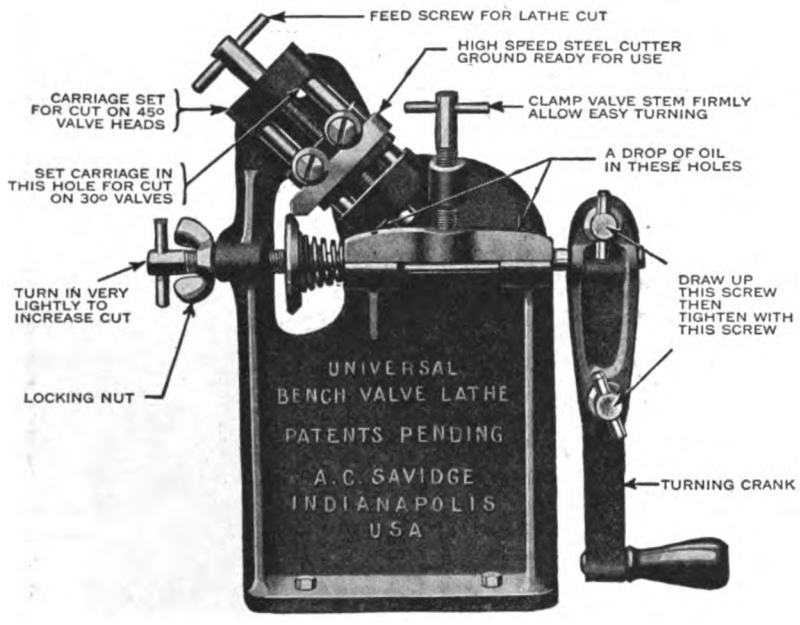
IMPROVED HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, **"Slim," "Light," "Slim Light"** and **"Fine Cut."** Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial. New catalogue mailed free on application.

HELLER BROTHERS CO. *Established in 1836* **Newark, N. J.**

SAVIDGE

UNIVERSAL BENCH VALVE LATHE



Anyone—**ANYONE**—can now quickly and accurately true the valve heads, thereby assuring a perfect fitting valve, an easy starting, a sweet running motor.

Savidge Valve Lathes are simple, rugged and efficent.

Vastly better and quicker than a machine lathe because self-centering and the angles are fixed,—YOU ARE SURE TO BE RIGHT.

To have a perfect job your valve heads must be concentrically true with respect to the stem,—THE SAVIDGE WAY.

Eliminate those carbon ridges caused by grinding—save gasoline, save grinding, save time and money and conserve your old valves.

Make a REAL lasting job and have that satisfied feeling due to perfect workmanship.

Write for full information about the Savidge Line of Valve Lathes—They are ABSOLUTELY GUARANTEED.

A. C. SAVIDGE, 615 N. Capitol Ave., INDIANAPOLIS, U. S. A.

THE ARMSTRONG MFG. COMPANY

BRIDGEPORT CONN., U.S.A. **NEW YORK OFFICE 248 CANAL STREET**

like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



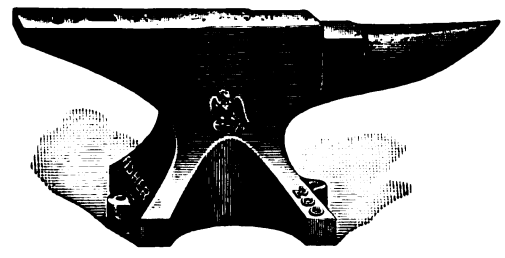
"Makers of the Genuine ARMSTRONG Stocks and Dies."

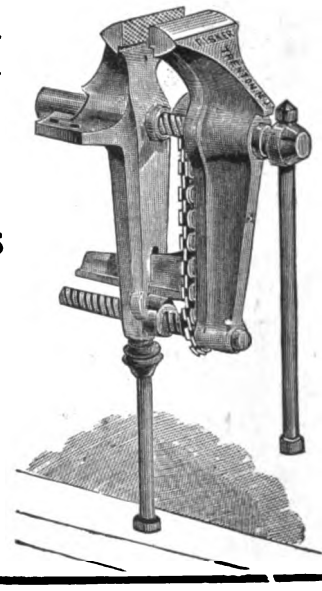
1843 EAGLE ANVILS 1919
AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE

BLACKSMITH AND WHEELWRIGHT

Vol. LXXIX. No. 2. NEW YORK, FEBRUARY, 1919 TERMS ONE DOLLAR A YEAR

Design, Construction, Operation and Repair of Automobiles and Motor Vehicles

Part XIII—Dealing With the Construction of Springs and Brakes and How These Important Units Should Be Cared For

AS FAR as comfort is concerned automobile springs are the most important units on the car. Manufacturers have worked upon various spring designs and types ever since the automobile first came on the market, consequently the present spring is a product of many years of intense study.

There are many different types of springs of which we show only the main ones; the others are modifications of those shown. In figure 58, at A is shown the full elliptic spring, probably the first type adopted since it resembled those in use upon carriages and wagons. This spring was hung upon a flexible joint at the top in most cases and fastened rigidly to the axle. In a few cases full elliptic springs were used crosswise of the car, but there was a general tendency toward spring breakage, due to sidesway, and the method was discarded.

At B in the same figure is shown the half elliptic spring, used to a great extent at present. In this case note that the front of the spring is fastened to the frame through a movable pivot while the rear is hung upon a toggle. Where both ends are hung on toggles, as in the Ford car, the spring is referred to as being semi-elliptic. This type is shown in figure 59.

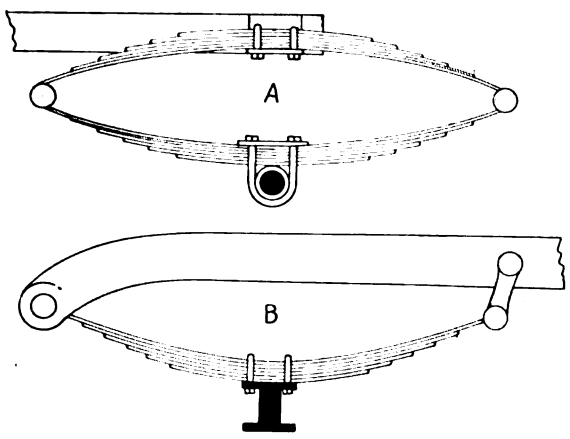


Fig. 58—Two Types of Springs. A, Full Elliptic; B, One-half Elliptic.

Three-Quarter Elliptic.

The three-quarter elliptic spring, though seldom used, has many points of merit, in one way it resembles the half-elliptic, except that instead of fastening directly to the frame, the main spring, through a toggle, hangs upon a quarter elliptic section of spring as shown at A in figure 60.

In all of these elliptic springs the general tendency is to absorb shocks and rebounds but in the device shown in figure 60 at B, another principle enters.

The latter spring is termed the cantilever and while it absorbs shocks it tends to change the up-and-down motion of the car to a lengthwise shock. The spring at one end is fixed to the axle while the other end is fastened, either through a toggle, or sometimes directly to the frame. The center of the spring is free to swing upon a pivot which is fastened to the frame.

Designers have been faced with many problems in making springs. In the first place a spring must be resilient enough so that it will yield to the weight of the car body when the wheels drop into a depression in the road. If, however, the spring is too light the body will rebound and break the spring.

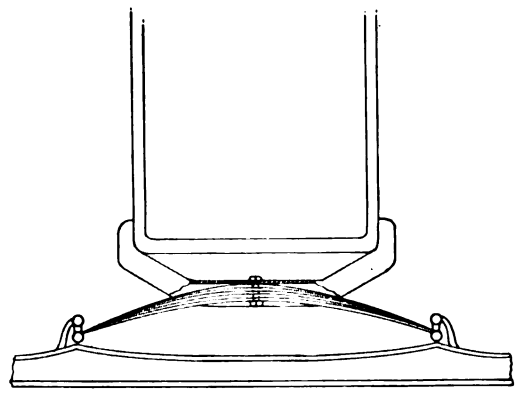


Fig. 59—Semi-Elliptic Spring as Used on Ford Car.

If on the other hand a spring were made from one piece of metal, strong enough to withstand the road shocks, it would not be resilient. One can understand this statement better if one rides in an unloaded motor truck or an unloaded trolley car. All of the road shocks are transmitted through the springs, because the springs are made heavy to stand a load. As soon as the truck is weighted down, or as soon as the trolley car is filled with people the machine rides easier.

Manufacturers worked for a long time to obtain a spring that would be resilient, but strong—seemingly one factor worked directly against the other. The only answer to this perplexing problem evidently was to make a spring from a number of pieces called leaves as shown in figure 61. Each leaf is designed to carry a certain portion of the load, and each leaf is made just as springy or resilient as possible.

Spring Construction.

The main leaf is fitted at each end with bushings, usually bronze, and around these bushings the spring leaf is curled as shown in the figure. In the semi-elliptic, or in fact in all elliptic springs the main leaf has a slight curve depending upon the size of the spring. The second leaf which rests upon the main leaf has a slightly deeper curve, while the next one has still a deeper curve and so on until the top is reached. If, therefore, all the leaves are packed one upon the top of the other they will not fit together as they do in the car. Most of the pressure will come upon the ends of the leaves.

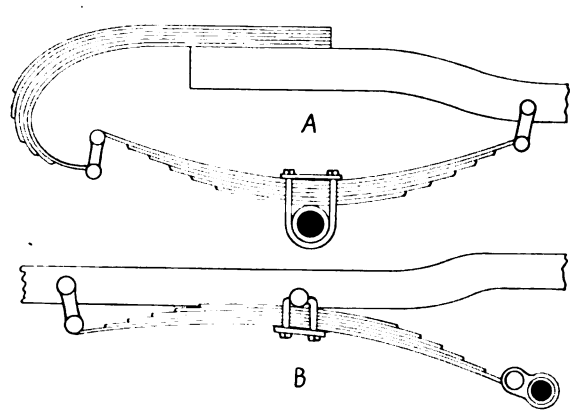


Fig. 60—A, Three-quarter Elliptic; B, Cantilever Springs.

As a general rule the leaves are fastened together into a unit by means of a center bolt though in some cases no fastening is necessary for the reason that the spring clips hold them together. When the spring is in place, the weight of the car is evenly distributed over the main leaf, for every leaf above it is slightly shorter than the next.

When the wheels drop into a hole in the road the weight of the car tends to straighten out the curve in the spring, therefore the ends of each leaf slide along the leaf below; this action has a tendency to absorb the shock. It would seem that if resistance were offered to this sliding motion the shock would be absorbed more readily, but it is not the case. A clean spring, having all of the leaf surfaces well polished and lubricated, absorbs shock much better than a rusty one.

In repairing springs they should be entirely pulled to pieces, the rust removed from the surfaces and the surfaces polished. Before putting the springs together the contacting surfaces should be given a thick coating of oil. Should one find that the springs are in good condition, that is, the surfaces clean, there is no necessity for removing them from the car. However, they should be oiled.

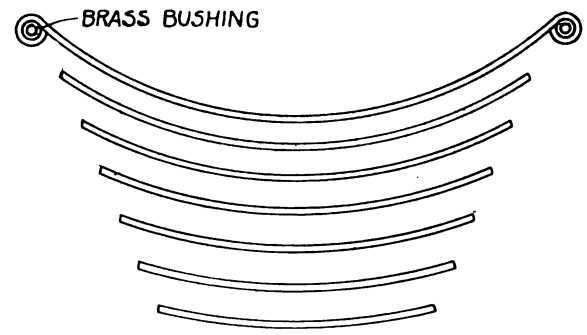


Fig. 61—Parts of a Semi-Elliptic Spring.

In oiling a spring the weight of the car should be removed from it. The car may be propped up on a box or by means of a jack, but there should be no spring tension. If there are any spring clips they should be unfastened or removed, then each leaf should be pried away from the next one to it and heavy oil or graphite applied to the contacting surfaces.

A Poor Method.

Many amateur repairmen use a cold chisel or a screw driver and a hammer to pry apart the leaves. This is a costly proceeding, however. The spring leaves may be bent out of shape and sooner or later the leaf will be weakened and break. There is a small spring spreading tool on the market which should be in the hands of any one doing automobile repair work.

We have said that heavy oil or grease should be applied to the springs. There is a difference of opinion as to the best spring lubricant. Heavy grease mixed with graphite makes a good lubricant. In some cases repairmen prefer graphite alone. In any case the lubricant can be applied to the spring by means of a thin piece of tin or a case

Digitized by Google

knife and spread over the surface by means of a heavy thread or wire. In this way the spring leaves need not be separated any great distance. In doing this work always be careful not to separate the leaves any further than necessary.

In overhauling a car there is one point which is often neglected—the point where the spring joins the frame or the axle. As we have explained above a bronze or steel bushing is usually found. Every movement of the spring means a movement in this

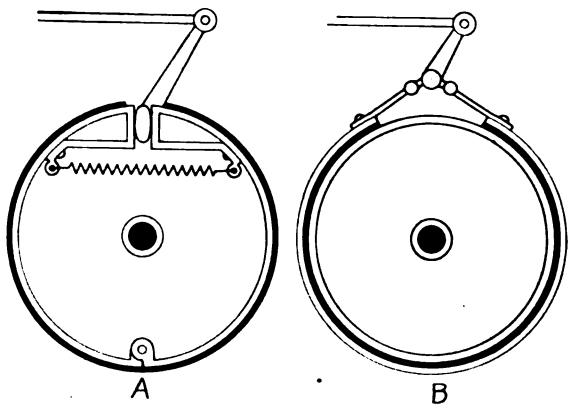


Fig. 62—Illustrating Two Types of Brakes. A, Internal Expanding Shoe; B, External Contracting Band.

bushing. There is a great tendency for the bushing to wear oval or egg shaped. Practically all of the road strains come upon the bolt which passes through this bushing, therefore the bolt itself wears very rapidly unless well lubricated. The average driver does not realize the importance of lubrication at these points and neglects them; consequently it is up to the repairmen to educate the driver and to be sure not to send out a car that is worn at these points.

The Braking System.

Next to the steering gear there is no more important part of the car than the braking system. Poorly adjusted brakes have resulted in a large percentage of automobile accidents. There are two types of brakes illustrated in figure 62—the internal expanding shown at A and the external contracting shown at B. These brakes are usually located on the rear axle while the other unit termed the brake drum is fastened to the wheels.

Referring to figure 62 at A the small cam is fastened through suitable linkage to a foot pedal or a hand lever. When the foot pedal is depressed or the hand lever pulled backward, the cam is turned upon its axis. This presses against the brake shoes and expands them until they press against the drum on the wheel. This has a tendency then to lock the wheel and prevent it from turning.

The external contracting brake shown at B works in exactly the opposite direction, that is when the foot pedal or the hand lever are operated, the external contracting band squeezes together around the brake drum. The two sets of brakes act independently, that is if the internal expanding brake is connected with the foot pedal the external brake will be operated by the hand lever.

Of late, manufacturers of the better cars have been in the habit of covering the brake shoes or brake surfaces with a braking material. This material may be made of a heavy asbestos fibre through which is interwoven steel wire for reinforcement. In applying this material to the brake bands, particularly the external contracting bands considerable care is necessary.

Applying the Fabric.

In referring to figure 63 at A is illustrated the first step in applying the lining to the band. The material is cut so that it is about one-eighth of an inch longer than necessary. It is placed in the band and the rivet B put into place. The excess or slack is allowed to bulge out as shown at D and the rivet C is put into place. Finally D is straightened out and riveted to the band. The fabric then should fit the band all the way around. It should have no projection or depression.

After it has been applied it should be tried around the brake drum and shaped to fit the drum as closely as possible, then it is put in place on the axle and adjusted so that when the brake is operated the band will draw together and contact with the drum all the way around.

In fitting the internal expanding bands the same care is necessary. It is essential that the fabric touch the inside of the brake drum at all points at approximately the same time when the brake is engaged. In riveting the fabric to the band or to the shoe the heads of the rivets should be countersunk as shown at E in figure 63. If this is not done as soon as the fabric wheels slightly it will cease to grip the drum and the rivets only will contact—the braking action will be impaired.

The adjustment of brakes is also very important. Should the left-hand brake lock the wheels before the right-hand one does, the car tends to skid and an accident may result. In the writer's opinion there is but one method of adjusting brakes properly. Support the car so that both wheels are free to turn, and engage the brake slightly so that its action can be noted upon the left-hand wheel.

Adjusting the Brakes.

Attach a spring scale to the outside of one of the spokes and with it pull the wheel around. We will assume that it takes two pounds to move the wheel. Apply the spring balance to the wheel on the other side of the car and adjust the brake until it requires the same pressure to turn it. In order to check up this adjustment engage the brake slightly more until it takes from ten to fifteen pounds to move one of the wheels, then make the adjustment again if necessary.

The same care should be exercised in adjusting both systems of brakes—the internal and the external.

Aside from the application of the brakes

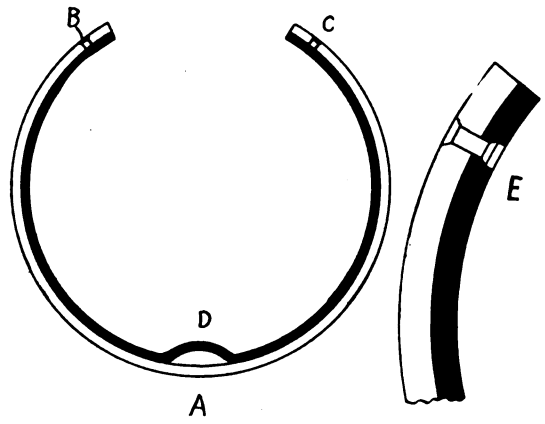


Fig. 63—Showing How the Fabric Should Be Applied to the Band.

directly to the wheels there is another method which is becoming popular. In this case usually an external contracting brake is applied to a drum on the propeller shaft either in the transmission or directly behind the gearset. The Ford car is a good example of this particular system. Manufacturers claim that a brake acting upon the propeller shaft is more effectual for the very reason that since its action is distributed through the differential to both wheels, the braking action is evenly distributed. There is practically no danger of skidding because of unevenly applied brakes.

There is another advantage which is evident. Assuming that the gear ratio, that is the driving gear ratio in the differential is three to one—one pound pressure upon the band around the propeller shaft brake is equal to three pounds pressure around a drum on the wheels.

WHY HORSESHOES ARE CONSIDERED LUCKY.

All superstitious people know that a horseshoe nailed over a door will keep out evil and bring good fortune; that a miniature horseshoe worn as a watch "charm" or suspended from a chain around the neck is infinitely "lucky," and that a floral horseshoe forms a part of the decorations for festivities.

The efficacy of the horseshoe is well known and can no more be doubted than can the luck-bringing qualities of the right hind foot of a rabbit caught in a graveyard at midnight during "the dark of the moon."

While only a few iconoclasts will deny the luck of the horseshoe, not many of even the most ardent devotees of that charm know how or why it gained its magical properties.

It was St. Dunstan, the blacksmith, and the patron of all smiths and Smiths, who made the horseshoe lucky.

St. Dunstan was an Anglo-Saxon ecclesiastic who lived in the Tenth Century. He entered the Benedictine order at an early age, and when not engaged in religious duties he was employed as a blacksmith.

One day he was toiling away at the forge, thinking, doubtless, of heavenly things, when a shadow fell athwart the doorway. The saint looked up and whom did he see? The devil—no less!

Dunstan, serene in his piety and faith, was not in the least afraid of his visitor, who, according to all accounts, looked very much like an ordinary man, save that he had horns, a tail and cloven hoofs.

The blacksmith inquired of His Satanic Majesty the occasion of the dubious honor he had paid him, and the Prince of Evil replied that he had been traveling so long and so far that his hoofs had become sore and tender, and he desired to have horseshoes put on them.

Dunstan agreed to do the job, and he made it as painful as possible for Old Nick. The devil bellowed and roared in rage, but Dunstan was very strong and refused to let go of his hoofs until the Evil One had promised that he would never enter any house where a horseshoe was nailed above the door, nor molest any person who carried a horseshoe charm.

This legend accounts fully for the good fortune that is supposed to attach to a horseshoe, but it raises an interesting question.

Satan promised to respect the horseshoe as a sacred talisman, but the efficacy of the charm rests solely on a promise given by the author of all evil.

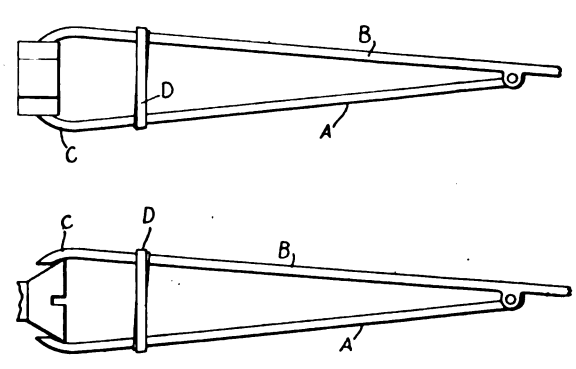
It was nearly a thousand years ago that the devil entered into that compact, which is a long time for even the best of folks to remember a promise.

TWO TWEEZER TIPS.

BY CHAS. E. DURYEA.

A slim cotter pin often can be used as a tweezer. The point can be shaped easily to suit the work at hand. If it needs to be extra good its point may be case-hardened after shaping. It can be sprung to remain closed if it is preferred that way, although to lightly spring open is the usual form.

An old umbrella bow makes a long tweezer,



Two Handy Tweezers.

as shown in the sketch herewith, with which screws can be dropped into inaccessible holes or nuts picked out of deep crank and transmission cases. The brace, A, and the short end of the bow, B, are about the same length, and their ends, C, can be shaped to suit by softening them. A rubber band, D, around them will hold them closed on the article and they can be forced apart by inserting a rod between them. The cost for material is nothing and the time required to make it very little.

Digitized by Google

Shop System Not Practical Without a Time Card

Furnishes Record for Keeping Track of All Time, Stock, Etc., Including Unproductive Labor—Prevents Leaks

BY FRANK A. OWEN

The first requisite in connection with the use of any time card of a system is to have it and a pencil in the most convenient place possible, so that the workman will not have to go out of his way to make his entries. The card shown is so planned than a workman who may not be good at figures can easily keep his record and accurately. Of course, if he cannot read and write he must ask someone to make the entries for him, but once the importance of regularly doing this is impressed upon him he will attend to it just as faithfully as the man who can properly keep his own record.

In keeping this time card the workman draws a line under the proper time as designated on the card every time he leaves a job, whether finished or unfinished, and makes the proper notations, for whom, order number and what the work was. The net time is figured out by the bookkeeper or whoever attends to making the charges for work done. In our case this is done each morning on the previous day's time cards.

Card a Benefit.

The effect on the men of being obliged to furnish a written account of their full time is very beneficial. For the proprietor who takes an active part in the work it is also advisable to keep a record of his own time, otherwise there will be a good many charges made for the jobs done which will not include anything for the labor he himself put into them.

One of the principal causes of unsuccessful blacksmiths and wagon men is the leakage or small things that do not get charged. The completed time card assumes a record of all labor customarily charged for at hourly rates, as well as a record of the time on so-called piece-work or fixed price jobs. The card also should be used by the workman to keep a record of stock used on the individual jobs, so far as is practical, though final responsibility for this really belongs to the bookkeeper, but he will be greatly assisted if all the workmen follow the practice as suggested. The completed time cards also furnish the figures for keeping a record of the cost of the productive and the non-productive labor, the latter a heavy item in overhead expense.

Keeping Track of Costs.

On the time card shown herewith, all filled out, it will be seen that there is also a space provided for keeping account of motor time, another common source of leakage. The workman sets down, or has someone else set down, the net time he uses motor power, every time he uses it; then if he uses it several different times on one job the bookkeeper charges up the total.

John Jones, the blacksmith, began work at 7 o'clock, February 1, 1918. The first half hour he spent fixing his cold chisels and cold cutter, so when he finished he drew a line under 7.30 on his time card, wrote down Shop and Rep. Tools. After that he worked until 9.15 for G. A. Brown, setting two tires 3 inches wide; so he drew the line under 9.15 and made the proper notations as illustrated. Then he worked until 10.30 repairing evener irons for the City Transfer, and so on through the whole day he made the records immediately after finishing each job. It will be seen that he used the motor 15 minutes for the City Transfer and he, himself, set down the net time in the proper place.

On the morning of February 2 the bookkeeper gathered in all the previous day's time cards and on Jones' card he set down 30 minutes net time for the repairing of tools for the shop. From 7.30 to 9.15 is one hour and 45 minutes, so he wrote down 1.45 for setting Brown's tires. The succeeding entries on the time card were similarly figured out and adding the net time for all the individual jobs showed that Jones worked nine hours that day.

Here, you see, is evidence of the moral influence on the workman of being obliged to keep an accurate record of his full time. Of course we know, as probably many of you readers know from experience, that there are a good many workmen whose morals do not encompass the belief that they should work the full number of hours they were hired to work, but we believe the keeping of his time card record does have a good effect on the average mechanic. Occasional "follow-up" inquiries by the foreman or the

TIME CARD

John Jones Feb. 1. 1918

	NET TIME	MOT.	FOR WHOM	ORDER NO.	WORK
7.00 7.15 7.30 7.45	30		Shop		Rep. Tools
8.00 8.15 8.30 8.45 9.00 9.15	145		Geo. A. Brown	4270	Setting 2 Tires 3"
9.30 9.45 10.00 10.15 10.30 10.45	115	15	City Transfer	4272	Rep. Evener Irons
11.00 11.15 11.30 11.45 12.00	130		C. D. Clark	4268	4 Shoes on Horse #5
12.30 12.45 1.00 1.15	15		(Noon) O. D. White		Planning Repairs
1.30 1.45 2.00 2.15 2.30 2.45 3.00 3.15 3.30	215	130	Smith Const. Co	4271	Making 6 Truss Rods 75 Lbs. Iron 10 " Nuts
3.45 4.00 4.15 4.30 4.45 5.00 5.15 5.30	130	45	Davis Express		Ironing New Wagon
			(Overtime Space)		
TOTAL	9		JOBBING W. & I. 7 / Paint	NEW WORK W. & I. 1½ / Paint	NON-PROD. W. & I. ½ / Paint
Week's TOTAL					

A Time Card Enabling Workman to Keep Accurate Record of Labor, Stock, Etc.

proprietor regarding the amount of time charged in doubtful cases will tend to increase this moral effect.

If the bookkeeper keeps separate records of jobbing, new work and non-productive work, he fills in the proper spaces as shown, "W. & I." standing for Wood and Iron work. The spaces marked "Paint" are of course for keeping record of the painters' time. "Week's total" is only filled out on the last card of the week. The six cards for the week may be placed in an overlapping group, index fashion, so that the figures in the footing spaces are visible and form vertical columns and they may then be added very readily to obtain the weekly totals and compute the workman's wages.

Many Benefits Derived.

Having explained the technical features and the manner of recording the day's work on the time card, we will now proceed to show the benefits resulting from the practice of using the system. The first entry, 30 minutes repairing tools for the shop, is not directly chargeable to any one customer and is entered in the non-productive space, eventually to be added to all other items of overhead or running expense. If perchance the reader thinks it is unimportant and too much bother to keep accurate account of such "small" items, let him take thought unto himself in this manner: John Jones, the blacksmith whose time card we are considering, draws 40 cents per hour wages, therefore repairing those tools cost the shop 20 cents, or one-eighteenth of the day's expense, so far as the cost of the blacksmith's labor was concerned. Now, even if we forget or ignore the coal used to fire the forge, the electricity to run the blower, accident and fire insurance, shop rent, office expenses, breakage, depreciation, fuel for heating, poor account losses and numerous other expenses frequently estimated to amount to 25 per cent. or one-quarter of the total cost of doing business, who will say that one-eighteenth of his expenses is so little that it is not worth while to bother about such things? Give the time card credit for one point, for furnishing the cost of non-productive labor.

Points Out Cost of Work.

Item number two: Setting two 3-inch tires for G. A. Brown, one hour and 45 minutes. William Wade, the helper, also had the same amount of time on his card. It is probably universal practice with all blacksmiths to have a fixed price for setting tires, so for this kind of work the advantage of the time card lies chiefly in the fact that the entry serves as a memorandum to make the charge against the customer. It is also, of course, an advantage for the proprietor of the shop to know how much time is spent on this "piece work," for he can figure up the labor cost, add all other items of expense, and determine whether or not his prices are what they should be. How else, than by use of the time card, can fixed piece-work prices be determined intelligently?

Item number three: One hour and 15 minutes for the City Transfer repairing evener irons. Charge for this work would be for actual labor as recorded on the time cards. This is the first job on the card on which the motor was used, and the bookkeeper charges the City Transfer for one and one-quarter hours' labor of Jones and one quarter hours' motor time. Very likely William Wade, the helper, also had an hour and a quarter on his time card charged to the same job. In that event you see we would have three entries recorded on the two cards for charges to be made by the bookkeeper against this concern.

Charging Lost Time.

Comments on item four are about the same as on number two; it was a piece-work job and the record is of value as a detailed memorandum to make the charge for the four number five shoes on a horse.

The fifth entry, 1 o'clock to 1.15, was for time spent with O. D. White discussing proposed repair work on his express wagon. How about it? Do you charge for time so spent? If not, why not? We pay Jones for his time while he is talking with White. Where do we get off if we don't charge it to White? We do, if he gets the work done; if he doesn't, that makes 15 minutes more of non-productive labor to be added in reality to overhead expense.

But usually we get them and the bookkeeper makes some kind of a memorandum of this time, which is later added to White's account when the work is done. Without the time card this charge would probably be lost.

From 1.15 to 3.30 Jones worked for the Smith Construction Co. making six truss rods, and used the motor one and one-half hours cutting threads on same. He also made the entry of 75 pounds of iron and 10 pounds of nuts.

This is another profitable feature of the system connected with the keeping of time cards, keeping account of the amount of stock used, and the regular practice by the workmen of so doing prevents a big leak

Digitized by Google

which would be pretty sure to occur if there were not some simple system for recording the stock used at the time it was used.

The last item on the time card, 3.30 to [illegible] was on a new wagon for Davis' Express, also there was an entry of 45 minutes' motor time on the same job. The particular feature desired for illustration in this case is the provision afforded for keeping account of the labor of building new vehicles. It is the bookkeeper's duty to keep a careful record of all the time spent by blacksmiths, woodworkers and painters on new vehicles and he can easily do so by "charging up" each day the labor recorded on the daily time cards. Then when the job is completed of course he can figure up the total labor cost, add the cost of stock, overhead expense, etc., and then know what the job cost.

Time cards more than pay, many times over.

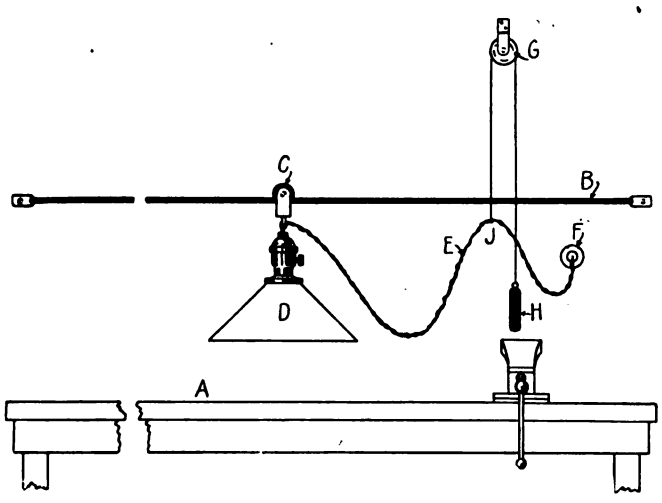
A HANDY BENCH LIGHT.

The Workbench and Vise Should Be Well Lighted or the Mechanic Cannot Do Good Work.

A few days ago as I was passing through a machine shop, I was attracted by the peculiar antics of one of the workmen. He was dancing up and down and occasionally he would wave one hand in the air; he wasn't doing this quietly by any means, but was filling the air with a sulphurous string of words that hardly look well in print.

So interested was I that I stopped to watch. After quieting down, Kelly, for that was his name, snatched rapidly at something on the workbench, and again went through the same performance. There was nothing offensive looking on the bench, and I certainly was curious as to the reason.

Kelly went through the same trials for a third time, then crawled beneath the work-



A Handy Lighting Arrangement.

bench and in a minute backed out again; then he went to work as though nothing had happened.

"What happened to Kelly?" was the question that kept running through my mind, and finally I returned to him and put the question to him directly. He acted rather "sheepish" for a minute or so, then solved the problem. "Nothing but a bare light wire," he said. "The thing fell across one of those wrenches, just the one I wanted, and I didn't want to crawl down beneath the bench to turn off the current."

There you have the reason for many minutes of lost time, doubtless the same trouble exists in many repair shops. The flexible lamp cord gets into the oil and grease and sooner or later the insulation is worn off. If a fuse doesn't burn out, the wire will give every workman "nerves" if he don't watch out.

Keep the wire out of grease and away from the bench in the manner illustrated. On the wall back of the bench screw a long, round bar, B, and upon it mount a pulley block, C, which is soldered to a light socket and shade, D. Cut the flexible cord just long enough so that the light can be carried to the end of the bar B, attach it to its plug in the wall, F, and overhead place a second pulley block, G.

About midway between the light and the socket, on the cord, tie a length of string, carry it over the pulley G and hang a weight to it as at H.

You see that the device answers two purposes. It preserves the light wire and it sheds light to any part of the workbench, just where the mechanic needs it.

SECOND ON THE LIST.

Down in a little Kentucky town there lives a negro by the name of Rastus, who conducts the only blacksmith shop. The town is small and Rastus found soon after he became established that blacksmithing did not occupy all of his time, so he bought a barber's chair and sat it up in the corner of his shop.

One morning, not long since, a traveling salesman hustled into Rastus' tonsorial parlors and requested a hurried shave. He made it clear that he was in a dickens of a hurry for he wanted to catch the early train out of town.

Rastus first eyed the salesman in the chair —then he glanced at his forge. Then he did what every perplexed man has done since Adam dwelt in the Garden of Eden, he scratched his head. He seemed very much in doubt as to what might be done.

Finally he solved the problem in his own mind for he said: "Ahs powful sorry, suh, ahm sure, but dere's a mule ahead of yuh."

The Rock Drill Blacksmith

Part VI—Apparatus Used For Quenching, The Depth of the Liquid and the Effects of Various Baths

Copyright, J. F. SPRINGER

I am indebted to Mr. Gilman's article already referred to for information as to a quenching apparatus employed by the Homestake Gold Mining Company. This apparatus is designed to give a drill bit a limited depth of quenching when first put into the water but to increase the depth continuously from that moment, until the quenching is completed.

The illustration shows the Homestake method of securing a deeper and deeper dip as the cooling goes on. The water or brine or whatever liquid is used is in a circular tank. It is supplied through a suitable inlet tube which discharges at the top of the quenching bath. On the diametrically opposite side of the tank, an overflow tube is arranged. There is a cock provided for the inlet tube, but in this case none is shown for the outlet tube.

A bearing is arranged centrally in the tank to support a rotatable vertical shaft. The shaft passes through the center of a circular platform, and the arrangements are such that the rotation of the shaft carries the platform around. However, the platform is not supported by the shaft but the latter rather supports the former. The two are secured together by screws shown in the drawing. These screws secure to the shaft tube the two halves of a spherical socket.

There is at the center of the circular platform a kind of hub in two parts. These are bolted or riveted to the platform and constitute a "ball" which with the aforementioned socket makes up a ball-and-socket joint. The lower part of the socket rests on the top edges of the bearing in the tank. The shaft projects down into this bearing and turns within it.

The weight of the combination of the shaft, platform and ball-and-socket joint (in so far as it is not carried by the rollers arranged around the inside of the cylindrical wall of the tank) rests on the top edge of the bearing in the center of the tank. The rollers are set so as to compel the platform to rotate in a plane a little different from the horizontal.

The rotation is effected by a horizontal belt which drives a pulley arranged on the upper end of the shaft. The shaft is provided with radial wings or brackets for the purpose of holding the drill steels in a vertical position with the cutting face resting on the platform. The steel is temporarily secured by a suitable catch or equivalent device.

The Apparatus in Operation.

When the apparatus is used, the hot drill bit is set up, face down, at a point where the bath is quite shallow over the platform. As the latter turns, it carries the steel around, submerging the face more and more. After passing the point of deepest submergence, the steel encounters a knock-off lever, A. The effect is to knock the hardened bit from the apparatus and leave a vacant place for a fresh, hot one.

It will, perhaps, be noted that by starting the hot bit at points more or less removed from the outside edge of the rotating platform, variations in the initial quenching depth may be obtained.

Some may be puzzled as to what purpose may be served by starting a hot bit with a shallow immersion and then increasing the depth of the submergence. The effect of the first part of the dip is to chill quickly the actual cutting edges—the actual points of metal that come into contact with the rock. This sudden chilling produces or tends to produce a high degree of hardness.

The parts of the bit above the level of the bath at the moment of first immersion get ultimately a less sudden chill. What chilling effect they do get comes first from the cooling metal near by which is actually in the water and second from a delayed contact with the water. The effect is to leave these portions of the bit, which are back a little from the actual cutting points, somewhat softer and tougher than would be the case if they were chilled very suddenly.

Quenching Liquids.

The favorite liquid for quenching rock drill steel is undoubtedly plain water. Water is a good quenching substance, doing its work promptly and effectively. Besides, it is easy to get and ordinarily costs little or nothing. Why should it not be the favorite medium?

And yet there are other substances in commercial use. In fact, water is used in more than one way. The foregoing facts are sufficient, perhaps, to show the reader that it is very possible that there may be some advantages in using liquids other than water and in employing water in ways other than the usual one.

To understand the matter, it will be necessary to have before us some of the scientific information, now available, with reference to the behavior of steel when it is quenched.

Rock drill steel will vary, let us say, in respect to its carbon percentage, around 0.80 per cent. Some drill steel will be softer, some will be harder. This means that, in the annealed condition, pearlite grains will constitute nearly the whole, or at least a large part, of the mass.

There may be a "honeycomb" separating the grains from one another. If so, it will probably have quite thin walls. It will consist of pure iron or of cementite. In short, rock drill steel will consist mostly of just one substance—pearlite. When the metal is heated to the proper hardening temperature and then suddenly cooled, an internal change will take place. The mass as a whole—inside and out—will become hard.

Digitized by Google

It is the **suddenness** of the cooling that in some mysterious way affects the hardening. In general, the quicker the cooling of the steel, the harder the result. There are other things that enter. Nevertheless, when other things are the same, a slow cooling with plain water produces a drill bit lacking in hardness, while a fast cooling under the same circumstances will bring about a higher degree of hardness. As it is desirable to have drills harder at one time than at another, it is useful to know what to do to get the desired result.

The **temperature** of the water affects the result. The colder the water, other things being the same, the harder will the steel become; and, similarly, the warmer the water, other things being the same, the softer the steel will turn out.

For example, the blacksmith will be forging, reheating and quenching rock drill bits. At the beginning, the water in the usual tub will be quite cool. Later on, the effect of the repeated quenchings of hot bits will result, it may be, in the water becoming warm or even hot. If the hardness be tested at the beginning and a good while later when the bits are being dipped into heated water, a difference will be noted. The drill bits now come out of the water in a softer condition.

To avoid this result, a flow of water through the quenching tank should be maintained. Even where no actual flow of water is provided, it is of advantage to move the hot work about in the bath, as this brings it into contact with cooler water.

Hardening Rate Is Vital.

Now it so happens that liquids in general differ in their power of absorbing heat from heated steel. And, even with the same liquid, it is possible to get different results by heating or cooling the liquid, or by adding some substance to it. Such variations in the quenching bath affect the **rate** of cooling the hot steel. **In hardening, rate is pretty nearly everything.**

Common salt, dissolved in water, hastens its cooling action. Ice would produce the same result. But it is probably easier in most shops to salt than to ice the water.

Various **oils** may be used in quenching baths as substitutes for water. In general, a change of temperature of the oil in a bath will not produce as marked an effect upon the hardness as will the same change of temperature of the water.

Where flowing water can not well be provided, a stationary oil bath will probably produce less variation in hardness than a similar water bath. The reason has already been given. An oil bath has, then, a considerable advantage, if a flow of the quenching liquid can not be conveniently arranged. However, oils are generally slower in action.

Whether an oil bath will be suitable depends upon whether its general average produces the right result upon the steel bits for the particular work they have to do in a given mine.

Let me now go into more detail. **Brine** is very quick in its action—quicker than pure water. Further, it retains its quickness of action better as it heats. In fact, if brine is used in a tank big enough and the contents of the tank are sufficiently kept in motion by stirring or otherwise to prevent the temperature getting above 150 degrees F., then the brine need not be used in the form of a flowing stream.

It is sufficient to use a simple bath. Brine acts very evenly for all temperatures from that of the shop up to 150 degrees—so evenly in fact that the difference between dipping a hot drill-bit into brine at 80 degrees and brine at 150 degrees is negligible.

The thing to decide at the mine divides itself into two questions:

(1) Does brine at the ordinary shop temperature give the degree of hardness desired?

(2) Will it be convenient to provide for the shallow dip required and still prevent the temperature from getting above 150 degrees?

If both—not one, both—these questions can be answered Yes, then brine is the liquid to use.

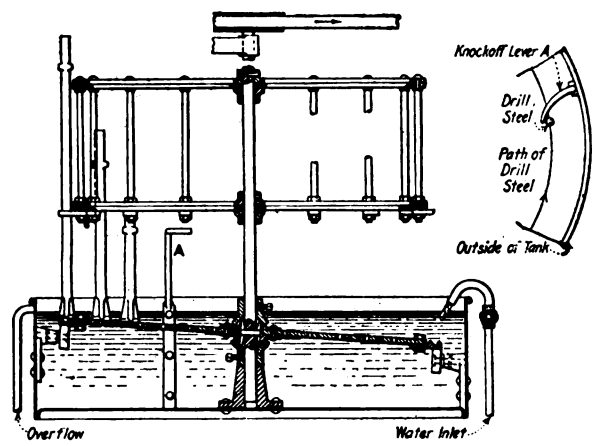
Water—that is, ordinary pure water—is quick in its action, although not quite so quick as brine. It is decidedly quicker than any of the oils in the list herewith. It has, as has already been said, the bad quality of varying its rate of cooling the hot steel as it itself warms up. Water, in fact, begins to change its rate of cooling the steel as soon as it itself warms up something over 100 degrees. We may, perhaps, regard it as having a uniform effect on the hot steel up to the point when the bath reaches a temperature of 120 degrees. What has to be decided at the mine is, as before, divisible into two question:

(1) Does plain water at the ordinary shop temperature give the degree of hardness desired?

(2) Will it be convenient to provide for the shallow dip required and still prevent the temperature from getting above 120 degrees?

If both questions admit of affirmative answers, plain water is the thing to use.

The following table gives a list of quenching oils used in commercial work. The number of seconds opposite the name of each oil is the average number of seconds required



The Homestake Quenching Tank.

to cool a piece of steel 500 degrees in 25 gallons of the oil, the oil being started at 80 degrees and not allowed to get beyond 250. The steel was heated to a **dull cherry.** The average numbers will afford a guide by which to compare the various oils.

Commercial Quenching Oils.*

Name of Oil	Number of seconds to cool steel 500 degrees
1. New fish oil	85
2. No. 2 lard oil	87
3. Prime lard oil in use 2 years	99
4. Boiled linseed soil	101
5. Raw linseed oil	102
6. New extra-bleached fish oil	106
7. New yellow cottonseed oil	107
8. New tempering oil (cottonseed 60 per cent., mineral oil 40 per cent.)	122.6
9. New mineral tempering oil	130
10. No. 1 dark tempering oil	157.3
11. Special "C" oil	164.7

* This table is taken from D. K. Bullen's "Steel and Its Heat Treatment."

All these oils, Bullen's curves seem to show, are more dependable than brine and water for producing the same hardening results as the bath warms up—that is, all but Nos. 10 and 11. However, it is to be remembered that the bath is not supposed to heat above 250 degrees. As water boils at 212, this is a pretty high temperature for a bath. The smith contemplating using an oil should consider the following questions:

(1) Which oil, if any, produces the desired hardness, when used at, say, 150 degrees temperature?

(2) Is it sufficiently convenient to arrange the bath so that the shallow dip will be provided for and the oil temperature kept below 250 degrees?

If both questions can be answered suitably, then the oil decided upon would appear to be the quenching liquid that the smith should use.

The problem of keeping the temperature down may be easy or difficult to solve. It depends upon conditions. If the amount of work to be quenched in a short time is quite moderate, it may be sufficient to provide a big quantity of the quenching liquid for the bath. It will then, perhaps, only be necessary to stir the bath now and then with a steel rod or by other means.

It is, however, very necessary now to overlook the requirement that the bit shall be dipped only a short, pre-determined distance into the bath—say, ¼, ½, ⅝ of an inch—and that the face of the bit shall enter the bath horizontally.

This means that some method must be adopted to limit the depth of immersion and at the same time require the shank of the bit to be vertical. The perforated false-bottom set at the proper distance below the surface of the bath constitutes one solution of the problem. But, it may be necessary to modify the arrangements, elsewhere described, if it is proposed simply to stir the liquid by a rod held in the hand. A central space might be left open for this purpose. Or some arrangement of a paddle or a paddle-wheel might be rigged in between the true and the false bottoms.

In the latter case, the shaft on which the paddle-wheel is mounted may be arranged to rotate in a stuffing box on one side of the tank. A hand-wheel or crank outside will then enable the operator to turn the paddle-wheel now and then.

A method of securing a continual flow through the tank—in at the bottom at one end and out at the top at the other—has been described in another portion of this article. It is particularly adapted for use with the public supply of water furnished under pressure. There are many cases, however, where a flow of water is not so convenient.

Where an oil is to be substituted for flowing water, one can not, of course, depend upon a public distribution of oil through one or more pipe lines. Nevertheless, it is not necessary to abandon the method depending on flow. A supply reservoir connected with the inlet end of the tank and a receiving tank connected to the outlet end would seem to provide essentially what is wanted. The supply reservoir is set up above the desired level of the bath in the quenching tank.

This arrangement provides pressure on the oil—pressure to force it into the quenching bath against the oil already in it. The receiving tank is, naturally, set below the level to which the surface of the bath is to sink. Suitable cocks should be provided to control the inflowing and outflowing oil. The receiving tank may conveniently be provided with a strainer near the bottom.

With the foregoing provisions, it only remains to arrange for transferring the strained oil in the receiving tank to the reservoir. This may be done now and then by a suitable pump. Or, if the amount of oil to be transferred at a time is small enough, the oil may be drawn, a bucketful at a time, and transferred by hand. Naturally, the discharge spigot on the receiving tank will be set above the strainer near the bottom.

Keep the Bath Clean.

The quenching tank may, probably will, develop a tendency to gather on its bottom all kinds of waste materials. Some of this waste stuff may be impurities in the water or oil; some may be dirt washed off the heated drill bits; and some may be miscellaneous material such as dust and odds and ends that naturally are received by an uncovered tank. It is not desirable to have such settlings come into contact with the work. With the quenching tank arranged for a continual flow of liquid and provided with a perforated false bottom upon which the bits may rest—with this apparatus there should be no trouble with settlings getting to the work.

Digitized by Google

BLACKSMITH & WHEELWRIGHT

The Pioneer Journal of Its Class in the World.

Member of the Audit Bureau of Circulations.

PUBLISHED MONTHLY BY

M. T. RICHARDSON COMPANY,

71-73 MURRAY STREET, NEW YORK.

POST OFFICE BOX, 654. TELEPHONE—7377-7378 Barclay.

CHICAGO OFFICE, Lytton Building, 14 Jackson Boulevard

Entered as second-class matter at the Post Office in New York City.

M. T. RICHARDSON, President and Treasurer — F. R. WHITTEN, Secretary

M. T. RICHARDSON, Editor

FRANK L. AVERY, Managing Editor

F. R. WHITTEN, Advertising Manager — H. F. LUDINGTON, Western Representative

GEO. A. SMITH, Eastern Representative

FRANKLIN MYERS, Art and Copy Dept.

FOREIGN AGENTS:

NEW ZEALAND

MR. R. HILL, Matlock House, Davenport, Auckland, New Zealand.

GREAT BRITAIN

ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance.....$1.00
One Copy, six months, in advance.....60 cents
Single Number.....10 cents
Canadian subscriptions.....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English Money.

Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

ADVERTISING RATES SUPPLIED ON APPLICATION.

SPECIAL NOTICE

Subscribers failing to receive their magazine regularly will favor us by giving us notification to that effect.

CHANGE OF ADDRESS

Subscribers who desire the address of their paper changed should send us the old as well as the new address.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

OUR EDITOR'S LETTER.

WHEN I was a little, curly-headed youngster, quite a number of years ago, by the way, my dad, who was a machinist, used to take me down to his shop and let me amuse myself driving nails in a board. Usually when I arrived home, at the end of a long day of heavy toil, my hands would be anything but white, my face would be the color of ebony and my clothes almost ruined.

Days not spent in the machine shop were occupied in amusing the village blacksmith, who had a shop just over the hill from my house. The town where I lived boasted of about 800 people, really a big family, for everyone knew every other resident. The smith was really the biggest business man in the place and was looked upon as an authority. He gave advice upon everything from politics to sick hens, for he had traveled wide and seen the world.

I remember Reilly well. Despite the fact that I was but five years old, that good-natured Irishman left a great impression on my mind. Next to my mother and father, I think he had my greatest esteem. I would sit for hours, playing with horseshoes and nails and had I been older I am sure that his wise sayings would have influenced me greatly.

Perhaps it is due to Reilly that my heart is warm toward the Irish, the lightest hearted people on earth, as well as the kindest. When anyone tries to scoff at them, I can't help but clench my fists, despite the fact that I know the Irishman is able to hold his own in any argument at any time.

There is one thing that I have noticed about the average blacksmith, he has a sense of humor. He is willing and waiting to be amused. He likes to play, provided he can find anyone to play with him. That's why I liked to visit Reilly when I was a little shaver.

Bearing that fact in mind, it has occurred to me that perhaps you, brother blacksmith, like Reilly, are fond of a joke. You like the Blacksmith and Wheelwright magazine because of its mechanical hints and suggestions, but wouldn't you like a little fun mixed with it? I hope you will answer yes, because I've taken a chance and inserted an Old Timer story which isn't just a mechanical article, but contains a few humorous sketches.

If you don't like it, however, just take a pen and a bottle of ink and send me a letter, call me anything you like if it eases your mind, and I won't make the mistake again. Of course, I have one advantage over you, all I need to do is write one letter and publish it—you all read it; while it takes quite a few thousand letters for all of you to get your ideas to me. I'm willing to make one concession. If you want to roast me real hard and let the other subscribers know about it, I'll publish the letter.

On the other hand, even if you don't roast me even a little I'll publish the letter if it contains anything interesting to the rest of our subscribers. I usually find that when any of my brother blacksmiths take time to write a letter, it is interesting enough to publish. So—let's get better acquainted; write me a letter to-day.

Always Try To Keep the Work In Your Own Shop

A SHORT time ago we received a letter from one of our blacksmiths who said that he worked in a town where another blacksmith shop was located, and that when he didn't know how to do a certain job he turned that job over to the other blacksmith. This shows that there is something wrong somewhere.

It is true that not every blacksmith can do all kinds of work, still what one man can do every other man should be able to accomplish, unless he has not the necessary equipment or tools. The blacksmith specializes too closely. Perhaps it is the fault of the work.

In certain communities smiths may do little else but plowshare and farming implement work. In other communities the smith may have farming implement work. In other communities the smith may have his hands full, horseshoeing. Continuously plugging away at the same kind of work makes a specialist who does not like to do anything else.

The attitude is wrong. The blacksmith should never say "I can't do that work." He should familiarize himself with all kinds of work and at least know how the work should be done. He can do this by reading the trade papers and books. No one is too old to learn. In these days work comes too hard to be ignored.

Every piece of work that you turn away from your shop into another shop means that the other fellow steals your customer. Not only will you lose work at that particular time, but in the majority of cases the customer will not return to you again. A satisfied customer is the best means of advertising that you have at your command. Don't let him keep away!

Try To Interest Your Son in the Automobile Business

WHAT argument can be used to convince a young man that the blacksmith field holds forth good promises for the future? So many of our blacksmith readers ask us this question that perhaps it is just as well for us to get together to solve it once and for all.

Doubtless many of our old "young" readers (we find that the blacksmith remains young until he is at least seventy years old) would like their sons to go into business with them. Every man feels that his business is perhaps the best, but usually it is hard to make a young man see the advisability of going into the blacksmith business.

You, who are blacksmiths and have sons old enough to work, should do a little thinking before you ask your son to work for you. For instance, suppose you had six daughters, all of whom were musically inclined. Would you think it best to teach them all how to play the piano? Wouldn't you prefer to teach one how to play the violin, another the 'cello, and so on? In that way you would have a sort of co-operative orchestra, all your own, whereas if each played the piano you would soon tire of this kind of music.

Again, suppose you were a doctor and your son wanted to get into the profession. Would it not be best to have him train for an apothecary rather than a doctor? Perhaps you could start him in the business and in that way, you could work together.

It is a strange fact that a son seldom likes the business of his father, but surely he can be interested in a line which is closely allied with his father's work. Acting upon this suggestion then, why would it not be wise for our readers who have sons ready for business, to educate their sons along automobile lines? The mechanical work which the father could not do, would go to the son. The blacksmith work that the son had, would go to the father. The two working together might be compared with a pair of clasped hands. One would uphold the other. When business was poor in one department, undoubtedly the shop could be filled with the other class of work. At any rate the arrangement is worth thinking over.

It can be applied in other ways as well. Why should a blacksmith purchase many tools and costly equipment, and permit an automobile repairman to go in business in the same town and purchase much of the same kind of machine tools? Why not combine the two shops into one larger one? Make a partnership of it, and help hold each other up. Don't you think this is worth thinking over?

We Still Have Many Duties Toward the Boys Coming Back

THERE is an old saying which we have all heard time and again. "Out of sight, out of mind," and this old adage has many applications. It is particularly true today. Only a few weeks ago each of us was enthusiastic and patriotic. Our pocketbooks were at the disposal of our country. We gave considerable money for charity and we always had a few cents ready for the cause.

The war is over now, and many of us feel that we want to forget it, not because we are not grateful to our boys who have done the fighting, but because we feel we have done our share and that no more help is needed.

Now is the time, however, when many of the large organizations such as the Red Cross, the Y. M. C. A., the Knights of Columbus, the Jewish Welfare Board, and the Salvation Army need a great deal of money. All of us remember that these organizations are taking care of our wounded, are helping to repair the devastation which has been wrought by the war, and are feeding the homeless.

Heretofore they have been assisted greatly by the different countries and the military organizations. Now, however, the load is the greatest and they must bear it alone. No matter how much we have given, we cannot have given too much. We owe a great debt of gratitude which we cannot repay to our boys who have fought for us. We owe still more to those boys who have been wounded.

You and I, brother blacksmith, who have stayed at home, have been comparatively safe. In way, we have sacrificed nothing. The boys who have gone to France, however, have sacrificed their careers and in many cases their lives. Yes, we know that you have given. Perhaps your business does not warrant any more charity gifts. Even so, however, to quiet your conscience, you should do your little part in helping the worthy causes which we have mentioned.

Much money has been expended, and much more will be necessary. Heretofore your gifts have been in the nature of an investment. They have been your duty. Now, you are called upon to give purely from sympathy.

Digitized by Google

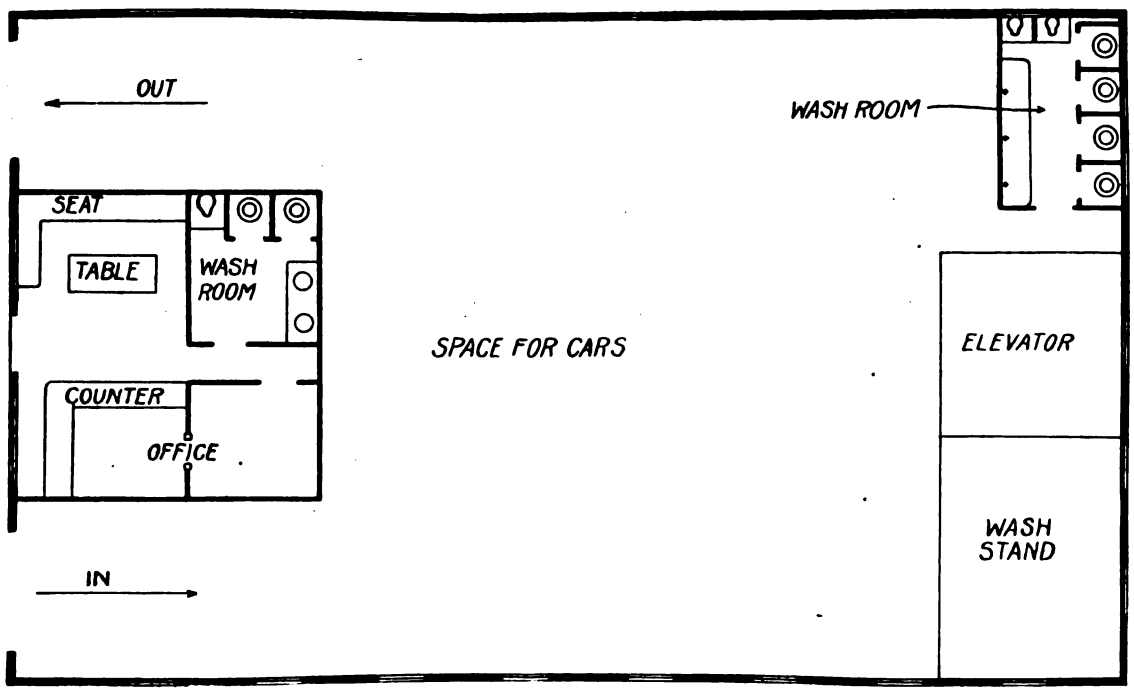
Stable Versus the Garage

How a Stableman and a Wheelwright Achieved Sucess In a New Line

JAMES F. HOBART, M. E.

I can count up at least three livery stables which have given up altogether the handling and care of horses and have gone into automobile handling, storage and repair altogether. One in particular, occupied a rambling brick building with all kinds of room inside, some of which was used only for the storage of accumulated rubbish and still left room for keeping over one hundred horses and a large number of vehicles.

When the mandate went forth to close out the livery business, the building was



Illustrating How Ground Floor of Stable Was Arranged for the Automobile Business.

cleared from top to bottom and everything which could be moved was thrown out. Then the walls were swept well and whitewashed. The ground floor was ripped out and a good concrete floor put in, with adequate washing and toilet facilities. Two toilets were installed, one for patrons, the other for attendants, thus avoiding the necessity for communication between office quarters and the garage proper, either for workmen or for visitors.

The building was originally supplied with a steam heating plant and this was well overhauled and put in perfect condition. Mezzantine floors were then constructed all around the building, high enough above the ground floor to permit automobiles and trucks to pass freely under said floor. The middle of the building was left open to the roof, which was pretty high in the middle of the building, especially as it was a pitch roof and well supplied with skylights which could be opened or closed at will from the ground floor.

Installed Elevator.

A platform elevator was installed which connected with the mezzantine floor and on this floor were kept all supplies, and a stock of automobiles for sale was also stored on that floor. In the rear, a space was partitioned off for a repair shop and it was fitted with lathe, drill, arbor puller, grinding machines, brazing and welding outfits, both oxy-acetylene and electric. A vulcanizing outfit was also to be found, but in a little room of its own, upstairs, and connected by stairway with the repair shop downstairs and by passageway with the tire and stock rooms.

A well appointed office and waiting room was erected on the ground floor, at the front of the building, and as stated, the patron's toilet and wash room was adjacent thereto.

For the past ten years the business of the old livery stable had been slowly dwindling away and the last year had barely business enough to pay expenses. But after the change was made, the business increased so fast that the owner had hard work to take care of it properly. He was obliged to employ nearly a dozen men to take care of the large volume of business which immediately began to flow in his direction. It took him a little time to get acquainted with the details of his new business, which was very much different from the "horsey" situation to which he had been accustomed.

But the owner went into it right, therefore he came out right. He did not attempt to carry on such a business without efficient help. Before he had been in the rejuvenated garage ten days he found himself simply snowed under with a business which was strange to him and the details of which he knew absolutely nothing.

And right here the owner showed another bit of long-headed wisdom. Instead of plugging along, finding out by expensive experience what and how to do, the owner immediately engaged a capable, experienced man, who knew the automobile business from the ground up, having grown up with it. This man was paid a large salary from the very start—and he earned every cent of it and more, too. He immediately set the business aright, engaged competent help and installed the peculiar ways and customs which make or mar the automobile business.

The owner immediately began in his quiet way to "go to school" to his manager, and to act as assistant thereto, instead of trying to run the business himself. The result was that the owner soon acquired a working knowledge of the business and quickly proved that he knew a thing or two by fixing up his capable assistant in such a manner that it was almost an impossibility for said assistant to ever leave the business of the owner.

This was effected in a very simple manner. The owner simply made his assistant a partner—gave him an interest in the business and went to work in harmony with his capable assistant, dividing the work between them in a manner which gave to each man that part of the necessary routine work which he liked best and consequently was best fitted for.

I have not been at this garage since February, 1917, but I assume that its business is still growing, for it is situated near, but not in, the center of a large and thriving city, where business is to be had by the competent concern merely for the taking.

How the Little Concern Grew.

Much different was the course followed by a man who had a smithy in the outskirts of the same city, but several miles from the center thereof. This man had a large shop, big enough for three fires and there was a space which had been used by a wheelwright in the days past, before two or three large concerns had monopolized the wagon making business.

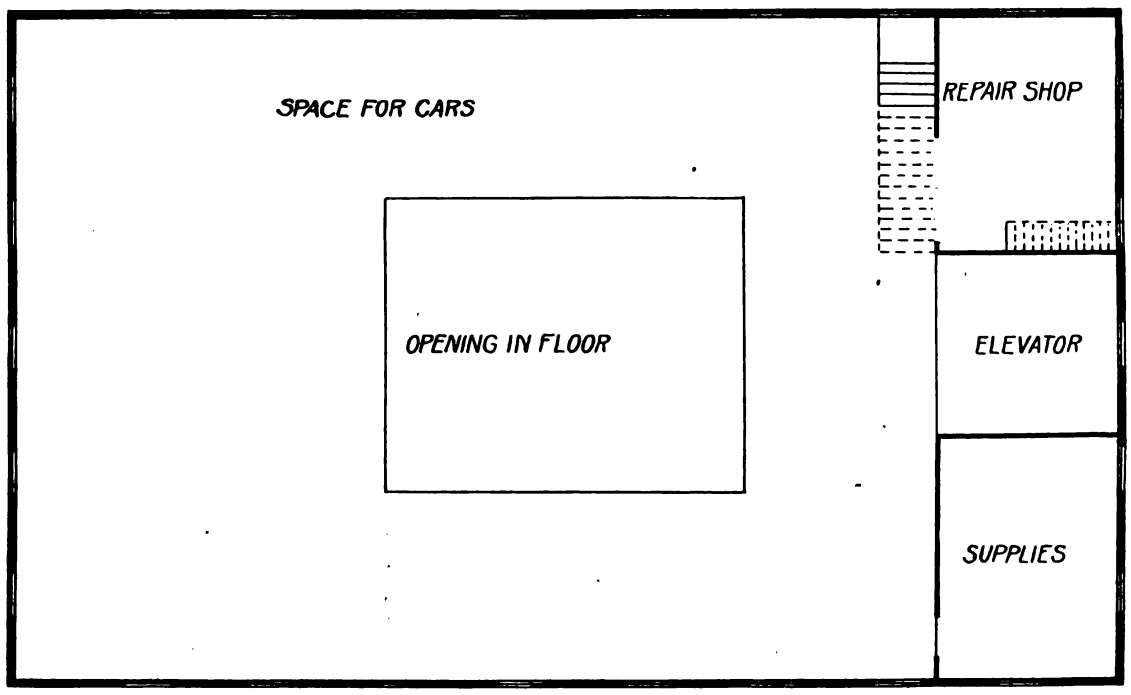
This man went to work and cleaned out his shop, removing all rubbish and material which would not be needed for automobile work. He reserved a small space near the forge for horseshoeing, for there was still a little to be made in that business, also in occasional wagon repairing. The latter, however, was to be taken care of in the automobile department.

Makes a Start.

Next, this smith, who, by the way, had a few hundred dollars to work with, procured an underground gasoline filling tank and set up in the shop a little air compressor, operated by an independent gasoline engine. The gasoline device was installed by the roadside and the air pipe brought to the same point with the hose thereof so arranged that it could be safely locked up at night inside the gasoline cabinet.

Next, the smith held an earnest debate with himself as to whether it was best to break into the business alone, or to hire a competent repair man and act in accordance with the advice of that man. While making up his mind as to the above, the smith put out his big "Repair Sign" which he had prepared, filled the gasoline tank and sat on his anvil between horseshoeings, waiting for sick autos to come along to be cured.

And they came, soon and several. The smith jumped right in, did the best he could, acquired automobile engine knowledge and made what repairs and adjustments he could



The Supplies and Repair Shop are Located On the Second Floor and Reached By an Elevator.

Digitized by Google

and sent into town such work as he was not fitted to handle in his little "one-horse" repair shop.

Rushed With Work.

Within a week the smith was completely overwhelmed with work. He hired a smith to shoe the few horses and to help on autos between shoeings. But all the time the smith saw jobs going away from him—he had to send them to town himself—which were the cream of the whole thing and wherein the most profit would be found.

Thereupon the smith took stock with himself and sought for and hired an experienced auto repair man and with him began to install, one by one, as soon as possible, the machines and appliances necessary for doing all kinds of repair work pertaining to automobiles.

That little desolate, lonesome smith is now a bustling auto repair ship with a dozen men busy in it all the time and machines waiting their turn to be brought in. The smith was in town last time I was at his shop. He was arranging with a contractor to put up an addition to the shop, and the addition was to be built of poured concrete! Therefore, smiths, go to it. Be not afraid to venture everything in the auto repair business, provided you have the necessary skill and can obtain the "know-how"!

FIRST ENTRY IN CONTEST.

We have always known that New Jersey was on the map, and just about a lap ahead of every other state—now we have proved without a shadow of a doubt that the Blacksmith and Wheelwright readers from that state were just as up-to-date.

Our first picture received and published, entered in the prize contest, comes from New Jersey. From Mr. Ewing, and although Mr. Ewing does not look lonesome in the photograph, the two photographs were the only ones received up to the time this paper went to press. At this rate Mr. Ewing will win all three prizes. So get busy, brothers, and send in at least one picture. For the benefit of our new readers we will repeat the terms of the contest.

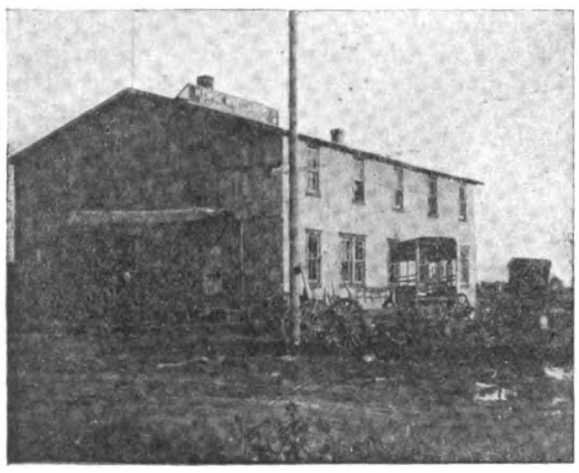
The contest is open to all readers of the Blacksmith and Wheelwright. Whether you are a subscriber or not you stand a good chance of getting a prize. There are three prizes to be given out, the first of five dollars will be given to the reader who sends a picture in which is shown the most automobile work going on in his blacksmith shop. In case of a tie, five dollars will be sent to each of those who, in our opinion, have shown the most automobile work in their shop.

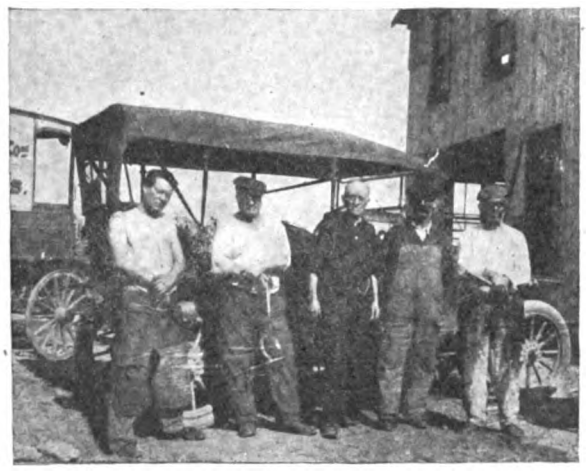
The second prize of five dollars will be given to the reader who sends in a picture of the best looking shop, and the third prize of five dollars will go to the reader who writes the best letter, telling how successful he has been in doing automobile work.

After we are through with the half-tone cut which we use for printing the picture in the magazine we will return it, together with the original photograph, to the original sender.

It doesn't cost you anything to enter your picture in the contest, there are no strings attached to the prizes. In any event you will receive a cut which you can print on your billheads. The cut alone is worth from two to five dollars. In our last contest one of the men who entered pictures used the cuts to advertise in his daily paper. The winner of the first prize had a fine long article published in his local paper

The contest will close on October 1, 1919, so send in your picture to-day so that it will appear in our next number. "The more the merrier."





Prize Photo Number 1.—Mr. Ewing's Shop Measures 36 by 50 Feet and Was Built in 1917. In the Group at the Right, Mr. Ewing is at the Center.

HARD SOLDERING OR BRAZING ALUMINUM

The process of hard-soldering aluminum differs from ordinary soft-soldering, principally because the solder has a much higher melting point than soft solder. The term "brazing" is generally applied to this kind of soldering. Brazing is one of the oldest included in the mechanical arts, and was well known to the ancient Egyptians, as many relics of their work indicate.

Hard-soldering or brazing is a fairly simple process, but proficiency in it requires practice. It is usually employed where greater strength is required than can be given by soft-soldering, or where an article has to stand a temperature that would cause soft solder to melt.

A brazed joint in most metals, properly made, will withstand a strain nearly equal to the tensile strength of the adjacent metal.

One of the conditions essential to success in all brazing is that the solder should unite to form an alloy just where the brazing occurs, and this should take place spontaneously. This actually happens when brazing such metals as copper, gold, iron, and silver, and such alloys as brass, german-silver, gunmetal, etc., but not in the case of aluminum.

This metal is without doubt one of the most difficult to braze effectively, due largely to the vast difference in the fusibility of aluminum oxide and aluminum metal. The melting point of metallic aluminum is about 655° C., whereas that of the oxide is nearly 3,000° C.

In making brazing solders for aluminum it is always desirable that the constituent metals should be commercially pure, because impurities interfere to a great extent with the strength, fusibility, malleability and color of the metal. A solder with the color of aluminum is obviously an advantage; hence it should contain a percentage of aluminum; zinc is often added, as its color resembles that of commercial aluminum and many of its alloys.

For work where the joint has to withstand bending stress, a high percentage of zinc should be avoided, as it is apt to cause brittleness. The fusing point of brazing solders for the general commercial metals should be as close as possible to that of the metals joined, as a more tenacious union may thus be secured; but experience shows that brazing solders for either aluminum or its alloys should melt at an especially lower temperature than the metal on which it is used, for between 500° and 550° C. these metals become very friable and their tenacity practically disappears. It is therefore recommended that brazing solders for aluminum should not exceed a melting range of from, say, 400° to 450° C.

Care should be taken to guard against the effects of expansion and contraction, since the co-efficient of expansion of the metal is considerable; indeed, while a piece of work may be quite good so far as the joint itself is concerned, it may be rendered useless owing to the deformation caused by the heat.

As previously stated, these hard solders have a high melting point; therefore they cannot be melted with an ordinary soldering bit. The work is sometimes done on a coke or coal forge fire, but the usual process is to raise the temperature by a gas blowpipe, applying the blast by a power-driven fan or by foot or hand bellows. Suitable gasoline, gas or kerosene brazing lamps may also be used.

The blowpipes with gas and air blast are more preferable than the hard fuel system, because the metal and flux are kept clean and free from particles of dust, and, therefore, a more reliable joint may be made.

During the brazing operation joints will often appear to be sound, but when the superfluous metal is removed, such as by filing, grinding, etc., it will be discovered that there is no metal in the joint, the solder having failed to penetrate it. This is frequently the case with aluminum, as the rapid formation of the oxide prevents the solder from flowing easily between the surfaces to be united. Consequently, the process known as "dip" brazing should not be attempted, as it is unsuitable for aluminum.

As is well known, the essentials of a brazed joint are the contact of perfectly clean surfaces free from oxide and dirt. In aluminum we have a wonderful bright and clean-looking metal, and probably this is the reason why so many workers are somewhat mystified regarding the difficulty in soldering it satisfactorily.

The question is often asked why, if aluminum cannot be effectively soft-soldered it should not be brazed; but the bugbear to successful brazing is precisely the same as that encountered in soft-soldering, namely, the difficulty in eliminating the refractory oxide from the hot metal, the oxide preventing the interfusion or alloying between the brazing solder and the surfaces to be united.

It is evident that aluminum and many of its alloys do not lend themselves to brazing. Not only is there the difficulty in removing the oxide, but the metals are more liable to fuse during the operation than many of the brazing compounds used.

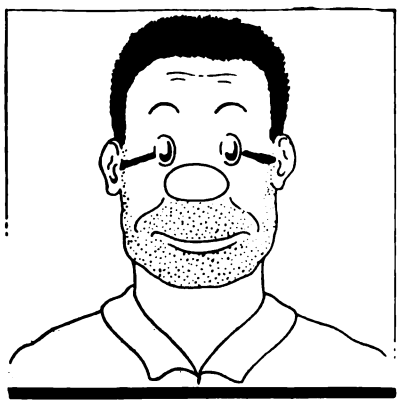
The writer is referring to the operations of brazing proper as generally carried out when brazing copper, brass, iron, steel, etc., not to operations where the worker uses a blowpipe or blowlamp simply to melt the solder or to heat up the pieces to be joined. In the operation of brazing, the heat is not usually applied to the solder, but rather to the work from which it travels to the solder.

The search for a reliable flux for use in brazing aluminum is unquestionably one of the most difficult. There is no reliable flux for brazing aluminum of which the composition has yet been made public, although several special spelters are manufactured for aluminum brazing.

A series of interesting experiments was recently carried out in a large engineering works with the brazing of various sheet-aluminum articles, ranging from 1/32 inch to ⅛ inch in thickness. Several types of joints were made, namely, the ordinary dovetailed joint, wedge or scarf joint, overlap joint, butt or edge to edge joints, etc. Many brazing solders and fluxes were also employed.

The articles were mostly of a cylindrical shape, and varied from about 1½ inches to 10 inches in diameter. The surfaces to be brazed were thoroughly cleaned, accurately fitted, and the pieces were fastened securely together. The brazing was effected on an ordinary brazier's hearth, and for heating the work clean and small coke was the fuel employed. The results were unsatisfactory, in that the aluminum fused before a sound joint was obtained.—(From Work, an English Publication).

Digitized by Google



The Village Blacksmith Gives Advice

Another Old Timer Story In Which the Smith Does Most of the Real Talking

For the fifth time in as many minutes, the blacksmith scratched a match and lighted his pipe, just as the old timer limped into his shop. A man can't do more than ten things at once and the blacksmith had just managed to finish what he had started out to do: hold up the oil base beneath a truck engine with his knees, put in a couple of bolts with one hand, and turn on the nuts with the other. No wonder his pipe couldn't be managed, in the bargain.

"If I didn't know you, you tight fisted, leather backed, penny squeezer," said the old timer, "I would think you were insane." He didn't get any farther with this thought, but exclaimed—"By Heck, I guess you are insane."

This last exclamation surely had its reason. The blacksmith had been rather busy and evidently the dust and grease had bothered him. A black streak led from the corner of each eye and ran directly back to his ears, where he had rubbed his face with the back of one oily finger, giving him a most peculiar expression.

The old timer evidently decided, however, that for the time being he was safe and continued his first line of thought. "Of all the blamed idiots, you surely are one," he said. "I'm willing to bet a dollar against a five cent piece that you've got two hundred dollars' worth of iron right on this floor now, and three times that amount on the bench. Looks as though it had all just come in, too. Don't you know the war is over?—Where'll you get off when the prices of iron drop?

"Should think a five year old baby would know enough not to lay in a stock of iron or parts now, when things will drop in price within a month. Sure that Peace ain't turned your head a little?"

"If your character was as straight as my brain is just now," said the smith, "You'd be advertisin' in the papers for everyone, who thought you owed them something, to come to you, and you'd pay them off on demand. No, I'm not daft or crazy, but just a derned busy man, and if you don't get your worthless number fifteen shoe off that box of parts for this truck, you'll need a pair of crutches 'stead of just a cane. What's happened to you, anyway? Stub your toe in an



"He Lighted His Pipe for the Fifth Time."

argument or hurt it kicking the cat out of the milk house?"

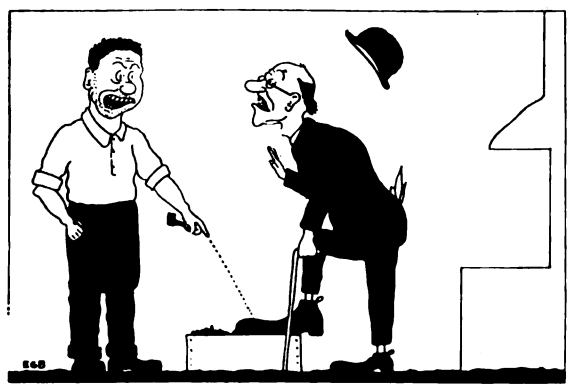
"It's none of your funeral what ails my foot, but so long as I'm here for the forenoon, I might as well tell you—that new horse you shod last Saturday stepped on it yesterday, guess she caught bad manners from you. But why in blazes have you bought all this iron junk around here?"

"Stepped on your foot, did he? Too bad, too bad, serves you right for keepin' such an unmannerly horse. If you had only a few brains you'd have sold that horse 'bout a year ago and got a truck, like the other enterprisin' farmers 'round here. Since you brought up the subject, that's one of the reasons I've got all this junk, as you call it.

"You see, about all the farmers hereabouts own trucks; they've found that they can save time and money on them over horses. They can do twice as much work and cover five times as much ground with one of the things as they can with a two-horse team. I'll tell you more about what they can do in a few minutes.

"This winter has been pretty light so far and they've been usin' the trucks right along, but a truck ain't like an automobile; it requires a certain amount of repairin'. Every time a truck passes the shop, I hotfoot it out and listen to the racket. If the old engine is knockin' and the thing sounds like a tin-shop in full operation, I hail the driver and ask him to spend five minutes with me.

"I tell him that it's time to repair the machine. That a truck will work like the dickens until it is all worn out and then it



"If You Don't Get Your Worthless Number Fifteen Shoe Off that Box—You'll Need a Pair of Crutches."

will fall apart all at once. When he uses his truck right up to the last minute, he is taking away years of service from it. But if he tends to it, takes up a few bearin's and replaces some of the worn parts it will be almost as good as new.

"Most generally I can persuade him to let me look it over and see what needs replacin'; sometimes he will tell me to go ahead on the job, so I order all the parts I think he will need and when they come in, I take a trip over to his house in my flivver and he brings down the truck. In that way, I can give him real quick service and he can use the truck until I'm ready to repair it.

"I generally try to get onto the job just as soon as I can, 'cause there is no reason why, so long as he is going to pay for overhauling, the truck shouldn't be repaired right away.

"A truck is just like a carriage in one way—let one of the spokes get loose and another soon loosens up, then the wheel falls to pieces. If you get busy as soon as the spoke loosens, then the repair bill is pretty small. But if you wait, then the whole dern thing goes and the bill is 'bout ten times as big.

"Take a truck f'rinstance; we'll s'pose that it's been running all summer, carryin' milk over rough roads, haulin' lumber, garden truck, and most everything else. The farmer always intends to lay it up for a few weeks as soon as snow flies and he don't care to put it in the shop when he needs it. This year we've had a pretty light winter, no snow to speak of, and so the farmer has run his truck nearly every day for ten months. Stands to reason the truck needs some attention, don't it?

"P'raps the engine began to do a little knocking 'bout the first of November. Farmer thought it would last over for another week or so, then snow would come and lay it up for at least a month, but the snow didn't come and he kept runnin' the truck. The knock grew worse, strainin' the engine all the time; finally something gave way and the farmer was out a couple of hundred dollars.

"The old sayin' of 'A stitch taken in time saves nine' applies to trucks and any machinery if you change it a bit to 'A knock taken in time saves a big repair bill.'

"That's the sort of dope I've been handing round to the farmers hereabouts and I guess I've got them scared a bit. At any rate I've got my hands full of work. Most of this stuff you see is either repair parts or worn out pieces from trucks I've repaired.

"The old stuff I'm collecting as fast as I can into a pile so that I can get rid of it to the next junk man. Don't do to hold on to old iron nowadays, junk prices on iron are high but dropping fast. If you've got any old iron or metal on your farm, better get rid of it right away.

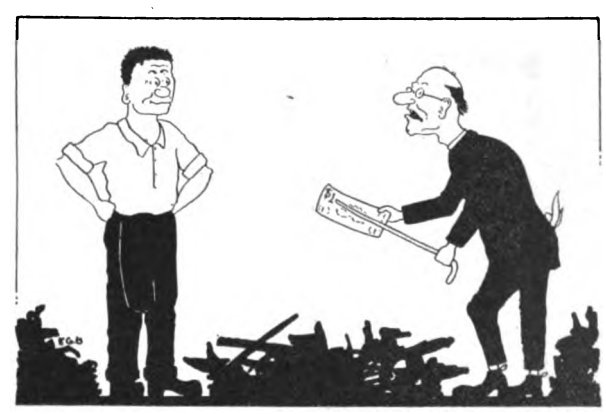
"This truck bug has certainly got under my skin lately, it's about all I can think of. I used to be a regular blacksmith but it don't pay nowadays. I soon found that the farmers always kicked about my charges, same as you do. So I began to get hold of all the automobile and engine dope I could and study up on it. Then I bought a flivver, an got some real experience. I used to keep the thing out in front as a sort of bait for the traveling fellows.

"When a fellow goes past a shop and doesn't see any machines inside, he ain't apt to stop to have his machine fixed even if the sign says 'Automobile Repair Work Done Here.' I used my flivver just to catch those fellows. It's a scheme that always works and is old as the hills. All farmers know enough to put a china egg in a nest, it fools the hens. Hens and humans are just like sheep in some ways, they follow the leader.

"It's time you farmers woke up to the fact that horses are a back number. Course you'll always need one or two for certain kinds of work, but the motor truck is the thing that is worth a barnfull of horses. Suppose you didn't own any horses now that you are laid up with a sore foot, 'twouldn't cost you one cent for feed for them. As 'tis you are losin' about three dollars a day on them, and you will keep losin' until you get back to work.

"If you had a truck, in the first place, it wouldn't have stepped on your foot and if it had, you wouldn't have to feed it until you used it again. You could keep it goin' from sunup to sundown if you wanted to. When you weren't usin' it, your hired man would keep it busy.

"Have you ever stopped to figure how much it cost you to get milk to market? Well, in the first place you have to harness up the horses in the morning, soon as the milk is ready, that takes a little time from other work, then you have to load the milk, but you'd have to do that anyway so it don't



"I'll Bet a Dollar Against a Five-Cent Piece."

count. But it takes you a good hour to get the milk down to the freight, then you have to unload it and that takes another fifteen minutes. The milk buyers make you pay the freight to town and then they have to unload it at the station and take it to their shop.

"Their price to you takes into account that little item of haulage. Now suppose you owned a truck. You wouldn't have to harness it up in the mornin'. Instead of taking

Digitized by Google

the milk to the station, you'd take it direct to town and save freight and save that haulage charge the milk company makes, and finally, by Heck, you'd save time too, cause you'd be back home sooner.

"The milk item ain't much perhaps, but when a man runs a farm as large as yourn, he could manage two or three trips to town with loads of green stuff, fruit and anything else. You could usually manage to pick up something to bring back, either for yourself or neighbors and so you would save freight charges and make a little money on the side.

"There ain't any limit to what you can do with a truck, that is within reason, course you can't expect the truck to shingle the house or milk the cows or pick apples, but when a fellow's got brains, he can keep the machine working out its board.

"Just listen a minute, you hear that steady bzz, bzz? Well that's the old saw of Henderson's. Jim has got his old wood saw rigged up and goes out cutting stove wood for the farmers and villagers. You remember he used to have a gasoline engine and circular saw mounted on an old lumber cart? Well he pulled off the saw rig and put it on his truck. Fixed it so the pulley stuck out over the edge of the truck.

"Now when he has a little spare time he runs into town and cuts wood for people. It don't take him but a minute to jack up one of the truck wheels, block the others, put on a belt and whizz goes the saw. I made him a pulley that fits onto the truck wheel hub. He's got his youngest boy trained to mind the throttle and the old saw just eats up the wood.

"The whole rig is fixed so that he can slide it right out of the truck in twenty minutes. I helped him fit it, most any smith could do the same thing.

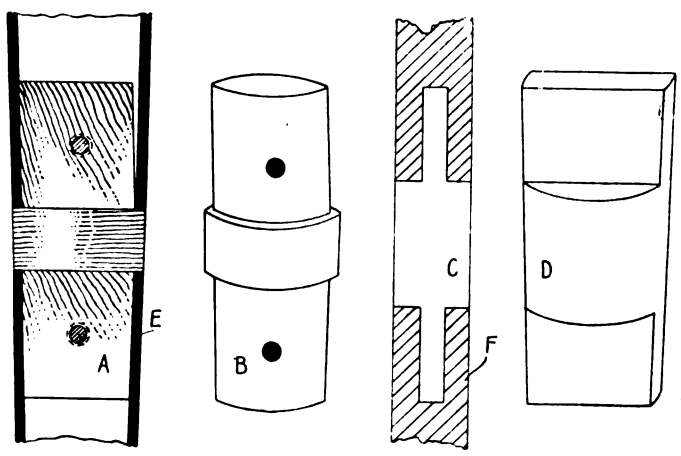
"Now I've told you some reasons for buyin' a truck, they save doctor's bills, time and cold cash. They don't kick, you don't have to worry about them catching the colic and they don't shy or balk, if you know how to manage 'em. So get busy old man, order that truck before Spring, I'd much rather tighten a connecting rod than shoe one of your cankerous horses.

"Guess it's about time for dinner, ain't it? Come on, hop and I'll take you home in my flivver. She's not much on looks, and she's kinder noisy, but she's got your little mare beat for speed."

MENDING TOP BOWS.

Top Bows Can Be Mended by Binding Splints Across Them, But the Job Has an Unsightly Appearance.

One thing that the war has done for me is to teach me how to conserve, not because I wanted to learn, but because I couldn't afford to be quite as extravagant as formerly.



Repairing Bows and Bow Irons.

A short time ago I tried to run my car beneath a shed that was just half an inch too small for the machine—that is, the roof of the place was just on a level with the top. Consequently, as the shed was strongly constructed, my top yielded up the ghost and telescoped into itself, before I knew what had happened.

Before the war I would have thrown the top in back of my neighbor's garage (all his empty cans are behind my garage), then gone to the topmaker's and in one compound word said "giveusanother."

As it was, however, I tried to manicure and massage the bent tubes into shape. I didn't succeed, so I took the wreck to a topmaker and suggested that he do his derndest—he did.

I hung around for a while and watched him work, thought it would make a good story for my blacksmith readers. In the first place he removed the covering material from the bent portions and broken bows, so that he would have room to work. Then just above each dent or bend he cut the tubing across with a hacksaw.

He carefully trimmed down a piece of pine wood into shape that approximated the inside of the tube and drove it into the tube. After a little coaxing the tube was straightened out, except for the extreme ends, where it had cracked. He cut off this cracked place and then turned out a piece of oak into the shape shown at B in the accompanying sketch.

After he had fitted this plug to the tube he drove it in and then drove the other part of the tube over it, as shown at A. I noticed that he used plenty of orange shellac, and finally he pinned the plug into place by two rivets, one in each part of the tube.

A few of the wood bows were so badly splintered that they were discarded, but two of them at least were repaired by doweling, as shown in Figure C. The dowel pin was shaped by hand, as shown at D, and glued into place. After the joints had been given a couple of coats of paint, one would hardly know where the repair had been made.

The Metal Turning Lathe

Part 2.—Various Types of Tool Post Feeds, The Speeds of the Work for Different Kinds of Metal and Rotation at Various Diameters

The power-driven turning lathe in the form known as the engine lathe, when provided with usual accessories, is probably the most useful of all machine tools. It is competent to do not only its own proper work, but also a good deal of work that is ordinarily done on other machines—as for example, drilling holes, grinding, etc.

The modern lathe is driven by a belt-operated cone pulley, by a geared head operated by a plain belt-driven pulley, by the individual electric motor combined with a geared head, etc. The most usual thing in an ordinary small shop is perhaps the cone pulley drive operated by a belt from a corresponding but reversed cone pulley on a countershaft.

The object of the various steps on the cone pulleys is to provide for changes of speed of the lathe spindle. When the belt is on the smallest step of the cone pulley mounted on the spindle, it is in shape to obtain the highest spindle speed. As the belt is shifted from one step to any larger step, the rate of spindle rotation is decreased. One of the objects in view in changing the speed of the spindle is to keep the work at the proper cutting speed. This remark will perhaps become clearer after some explanation.

Tool Post Feeds.

The cutting tool is fed to the work in two directions: It is fed longitudinally with the length of the lathe, and it is also fed towards the center of the work in a direction perpendicular to the other feed. The combination of the two feeds determines the rate at which metal is removed.

Consider now a piece of metal held in the jaws of the chuck. Suppose it is purposed to machine the face of this work, beginning on the outer edge and working in towards the center. A suitable combination of longitudinal and transverse feeds is first adopted. The work will pass the nose of the cutting tool at some definite rate of speed—say, 40 feet per minute. This means that the chip is coming off at this rate.

Suppose now both feeds are kept at just the same speed and an unaltered spindle speed is maintained (i. e., its number of turns per minute). When the tool reaches too near the center the chip will be cut off at a very slow rate—nothing like 40 feet per minute. The chip may be cut at only four or six feet in a minute's time.

This is, of course, all wrong, time is being wasted at this extremely slow cutting speed. If 40 feet per minute is right at the beginning, it will be right generally throughout the cut from start to finish.

We could make the chip heavier by increasing either the longitudinal or the transverse feed or both; but this will often be inadvisable. It will be quite easy to do something else. That is to increase the rate at which the spindle turns. What we want to do then is to speed up the spindle from time to time with the view of maintaining the cutting of the chip at the rate of 40 feet per minute. Consequently, we begin work with the belt on the big end of the cone pulley, and, as we work in towards the center in making our cut, we shift the belt from step to step. When we get down to the smallest pulley, we will have the most rapid rotation of the spindle possible.

Various Cutting Rates.

We have been talking about 40 feet per minute as a rate at which the chip came off. As a matter of fact, there are various rates of cutting speed. They differ with different steels. With modern high speed tool steel as the cutting tool, we can use rather high rates. With the usual carbon tool steel, a more moderate rate is best.

For a good average cutting steel, 40 feet per minute is a fair rate, when cutting low or medium carbon steel. If we have to cut high carbon steel, we may adopt a somewhat slower speed or else reduce the size of the chip.

It's a very good idea to find out whether we are running our lathe right—that is, whether we are using the proper speed, considering the kind of metal in the work and the kind of metal in the tool. We may be running much more slowly than we need to run. But, how are we going to find out the rate at which the chip is coming off? It is very easy to say that it should peel off at the rate of 40 feet or 50 feet per minute. But, how are we going to find out?

Well, there are two or three ways. The easiest way is to make use of a special instrument called a cut meter. We hold it against the work and readily determine the speed in feet per minute at which the work is moving, at the point of contact with the instrument. We haven't anything much to do except hold on to the instrument and read off the number of feet. We use a watch or a clock to give the length of time.

Using the Cut-Meter.

The calculation will be a simple one. If the instrument has a rubber-tired, small wheel, which is to be held against the rotating work whose diameter is such that the circumference is just four inches, then all we have to do is to divide by three the number of turns indicated on the dial during one minute. We shall have at once the number of feet per minute. One turn gives us four inches—that is, 1/3 foot. If we have 130 turns shown by the dial in the course of one minute, then we have 130 x 1/3 as the total distance covered in one minute. That is, we get at once 43 1/3 feet for the one minute's work.

There is another way of getting at the speed at which the chip comes off. This method calls for a little calculation. We first find out the spindle speed. How this is done was explained in our former article. We then have the number of turns per minute made by the work. We next measure the diameter of the cut we are making. By mul-

Digitized by Google

tiplying this diameter by 3 1/7 we will obtain the length of the chip taken in one turn. Suppose we measure the diameter and find it to be 3½ inches. Multiplying by 3 1/7, we obtain 11 inches. That is, every time the work makes a complete circuit, we take off 11 inches of chip. Suppose now that the spindle was going at the rate of 46 turns per minute. Then the total length of chip in one minute would be 46 times 11 inches. This is 506 inches, or slightly over 42 feet.

Speeds for Special Work.

Now 46 turns of the spindle per minute is a pretty slow speed. Our arrangements with the line shaft, counter-shaft and cone pulleys may or may not be right to take care of this speed. Sometimes very slow speeds are gotten by using back gearing on the head-stock of the lathe. But we should not need to resort to the back gears in order to handle an ordinary cut of 3½ inches diameter. We should be able to take care of it with the belting arrangements, using the big end of the cone pulley.

If, for any work that has to be done, especially if there is a good deal of it, it should be necessary to make special arrangements for a slow spindle, we may put a small pulley on the line shaft and a big one on the counter-shaft. This may seem cheaper than buying a lathe fitted with back gears.

(To Be Continued.)

GRILLE FOR BOUNDARY WALL.

BY ARTHUR W. JORDAN.

The grille shown in Fig. 1 was made some years ago for the boundary wall of a public school in London, England. It was one of several, all to the same design, let into the wall facing the road, and is notable both on account of its design and the way it was put together.

Without being too florid, the design is good, and based on the style then most in favor for school buildings. It was made under the direction of the writer and although there is nothing particularly intricate to make demands on the blacksmith's art and ingenuity, there are several portions needing care in the proper bending of the iron to get the correct shape and proportions, for on these depend the beauty of the design.

It was always the writer's practice, when setting out such work for the smith, to draw with chalk on a board, or brown paper, every scroll to the full size, even to the dimensions and section of the iron to be used. This leaves no loophole for mistakes and although it takes up much time, it also saves it in superintendence and in answering questions, and is a practice that years of experience has not proved to be wrong or wasteful.

Every portion of the grille was of wrought iron, except the monogram plate in the centre, which was of sheet iron nearly 1/16 in. thick. The sizes of the grille, over all, were 5 ft. wide by 3 ft. 6 in. in height. It was strongly made to stand any rough wear to which it was likely to be subjected by schoolboys, every part that touched another being riveted together as far as possible.



Fig. 1—Elevation Showing Grille in Position.

The semi-circular band bedding down on the stone coping and finishing with a scroll on each side at the top, was of 1¼ in. by ¼ in. iron. The top scroll, A in Fig. 2, was of the same dimensions. The other scrolls being of slightly lighter stuff, the width of the top scroll acted as a sort of weather protection, preventing somewhat the dripping of rain on the higher parts of the grills, and the artistic effect was good.

The scroll, B, was of 1 in. by ⅜ in. and was forged down to the section shown at the squared part of the design. The scrolls, C and D, were of ¾ in. square, the ends being forged to a tapering flat point. The squared frame for the monogram plate was of the same size and section and was welded into one piece. The sheet iron was fixed as shown at E. The letters were saw pierced and finished up by filing.

The other scrolls were all ⅝ in. square iron, that at F being to the section shown at the point marked, at others it was square. The center rod, finishing in a lanced shaped point, carried the other floriated scrolls which were forged separately and welded on.

The first portion to be made was the bottom semi-circular piece which forms a sort of foundation for the remainder. This was quite a simple job, and calls for no further comment. The top scroll A was next formed, and these two made a kind of frame into which all the others had to fit. This latter scroll is also quite simple, only requiring a little manipulation to get the top center portion right and the little "tuck" just under the ends of this.

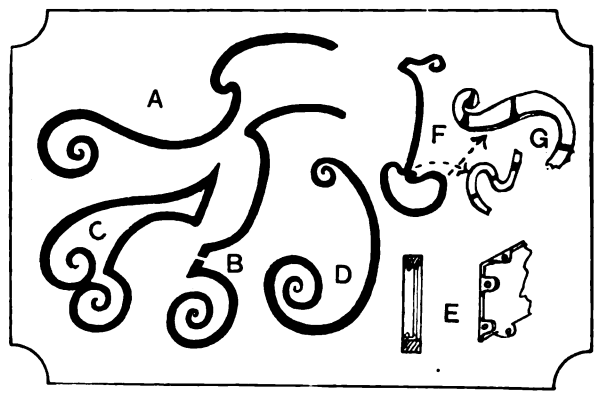


Fig. 2—Various Details of Scrolls and Fitting.

The scroll B was measured for the top and after the similar but slighter "tuck" had been given, the squared part on each side was forged. It was important to get the shape of this right from the first, so that it required no springing to get it into place, as a little of this would have spoilt the carefully arranged arched part at the top and only a trifle would have tended to show up unpleasantly by reason of the other arched bar above it being so near.

The shape of the scroll C required forging at several points, but this was nothing difficult, only needing care in the following of the full size working drawing. The most important of these forgings was the top pointed corner where the two pieces of iron, of which the scroll was formed, were welded together. This proved to be quicker than making the scroll of one piece of iron and then bending and forging out to form the point.

The scroll F required a little careful fashioning as it was of rather stout iron for so small a scroll, but it was not desired to have it made of lighter stuff for several good reasons. The squared portion at the top was made more readily by the nicking out with the file underneath the bends, and the iron being good, the amount of heating and hammering required was not excessive. The ends were forged to a taper scroll. A section of the bottom part is shown at G. Similar work was necessary to get the small bottom scroll in the center which was also of the same stout material for similar reasons. The small ring in the middle was about 2 in. diameter and was made of ¾ in. by 3/16 in. iron. This was secured on both sides to the scroll by rivets. The small scroll supporting the frame for the monogram is so simple as to need no description.

The whole grille was easily put together as far as the several parts were concerned, for by making each separate to the full size working drawing, if only care is used in the fashioning to shape the assembling together is much eased. Of course there was some awkward riveting which might have been avoided, but the architect insisted on each part being strongly riveted together, and after all there was wisdom in this, for notwithstanding rough wear the grilles were in position for many years and never needed any money to be spent on them, except for paint.

After being put together, each grille was cleared free from grease, etc., and given two coats of lead and linseed oil. The second coat having one-third less oil and the quantity made up with turpentine. After being fixed in position they were given a third coat of paint to the architect's specification.

The wall being gambled round as shown in Fig. 1 the effect of the grilles let in between was very good. This was enhanced by the iron work being painted a dead black and by the stone coping coming between them and the red brick wall.



Trading With the Farmer.

From a Reader in Ohio.—I have a few minutes in which to write, and perhaps you would be glad to publish the letter if it is interesting to the other readers.

In the month of August there were six blacksmiths who called at my shop, and only one of them reads a trade paper. Just think of it, Brothers! No wonder the blacksmiths (some of them) are back numbers. Their excuse was that they did not have time; two of them said that they could not read very well, anyway. There are about four out of every ten smiths that don't care to read; that's another reason we are not at the top.

A mechanic that doesn't take a trade paper is a back number. The —— & —— is worth $5 a year to me (Editor's note—This statement was so strong that we thought it best to leave out the name of the trade paper which this reader likes so well; modesty forbids the mention), and yet it only costs one dollar. The advertisements and suggestions in it are worth a dollar a month to a mechanic.

I like to keep up with improvements. If the blacksmiths had to go back 18 years and work with such tools as they had in those days, they would go out of business. I know that if I could not use the machinery in my shop I would quit right away: I could not make my salt. Just think of the old bellows, the hand drill, and so on.

With the machinery I can do in one day work that used to take three days to accomplish. We are just like the farmer (but the farmer is a bit ahead of us); take the farmer's machinery away from him and he cannot run his farm, because he can't hire the help—nor can we blacksmiths hire the help either, so we have to get machinery instead.

All the wise, up-to-date farmers take two or three farm journals and they find out from these papers how much stuff is worth and where to get the machinery. We blacksmiths don't know how to get prices for our work

Digitized by Google

because we don't read enough. I wish the Government would fix the prices on our work. I know we should get more. Half of the blacksmiths in the country are not making living wages today, and I can prove it.

Nineteen years ago I started in the blacksmith business, and our prices were somewhat as follows: Horseshoeing, $1.25; buggy tires, ¾ by ¼ inches, $5.50; buggy spokes, 20 cents each; wheel rims, $1.25; plows sharpened, 20 cents, and so on. Horseshoes cost us $3 a hundred in those days.

Today, however, we get only $2 for shoeing; buggy tires, ¾ by ¼, $7; buggy spokes, 25 cents each; wheel rims, $1.50; plows sharpened, 30 cents, but horseshoes cost us $7 a hundred.

The farmers for whom I did work often used to ask me to trade with them. I kept one horse, and for my work I obtained six bushels of corn for $1.25, that is 25 cents a bushel. Sometimes I got three bushels of wheat at 45 cents a bushel. If I shod a horse, to pay for it the farmer was willing to give me five old hens at 25 cents each. There's no use for me to go any farther and mention such things as bacon, ham and eggs; they are too high to mention nowadays.

Now if the farmer were to trade today, he would get a little the best of it. I would get either one bushel of corn, one bushel of wheat, one old hen, or only a smell of the ham, to shoe his horse; but still he is not satisfied. Think this trading matter over, brother blacksmiths, and use it as an argument when the farmer kicks at your prices.

Editor's Note.—This reader enclosed with his letter a clipping from a newspaper, which we are reproducing herewith. The reader makes a notation on the article to the effect that corn, in his part of the country, now costs $2 a bushel, bringing the total value of the corn to $600.

Farmer's Grain Buys More Than It Did in the Past.

A merchant in a western town showed a farmer a buggy, priced at $90, and the farmer kicked because twenty years before his father had bought one just like it for $60.

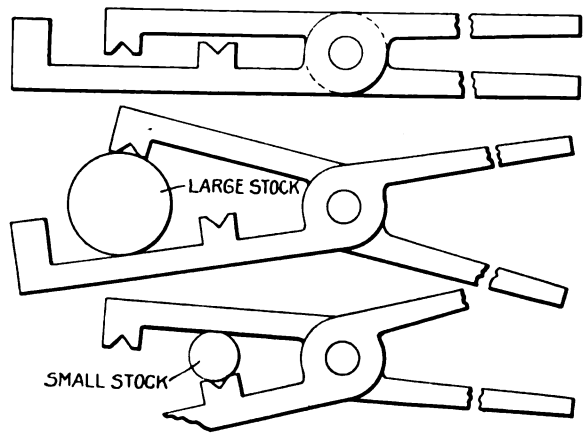
Then the merchant looked up the sale and found that the father had turned in 300 bushels of corn for that buggy. So he told the farmer's son to deliver him 300 bushels of corn and he would give him:

One	$90.00 Buggy.
One	75.00 Wagon.
One	20.00 Suit of Clothes.
One	20.00 Dress.
One	5.00 Baby Dress.
One	5.00 Crib.
One	3.00 Box of Cigars.
$10.00	worth of Sugar.
10.00	worth of Tea.
100.00	worth of Gasoline.
15.00	worth of Lubricating Oil.

The total figures $365.00 as the value of 300 bushels of corn, and it is needless to say that the high cost of living disappeared from the farmer's mind and he bought the buggy.

A Pair of Handy Tongs.

From Frank Lachman, Kansas.—I get a great deal of benefit from the Blacksmith and Wheelwright and I think that I really



Illustrating a Handy Pair of Tongs.

owe the other readers something because I have never written for your paper. I am sending you a sketch of a pair of tongs which I designed myself, and I think they are the best for round and square stock that I have ever used.

One pair is so made that it will hold any size from one-quarter inch to one and one-quarter inch without a chain. When holding small stock, use the projection at the back. When holding larger stock, put it at the center, and hold it with the upper pair of teeth, and when using still larger, put it way out at the end. My sketch explains the whole thing very well.

Double Tires in Utah.

From E. W. Berry, Utah.—In your October number, Mr. Maser of Texas asks about double tires. One man in Fresno says that double tires are applied so that heavier loads can be carried on lighter felloes. That is true, but is not always the purpose in this part of the country. We apply them for the following reason:

We have long, steep grades down which to haul ore from the mines. The grades are from two to three miles long, and require very heavy braking. Years ago I found that it is impossible to hold the wheels together with one tire. The heavy brakes or the friction on the tires heated the tire so much that it would expand and loosen up. Then down would go the wheels.

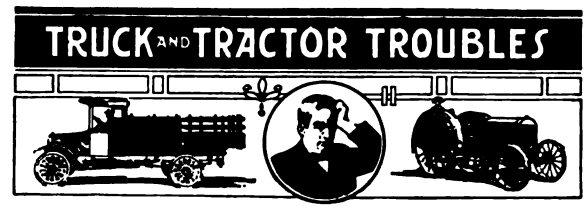
When double tires are used, the outside one may get hot from the friction, but the inside one stays comparatively cool, and so prevents the wheel from falling to pieces. In putting on double tires I drill four half-inch holes through both the tire and the felloe and countersink the heads. The underneath tire should be made tight so as to keep the wheels solid. I use on 4¼-ton ore wagons 3½ x ¾ inch stock for the under tire and 3½ x 1 inch for the outside. I give the outside tire one-half inch draw. The bolts keep the tire in place when it is hot.

If the old tire is not too badly worn, it can be put next to the rim. Always use lighter iron for the under tire. If Mr. Maser does not understand this, send him out to this town and we will show him.

Just in Time.

From Ed Loffer, Montana.—Received your Blacksmith and Wheelwright a week or so ago, and it certainly came in handy. I was at the time working on a Ford magneto, and sure was stuck, but with your explanation I was soon straightened out again. I think that the automobile articles are fine, and if you give them up somebody will be the loser.

I am going back to the automobile repair game myself, simply because I don't have to carry such a big stock on hand. We have had an extra good fall out here, and there has been a great lot of wheat put in the barns. I saw forty-four wagons, two, four and six horse teams, and three trucks all waiting to be unloaded at one of our elevators on the eighteenth of October. I put on five hundred plow points up to October first this year and sharpened one thousand lays besides.



Steel for Auto Springs.

From J. F. Murphy, Nevada.—I noticed in the January number that one of my brothers wanted to know what kind of steel to use for automobile springs. If he will write to the Sligo Iron Store of St. Louis, Missouri, and ask for Sligo's special spring steel, I am sure he will be satisfied.

I have used quite a lot of it and find it excellent for replacing broken spring leaves or for making new leaves. It is self tempering and hardens according to the degree of heat applied.



A DISTINCT DEPARTURE IN ROLLER BEARINGS.

Accepts Thrust Pressure Equally As Well As Radial Loads—and Is Self Aligning.

Departing from the usual type of roller bearing design the Geo. D. Bailey Co., makers of the Bailey Ball Thrust, have placed on the market a front wheel bearing for Ford and Chevrolet 490's under the name Shafer Roller Bearing that eliminates the chief source of front wheel bearing trouble, namely the inability to take a heavy thrust (sideway) load without damage to the bearing and take care of axle spindle deflection as well.

The outer surface of the inner cone is convex, having the contour of a perfect ball, and the rollers possess a concave surface, thereby forming a cradle as it were for the cone and allowing it to swing to meet any deflection of the spindle when same gets out of alignment. The cone being free to move with the spindle and the load being taken upon the full length of the rollers causes no strain or binding of bearing itself, as in the case of the rollers of a bearing the cone of which is held perfectly rigid and cannot meet the misalignment or deflection of spindle.

The concave surface of the rollers at all times presents an equal load-carrying surface both from the side as well as the top and therefore the bearing is able to accept thrust (sideway) loads equally as well as radial (downward) loads. This feature in itself is a distinct departure and permanently stops the real source of front wheel bearing trouble.

Moreover, nothing but the highest grade chrome nickel alloy steel is used throughout. This fact coupled with three years of most severe road and breakdown tests enables the makers to guarantee every Shafer bearing without reservations.

Steel Stamps.

Where more than one blacksmith is located in the same shop, in order to avoid confusion it is always best to mark their wrenches or tools with steel stamps. In many cases the blacksmith if he is putting out very much work desires to put his own mark or the name of his shop upon his product. S. D. Childs & Co., Dept. 2, 136 S. Clark Street, Chicago, Ill., make a specialty of steel stamps for all purposes, either letters or figures, and also manufacture name plates.

Vises and Anvils.

There is no tool in the garage of more importance than the anvil. Next to the anvil comes the vise, and it is poor economy to purchase an inferior tool—a tool that will smash in a few weeks and need replacement. The cost of two poor vises or two poor anvils is much greater than the initial cost of a high grade device. The Columbian Vises and Anvils made by the Columbian Hardware Co. of Cleveland, Ohio, are among the first in this line. This line of vises and anvils is extremely large and the blacksmith who is equipping his shop should surely investigate the Columbian line, for they are dependable.

Universal Wheel Compressor.

Every blacksmith who is called upon to do any automobile wheel repairing should investigate the Universal Wheel Compressor manufactured by the Universal Wheel Compressor Co. of Cedar Rapids, Ia. This device is so arranged that it can be swung like a turntable when the wheel is in place, and is fitted with a number of compressing screws. With it the rim can be put in place and compressed, the spokes being given the desired dish, and the rim applied.

It is so aranged that wheels of practically any size can be taken care of. In addition to its utility as a wood wheel repairer the device can be used for truing up wire wheels. An automobile wheel undergoes considerable strain at all times when in use, and should be kept in the best of condition or a serious accident might result. The average blacksmith should be able to do quite a little business in repairing wheels.

Plymouth Punch and Shear.

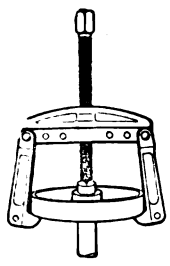
The Plymouth Foundry & Machine Co. of Plymouth, Wisc., are manufacturing a handy machine tool for the blacksmith. This device is known as the Plymouth Combined Hand Power Punch and Shear. It is operated by hand. The blades are extremely heavy and the shear will cut iron 4 inches wide by ½ inch thick, 3 inches wide by ⅝ inch thick, or one inch round.

In addition to the shear the lower jaw is designed to carry a number of punches from ¼ inch in diameter to ⅞ inch. These punches are arranged on a sliding rack so that either one may be brought under pressure as required. The punches always remain in the machine so that there is no chance for loss.

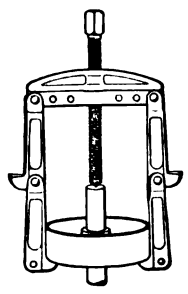
Digitized by Google

INCREASE THE USEFULNESS
OF YOUR
CRANE PULLER

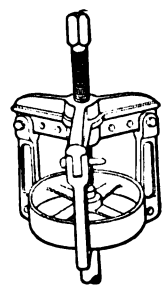
With this New Locking Arm. Absolutely Locks the Puller on the Work, making it a one-man tool



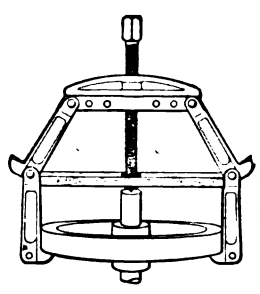
Two-Arm Puller removing work near end of shaft.



Work beyond reach of one set of arms.



Three-Arm Puller pulling from three points will remove collars and work that cannot be started with the two-arm pullers.

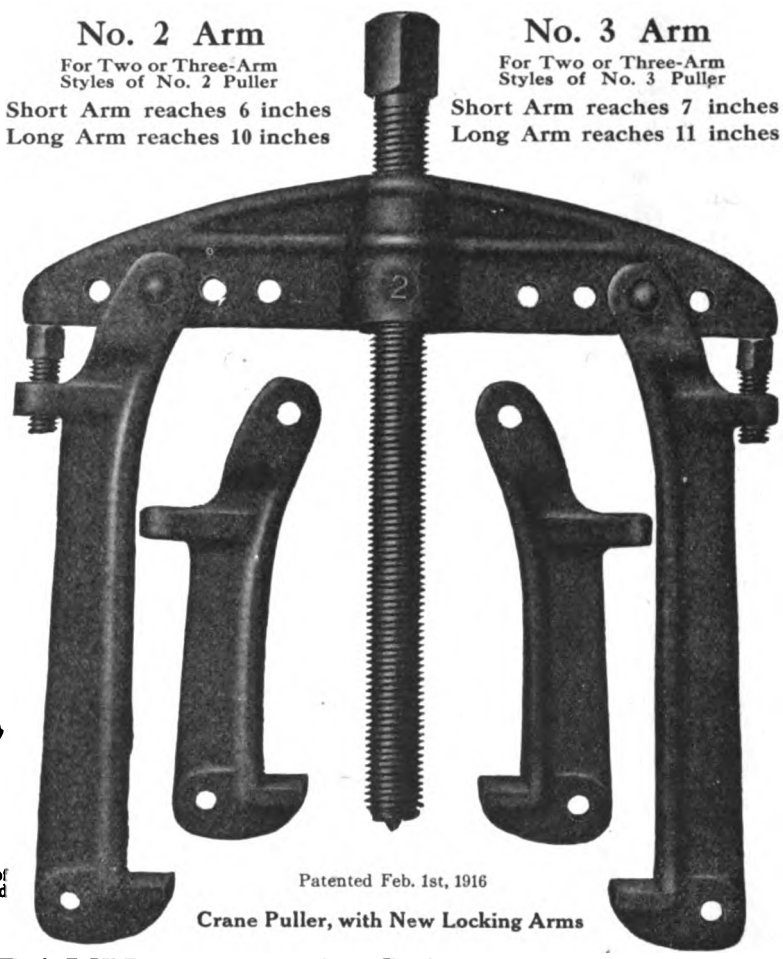


Two-Arm Puller on work of large diameter (a piece of wood being used as a spreader).

No. 2 Arm
For Two or Three-Arm Styles of No. 2 Puller
Short Arm reaches 6 inches
Long Arm reaches 10 inches

No. 3 Arm
For Two or Three-Arm Styles of No. 3 Puller
Short Arm reaches 7 inches
Long Arm reaches 11 inches

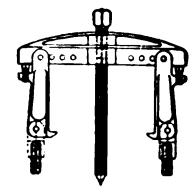
Materials and workmanship absolutely guaranteed. We will replace any part that is defective, without question and absolutely free of charge, upon return of same to us.



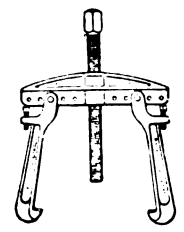
Patented Feb. 1st, 1916
Crane Puller, with New Locking Arms

Pictures on both sides show different styles of Pullers and Attachments for a wide range of work.

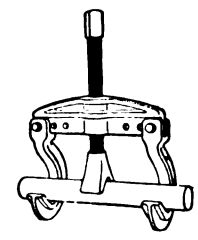
Repair season is here, write today for Price List or order from your Jobber.



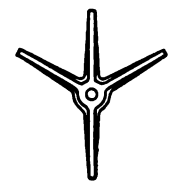
No. 0 Two-Arm Puller



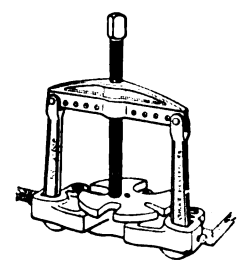
Patent Locking Arm



Pipe Bending and Shaft Straightening Attachment



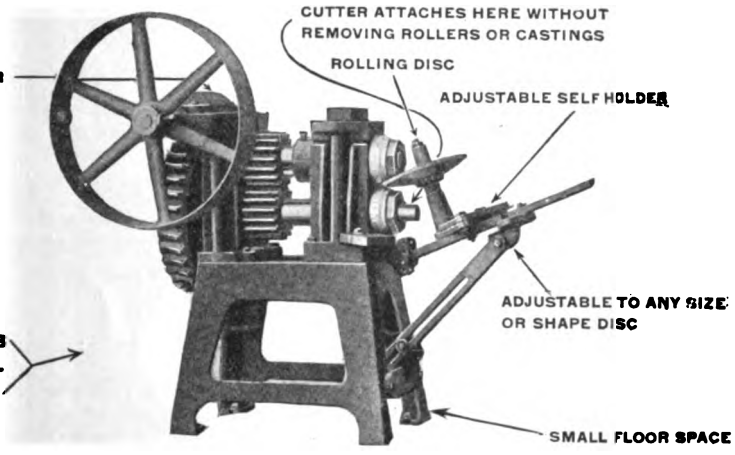
Crowfoot Beam



Arbor Press Base

CRANE PULLER COMPANY, 54 LAKE STREET, ARLINGTON, MASS.

DEPEW DISC ROLLER AND CUTTER



EITHER ROLLS OR CUTS DISC. SELF HOLDER.
ADJUSTABLE TO ANY SIZE OR SHAPE OF DISC.
DURABLE, NOISELESS, SIMPLE.

PAYS FOR SELF IN TEN DAYS

"I bought one of your machines and more than paid for it by the use of the machine before the trial period was up."
M. R. FOGARTY, Greeley, Nebr.

FAST AND EFFICIENT.

ROLLING: "I pressed 14 wheel discs, 16 inch blades, in 54 minutes yesterday." L. G. RISER, Sweetwater, Nebr.

CUTTING: "I cut 30 16-inch discs in less than 2½ hours the first half day." J. C. FULLER, Kiowa, Kans.

DURABLE: "I have used my Depew Disc Roller and Cutter eight years and first cost is all it has cost me . . . . I will not sell it for one cent less than I paid for it eight years ago." EDW. ANDERSON, Overton, Nebr.

Send for Prices and Full Information. Machine sent on trial if desired.

DEPEW SALES AGENCY, Trenton, Nebraska

Dyke's Automobile Encyclopedia.

As will be seen by reference to the advertisement on another page, the ninth edition of Dyke's Automobile Encyclopedia is announced to have 940 pages and the cost of this new edition will be, postage or expressage prepaid to any part of the United States or Canada, $4.46. This encyclopedia is a standard work. It covers the whole ground thoroughly and is having a big sale everywhere. Our readers who want to keep thoroughly posted should send to us for a copy at once.

New Prices on Kerosene Engines.

Those who are thinking of buying a farm engine will be interested in latest prices on the Witte—the better quality engine—longest on the market, easiest to use, fuel-saving, reliable. As usual the Witte factory offers the most favorable prices to the customer, and now as before the war, and during the war, buyers can buy on practically their own terms. Every Witte Engine—gasoline or kerosene—is sold on a valid five-year guarantee backed by the largest exclusive engine factory in the world selling direct to user. A handsome new engine catalog, and big illustrated folder, showing what Witte users are doing, together with latest prices, mailed free on request to Witte Engine Works, 2492 Oakland Avenue, Kansas City, Mo., or to 2492 Empire Bldg., Pittsburgh, Pa.

Luverne Truck Parts.

We know from actual experience that there are thousands of shops throughout the United States who have the necessary equipment and help to enable them to build motor trucks and to convert passenger cars into motor trucks for the trade in their local territory on a basis which will furnish their customers with the maximum of truck value and service, and at prices which will easily meet outside competition and enable the concern to become an actual motor truck factory with a permanent and profitable future.

To operate successfully and on a small investment it is necessary that these local truck factories have access to a supply of truck parts which they can get promptly and in small quantities as needed, and the Luverne line of truck and truck unit parts is offered to the trade to meet this demand.

The Luverne line of truck parts are furnished in several sizes suitable for trucks and truck units of from three-quarters to three ton capacity, and consist of axles, wheels and tires, frames, fittings, springs, motors, transmissions, bodies, cabs, hoists, etc.

All parts are complete in themselves, ready to assemble and are sold either in complete sets or as separate units.

The Luverne line of parts is also well adapted for the export trade, for foreign firms who are in position to assemble the parts, and build bodies and equipment locally.

Standard Motor Pep.

Automobile owners in all parts of the country complain of the gasoline which they are obtaining at the present time. The more volatile elements of this fuel seem to be lacking, while the lower test products comprise a large proportion of the fuel.

The objections to this gasoline are first, that a large portion of it will not vaporize rapidly, consequently an engine is difficult to start; second, the liquid carbonizes in the cylinders; and third, the fuel finds its way into the crankcase, and dilutes the lubricant.

All three troubles are caused directly by the fact that the fuel does not burn rapidly enough for the engine. Manufacturers have devoted considerable study to the problem and the Utilities Co., 310 Citizens Building, Cleveland, Ohio, have offered a solution in the shape of a fuel energizer called Standard Motor Pep. This product is guaranteed by the manufacturers to give 20 per cent. more power; to eliminate carbon, and to increase the mileage obtainable by one-eighth.

The fuel is in the shape of tablets and the manufacturers back the product by strong guarantees. They claim to return the money if the tablets do not give the results they claim. A small trial package may be obtained at a very low cost. We should advise our readers to make a trial of it.

Digitized by Google

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

will be inserted under this head at 3 cents a word, including the address, for each insertion, payable in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York.

PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT

Patents

PATENTS FOR INVENTIONS.

H. W. T. JENNER, patent attorney and mechanical expert, 622 F Street, Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trade-marks registered.

For Sale

FOR SALE.

One Defiance 60 ton Iron Frame Hydraulic Press; two Defiance 18" Broad Belt Polishing Machines; one Defiance No. 3 Hub Reaming and Boring Machine; one Defiance "Sharpsteen" Spoke Facing Machine; one Bentel & Margedant Rif or Felloe Polishing Machine; one Treavor & Company Double Spoke Equalizing Saw; one Gleason Disc Facer with Bentel & Margedant Spoke Equalizing Saw; one Gleason Disc Facer with Bentel & Margedant Spoke holding attachment; one Gleason Spoke Throating Machine. NESS BROTHERS & COMPANY, York, Pa.

FOR SALE

Spark Plugs	Doz.	$4.50
Sterling Plugs	Doz.	4.00
Ford Hose Connections	Doz.	1.00
Ford Hose Connections	Per 100	8.50
Radiator Hose, all sizes		
Primary Ignition Cable	100 ft.	2.50
Secondary Ignition Cable		6.50
Durabestos Brake Lining	correct prices	
Valve Grinding Compound	Each	.18
Rie Nie Grinding Compound		.27
Emery Cloth, assorted	Doz.	.70
Emery, per 10 lb. can		1.20
Key Stock, 1-8, 3-16, 1-4, 5-16	Per ft.	.10
Key Stock, 3-8—12c., 7-16 and 1-2		.15
Babbitt	Per pound 15c. to	1.25
Solder, Half and Half	Per lb.	.55
Tire Tools, Diamond—6c., 15 in. steel		.25
Ford Valves	Each	.12
Ford Timers	Each	1.00
Ford Tail Lamps, Electric		.65
Ford Headlight Doors		.65
Ford Rubber Robes, lined		2.00
Ford Linoleum Mats		2.00

Ford Felts, Gaskets, Engine Packing, Taper Pins, Lock Washers, Cap Screws, Set Screws, Machine Screws, Nuts, S. A. E. Screws, hundreds of other items. Mechanics' tools and shop machinery.

BICKNELL MFG. & SUPPLY CO.
Janesville, Wis.

FOR SALE

About 100 feet of two-inch internal wire carriage tire made by the Victor Tire & Rubber Co., will be sold cheap to close out. This is new stock. BECK-HAWKEYE TRUCK WKS., Cedar Rapids, Iowa.

FOR SALE

Blacksmith and wagon-shop, stock and tools. Good chance, in one of the best sections in southern Minnesota. Address WM. H. GOEDEN, Triumph, Minn.

FOR SALE

Country blacksmith's shop and store. Ten room house, acre of ground; unusual opportunity. Owner wishes to retire. F. W. LEWIS, Olyphant, Pa., R. F. D.

FOR SALE

Blacksmith shop, two lots, building, tools all handy. The only shop in town. Must sell on account of sickness. The best equipped shop in Potter County. Write for price. We must have a blacksmith before March 15th. Address JOHN WOLF, Box 62, Tolstoy, South Dakota.

FOR SALE

Blacksmith's shop, stock and tools, house, barn and two acres of land. Only shop in village and work enough for two men. Reason for selling, poor health. Address CHAS. BEMIS, Burlington, N. Y.

FOR SALE

368 page book containing 3,000 valuable money making recipes for the home, farm, workshop, mechanic, and manufacturer for $1.00, prepaid. Address H. GOCHNAUER, West Willow, Pennsylvania.

FOR SALE

Blacksmith and machine shop. Will sell machinery and rent building or will sell entire property. Splendid opening for good workman. For further particulars address MISS HATTIE HOFFMAN, Glasco, Kansas.

For Sale

FOR SALE

Blacksmith and wagon shop. Stock, tools, machinery, house and two lots, or will sell half interest. Address SCHMIDT BROS., Waldorf, Minnesota.

FOR SALE

For Immediate Shipment—9-in. jointers, $50.00; 5-in., $35.00. Bench jointer, 5-in., $30.00. 14-in. square style cutter head with attachments, $20.00. Circular style cutter heads for wood frame jointers from 5 to 12-in. Combined outfits, jointer head and pole rounding head, jointer and saw arbor, with various attachments; saw arbors and emery stands. Catalogue No. 15 for the asking. W. L. SHERWOOD, Kirksville, Mo.

FOR SALE

12 horse power double opposed air cooled auto motor with high tension magneto, $25. Two trailer wheels with roller bearing axle, solid rubber tires, carry 800 lbs., $20. Battery charging 6-volt dynamo, $10. Address F. WAYNICK, Reidsville, N. C.

FOR SALE CHEAP

Hydraulic cold tire setter No. 4 scientific, hand or power. Also L. S. P. calking machine; both in good shape. Address MRS. M. A. TUTTLE, Lake Charles, La.

FOR SALE OR TO RENT

Fine old established blacksmith's and wheelwright shop; two-story building; 30 by 70 feet; location excellent; well equipped for business; large country trade. Owner has recently died. Address for price and further particulars, A. B. SWAB, St. Johnsville, N. Y.

FOR SALE.

FOR SALE! "THE PALACE HORSE-SHOEING SHOP," in the town of Easton, Maryland. On account of poor health, will sell my dwelling and two shops—equipped complete for horseshoeing and up-to-date. Beautiful tidewater surrounding country, state roads and good prices. For price and particulars address JNO. W. MORRIS, Owner.

Wanted

WANTED.

Blacksmith and horseshoer, steady. Electric power. Address WILL MADDOX, Palestine, Illinois.

WANTED

Would like to hear from one who has a blacksmith's stand for sale with from 10 to 20 acres or more of land. Address L. LUBER, Box 23, Prairie View, Illinois.

WANTED

Two all around blacksmiths in general repair shop. No boozer need apply. Address CLEM STEVENS, Clifton, Colorado.

WANTED

A good all around blacksmith for a steady job, or will sell or rent my shop and outfit. Address E. J. PERRON, Ontonagon, Mich.

WANTED

To buy two second-hand Mole Shrinker and Benders. Must be in good shape and cheap. Address A. L. MERITHEW,, Burnham, Mo.

Tires

TIRES--DOUBLE TREAD

Guaranteed for good service. Big - Strong—Extra Heavy. 30x3 Tire $5.50; 30x3½ $7.00; 33x4 $10.00; 34x4 $10.25; 36x4½ $13.00; 37x5 $14.00. Big saving on other sizes and Tubes also. Trade in your old Tires. 10% deposit required on C. O. D. orders. Send for list now! State size and bead of tire. Orders filled same day received.

M. LIBEN & CO., 205-RK, W. 48th St., N. Y. City

Motor Topping.

At the present time new cars are hard to obtain, and this condition will exist probably until late this year, for it will take some time for the motor manufacturers to get back to full production. For this reason there will be considerable overhauling of cars done this spring. The principle part of an automobile to show excessive wear is the top and the upholstery.

A car looks no better than its top and everyone knows that when a top is exposed to the weather for two or three years it detracts from the appearance. The blacksmith or wheelwright should be able to do considerable work along the line of top replacement and should they decide to do this they should investigate the Drednaut Motor Top material manufactured by L. C. Chase & Co., of Boston, Mass. Any of our readers who decide to retop cars or do upholstery work should send for samples to this company.

Phoenix Horse Shoes.

Our readers should not overlook the fact that one of the oldest lines of horse shoes is manufactured by the Phoenix Horse Shoe Company of Chicago, Ill. Now that winter is here our blacksmith readers should investigate the Bull Dog Toe Calks manufactured by this concern.

Inventor's Manual.

The Norman W. Henley Publishing Co., 2 West 45th Street, New York City, announce a new book which they have just put on the market called the "Inventor's Manual." Doubtless many of our readers are interested in inventions. Very possibly many of them intend to have an article patented in the near future. This book tells how the new inventor can make mistakes as well as how to avoid making them. It tells how to obtain a patent and gives a valuable list of occupations which should be of interest to the person who is trying to invent a device, since he will know beforehand just how many people may be interested. The book contains over 130 pages and sells for $1.25.

Gillette Shearing and Clipping Machines.

The Gillette Clipping Machine Co., 129-131 West 31st Street, New York City, are manufacturing a very complete line of clipping and shearing machines, both electrically and hand driven. The electrically driven machines can be had to operate upon either direct or alternating current from the regular lighting system. All of the machines are guaranteed to be of the best materials and made by expert workmen.

Sandbo Starter.

The blacksmith is the logical man to sell automobile equipment to the farmer, and he should become familiar with automobile accessories. He should be able to make quite a little money by installing starting devices on old cars, or cars not equipped with starters. The farmer who intends to keep up-to-date should investigate the Sandbo Starter designed especially for Ford cars and manufactured by the Bear Manufacturing Co., Rock Island, Ill.

This device can be installed upon practically any Ford car and requires but little work in installing it. It is said to be positive operating since it turns the engine over past two compression points. Our readers who are interested in this device should write the Bear Manufacturing Co. at the address given above.

Gasoline and Kerosene Carburetors.

We have repeatedly suggested to our Blacksmith and Wheelwright subscribers that they go into the automobile repairing game since this field offers quick returns and easy money. An education however is necessary, and to get this education the blacksmith must read suitable books or magazines.

The Norman W. Henley Publishing Co., 2 West 45th Street, New York City, have just published a book entitled "Gasoline and Kerosene Carburetors" written by Victor W. Page, which sells for $1.50. This book explains carburetion very fully. It takes up in detail many of the standard makes of carburetors now on the market. It is well illustrated and contains over 200 pages. The blacksmith who purchases this book will find that he has made a good investment.

Bauer Kerosene Engines.

Every mechanic realizes that one of the cheapest forms of power is had by the kerosene engine. The engine can be used in any part of the country for running any sort of apparatus. Every blacksmith should know about kerosene engines for the reason that very frequently he can sell these machines to the neighboring farmers for pumping water or for running farming machinery.

In many cases the blacksmith or wheelwright may be interested in purchasing one of these machines for himself to use in his own shop. The Bauer Engine Co., 110 Bauer Block, Kansas City, Mo., manufacture a very complete line of engines in sizes from 2 to 18 horse power. This concern makes a special 60-day trial offer and guarantee their machines for five years. Our blacksmith readers should write this concern for catalog and price list.

Simonsen Hot Trimming Shear.

The Simonsen Iron Works of Sioux Rapids, Ia., are manufacturing an interesting device for blacksmiths called the Simonsen Hot Trimming Shear. This device can be obtained in two sizes. No. 1 can be used to cut hot plow steel as thick as 5/16 inch and as long as 6 inches. No. 2 will cut the same thickness but slightly longer. It will cut to 8 inches. It can be used for cutting plow points, trimming cultivator shovels, or in fact trimming practically any hot steel within its range.

Variable Speed Blower.

Blacksmiths who are not satisfied with the air supply to their present forges or smiths intending to install a blower should investigate the "Kazoo" Variable Speed Blower manufactured by the R. P Warner Electric Co. of Kalamazoo, Mich. This blower is designed to operate upon alternating current, and consists of a motor and a fan both mounted upon one base and both enclosed in dust-tight housings. The bearings are bronze and oiled by special ring oilers.

The big feature of this blower is that speed is varied through the blower itself by means of a special device. No outside rheostat or resistance is necessary. Different speeds are obtained by moving a handle in the side of the motor. If a smaller volume of air is required the motor can be slowed by means of this handle and less current is consumed.

Brooks Welding Apparatus.

There is no line of work which should be of more interest to the blacksmith than Oxy-Acetylene Welding. This work always finds an outlet in any part of the country. No matter whether automobiles are to be repaired or harvesting machinery overhauled, a welding outfit should be of value.

The farmer requires quick repairs or he will lose his crops. He has no time to wait for replacement parts to come from the factory, and for this reason the blacksmith can easily obtain high prices for welding work. The blacksmith should investigate the line of machines and welding apparatus manufactured by the Brooks Machine Co., 219-229 W. Lewis St., Wichita, Kan.

This company manufacture portable and stationary acetylene generators and tanks and both welding and cutting torches. The Brooks Machine Co. protect the torches and tanks with a special flash back exhaust safety valve. Every blacksmith intending to do welding should write for catalogs and price lists to the above address.

Wolfe Tire Cooler.

The attention of our readers is called to the excellent tire cooler manufactured by Matt. L. Wolfe of West Carrollton, Ohio. This device is one of the oldest on the market and well known throughout the trade. Our readers who desire to install a tire cooler in their shop should investigate it and write for circular and descriptive matter to the above address.

Crane Puller.

No matter what sort of machine repair work the blacksmith does, there is one tool which he finds necessary more than any other, that is a wheel or gear puller. Such a device is manufactured by the Crane Puller Co., of 54 Lake St., Arlington, Mass., and is unique in design in that it may be used either as a gear or flywheel puller, or can be used in conjunction with a special base as an arbor press. The parts of this device are exceptionally well made and the cost is low.

Champion Shock Absorber.

The first article of this issue deals with the care and repair of springs and in the article the fact is mentioned that spring breakage may be caused by rebound or recoil. As a matter of fact a spring seldom breaks under the downward pressure, but usually on the up-throw of the car. A Champion Shock Absorber particularly designed for Ford cars is said to absorb the rebound.

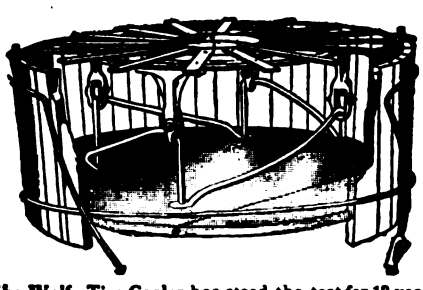
In addition to this, the device absorbs the downward jar as well. Side sway is reduced to a minimum, and all shocks are absorbed through a unique combination of springs and levers. The device should be of interest to every blacksmith who deals in automobile supply parts. The Champion Shock Absorbers are sold by the Champion Shock Absorber Sales Co., Inc., Dept. B, Indianapolis, Ind.

Northwestern Horse Nails.

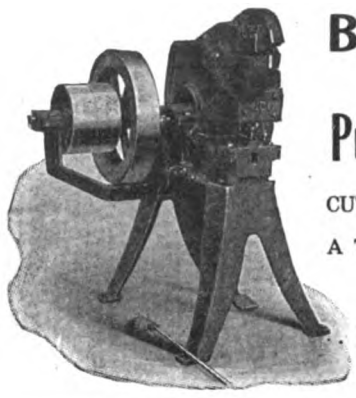
Every blacksmith realizes that a straight driving nail is essential to good workmanship. A horseshoe nail that bends while being used is dangerous and may result in a lame horse. The Northwestern Horse Nails manufactured by the Union Horse Nail Company of Chicago, Ill., have many interesting features. In the first place they are carefully designed to be easily driven. The one feature of these nails is a special reenforced point which is said to prevent breakage and bending.

Digitized by Google

THE
SANDBO
STARTER
—Two Compression—
FOR FORD
Write BEAR MFG. CO.
Rock Island, Ill.



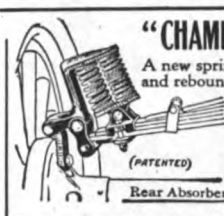
The Wolfe Tire Cooler has stood the test for 12 years in many of the best shops, and proven all that is claimed for it. The machine is right, so is the price.
Write for circulars.
MATT. L. WOLFE, WEST CARROLLTON, OHIO



BICKNELL'S
POWER
Punch and Shear
CUTS FLATS AND ROUNDS
A Time Saver in Any Shop
Write for Price
Bicknell Mfg. & Supply Co.
Janesville, Wis.



TRADE MARK
SAMPLE
OF WELDING COMPOUND
FREE
BLACKSMITHS!
Let me send you a trial package free and you will use no other. Anchor Welding Compound has no equal for strength. It welds the hardest steel. No hammer needed. Good for both big and little jobs. Try it.
Write to-day and mention The Blacksmith and Wheelwright.
N. D. DOXEY, ELMIRA, N. Y.



"CHAMPION" SHOCK ABSORBERS For FORD CARS
A new spring suspension which absorbs jar and rebound. A wonderful E-Z ride suspension. (E-Z to attach.) Guaranteed by manufacturers. Exclusive sales; big profit for dealers, agents and owners.
Champion Shock Absorber Sales Co., Inc.
Indianapolis, Ind., Mfrs., Dept. B

BAUER KEROSENE ENGINES
Write for Free Catalog before you arrange to try any engine. Sizes 2, 3, 6, 7, 9, 12, 15 and 18 H-P. Low Prices. Cash or Terms. 60 Days Trial. 5-year Guarantee.
BAUER ENGINE CO.
110 Bauer Block, Kansas City, Mo.

YOU CAN COUNT
ON EVERY
GIANT GRIP



1. Faultless Shanks. 2. Correct Blades. 3. Perfectly Tempered. 4. Uniform Size. 5. Sturdily Reinforced.

The Quality Is Uniform

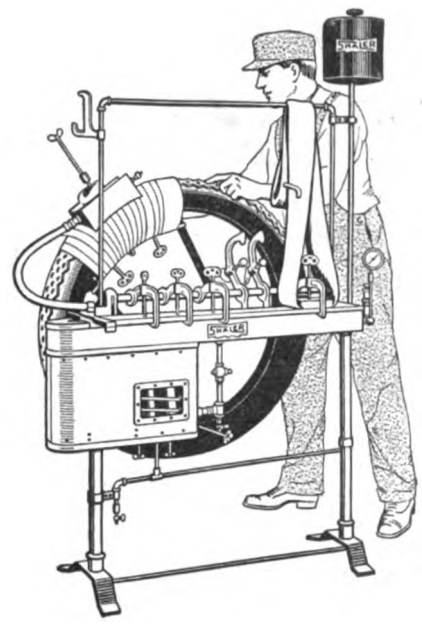
Quality is moulded in every Giant Grip Shoe and Calk. And the quality is uniform. The closest inspection is given every Giant Grip Shoe and Calk, and if it doesn't measure up to our requirements, it never leaves our plant.

This uniform quality means much to you. It is this dependability that satisfies customers and brings them back.

The Winter rush is on and Giant Grips are in big demand.

Write for catalog and prices

Giant Grip Horse Shoe Company
Oshkosh - - Wisconsin



An Easy Way to Make Money

Don't be content to plod along on a small salary. Be *independent*. Go in business for yourself. Open a Tire Repair Shop, and be your own boss. Hundreds of men are making $200 to $500 a month clear profit. Many make $60 a week. One man made $45 the first day. No experience is needed. We teach you how. Very little capital required and expenses are small. But little risk as there is plenty of work and motorists are willing to pay liberal prices for good tire repairing. There is a good profit on the sale of automobile accessories also.

SHALER
Tire Repair Outfit

is a simple, easily operated steam vulcanizer that does as much and as perfect work as the large $250 to $500 vulcanizing outfits. It is the only vulcanizier that has ***Automatic Heat Control.*** It must vulcanize just right. Can't overcure or undercure the rubber. So simple that a boy can operate it. Requires no watching or regulating. Only takes a small space in corner of barn, garage or repair shop. You can learn to do expert tire repairing in half an hour. It's easy and the work is pleasant. Complete outfit—Shaler Steam Shop Vulcanizer with full instructions for tire repairing costs only $70—subject to trade discounts. Tools and materials are not expensive. Do you know any other business that pays such large profits on such a small investment?

FREE BOOK
"How to Open a Tire Repair Shop"

—gives full information, and describes the Shaler Wrapped Thread Method of tire repairing that is used by all tire manufacturers. Write quick before some hustler gets ahead of you. It's easy to make money repairing tires, and there is a big opportunity now, right in your town. Don't fail to write for free book.

C. A. Shaler Company
1810 Fourth Street Waupun, Wisconsin

Digitized by Google

Index to Advertisers

Aetna Nut Co., horseshoe calks....Front cover
Akron-Selle Co., gears.... 27
American Calk Co., calks....Front cover
Anti-Borax Compound Co., welding compounds 2
Armstrong Mfg. Co., bolt dies.... 8
Armstrong-Blum Mfg. Co., punches and shears ....Front cover

Barcus Mfg. Co., horse stocks....3rd cover
Barnett, G. & H., Co., files and rasps, Front cover
Bauer Engine Co., engines.... 23
Bear Mfg. Co., starters.... 23
Bertschy-Bermo Co., welding plants.... 27
Bicknell Mfg. & Supply Co., punches and shears, spark plugs....23 and 24
Bradley, C. C., & Son, shaft coupler.... 26
Brooks, The, Machine Co., welding outfits 5
Buffalo Forge Co., blacksmiths' tools.... 7
Burden Iron Works, horseshoes....3rd cover
Butterfield & Co., taps, dies and screw plates 8

Campbell Iron Co., supplies.... 27
Canedy-Otto Mfg. Co., blacksmiths' tools.. 4
Capewell Horse Nail Co., horse nails, Front cover
Champion Blower & Forge Co., blowers.... 3
Champion Shock Absorber Sales Co., Inc., shock absorbers 23
Champion Tool Co., blacksmiths' tools.... 6
Chase, L. C., motor topping....Front cover
Childs, S. D., & Co., steel stamps, Front cover
Columbus Forge & Iron Co., anvils.... 26
Columbian Hardware Co., vises....4th cover
Cortland Welding Compound Co., welding compounds 27
Crane Puller Co., pullers.... 21
Cray Bros., blacksmiths' tools.... 27
Crescent Machine Co., woodworking machinery 6

Depew Sales Agency, disc rollers.... 21
Diamond Calk Horseshoe Co., horseshoes ....2nd cover
Doxey, N. D., welding compounds.... 23
Durner, A. E., disc sharpeners....3rd cover

Edwards, C. D., Mfg. Co., shears.... 27
Electric Blower Co., blowers.... 6
Electric Wheel Co., wheels.... 27
Empire Mfg. Co., wheels....4th cover

Felton, Sibley & Co., paints.... 1
Firestone Tire & Rubber Co., tires.... 5
Fisher & Norris, anvils and vises.... 8
Franklin Steel Works, toe calks.... 2

Giant Grip Horseshoe Co., horseshoes.... 23
Gillette Cliping Machine Co., clipping machines 28
Gogel Mfg. Co., tire heaters.... 27
Greb Co., grip pullers.... 25
Greenfield Tap & Die Corporation, screw plates and blacksmiths' machinery, 3d cover
Gwilliam Co., ball bearings....4th cover

Hart Mfg. Co., stocks and dies....4th cover
Harvey Spring & Forging Co., auto springs 7
Hay-Budden Mfg. Co., anvils....4th cover
Heller Bros., horse rasps, tools, etc.... 8
House Cold Tire Setter Co.., tire setters, hollow and spoke augers....4th cover

Jenner, H. W. T., patents.... 22

Kerrihard Co., hammers.... 6

Leonard-Morton & Co., shoes.... 1
Linde Air Products Co., oxygen.... 8
L. S. P. Calking Machine Co., calking machines 1

Macgowan & Finigan Cordage Co., hammers 28
Mayer Bros. Co., hammers.... 4

Ness, Geo. M., Jr., steel stamps....Front cover
Niehoff & Co., Paul G., defectometers.... 27
Nicholson File Co., files and rasps.... 1

Ottawa Mfg. Co., engines....Front cover
Oneida National Chuck Co., chucks, 4th cover

Parker, C. L., attorney.... 27
Parks Ball Bearing Machine Co., woodworking machinery 28
Peck, Stow & Wilcox Co., pincers.... 28
Phoenix Horseshoe Co., horseshoes and toe calks ....4th cover
Porter, H. K., bolt clipper....4th cover
Prentiss Vise Co., vises....4th cover
Plymouth Foundry and Machine Co., punches and shears 28

Root-Heath Mfg. Co. lawn mower grinders 26
Rosewater Electric Co., blowers.... 28
Rowe Calk & Chain Co., horseshoe calks, Front cover

Sampson & Murdock, directories.... 27
Savidge, A. C., lathes.... 8
Shaler, C. A., Co., vulcanizers.... 23
Sheldon Axle & Spring Co., axles.... 2
Simonsen Iron Works, shears.... 4
Standard Horse Nail Co., horseshoe nails, 4th cover
Standard Horseshoe Co., horseshoes....
Star Mfg. Co., agricultural implements.... 6
Sterling Tire Corp., hoof pads.... 26
Stokes Bros. Mfg. Co., rasps....Front cover
Superior Oxy-Acetylene Machine Co., welding outfits 27

Thompson Tuyere Iron Co., tuyere iron, 4th cover

Union Horse Nail Co., horse nails.... 7
Universal Wheel Compressor Co., wheel compressors 28

Warner, R. P., Electric Co., blowers.... 4
West Tire Setter Co., tire setters, hammers 27
Wheel B, Top & Hardware Co., supplies.... 4
Whisler Mfg. Co., nut splitters, jointer heads 27
Witte Engine Works, engines.... 25
Wolfe, Matt L., tire coolers.... 23

Young, W. F., veterinary remedies.... 27

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co.... 6

Anvils
Columbus Forge & Iron Co.... 26
Fisher & Norris.... 8

Attorneys
Hay-Budden Mfg. Co....4th cover
Parker, C. L.... 27

Automobile Springs
Harvey Spring & Forging Co.... 7

Axles
Sheldon Axle & Spring Co.... 2

Ball Bearings
Gwilliam Co. ....4th cover

Blacksmiths' Machinery
Greenfield Tap & Die Corporation..3d cover

Blacksmiths' Tools
Buffalo Forge Co.... 7
Butterfield & Co.... 8
Canedy-Otto Mfg. Co.... 4
Champion Blower & Forge Co.... 3
Champion Tool Co.... 6
Cray Bros. 27
Heller Bros. Co.... 8
Nicholson File Co.... 1
Peck, Stow & Wilcox Co.... 28

Blowers
Buffalo Forge Co.... 7
Champion Blower & Forge Co.... 3
Champion Tool Co.... 6
Electric Blower Co.... 6
Rosewater Electric Co.... 28
Warner, R. P., Electric Co.... 4

Bolt Dies
Armstrong Mfg. Co.... 8

Bolt and Rivet Clippers
Porter, H. K....4th cover

Calking Machines
L. S. P. Calking Machine Co.... 1

Calks, Horseshoe
Aetna Nut Co....Front cover
American Calk Co....Front cover
Diamond Calk Horseshoe Co....2d cover

Calks, Toe
Franklin Steel Works.... 2

Chisels
Champion Tool Co.... 6
Peck, Stow & Wilcox Co.... 28

Clipping Machines
Gillette Clipping Machine Co.... 28

Chucks
Buffalo Forge Co.... 7
Oneida National Chuck Co....4th cover

Defectometers
Niehoff & Co., Paul G.... 27

Directories
Sampson & Murdock Co.... 27

Disc Rollers
Depew Sales Agency.... 21

Disc Sharpeners
Durner, A. E....3d cover
Mayer Bros. Co.... 4

Engines
Bauer Engine Co.... 23
Ottawa Mfg. Co....Front cover
Witte Engine Works.... 25

Farriers' Tools
Barnett, G. & H., Co....Front cover
Champion Tool Co.... 6
Heller Bros. Co.... 8
Peck, Stow & Wilcox Co.... 28

Files and Rasps
Barnett, G. & H., Co....Front cover
Nicholson File Co.... 1
Stokes Bros. Mfg. Co....Front cover

Forges
Buffalo Forge Co.... 7
Champion Blower & Forge Co. 3

Gasoline Engines
Witte Engine Works.... 25

Gears
Akron-Selle Co. 27

Grip Pullers
Greb Co. 25

Hammers
Champion Tool Co.... 6
Kerrihard Co. 6
Macgowan & Finigan Cordage Co.... 28
Mayer Bros. Co.... 4
Peck, Stow & Wilcox Co.... 28
West Tire Setter Co.... 27

Hollow Augers
House Cold Tire Setter Co ....4th cover

Hoof Nippers
Champion Tool Co.... 6

Hoof Pads
Sterling Tire Corp.... 26

Hoof Parers
Champion Tool Co.... 6

Hoof Shears
Champion Tool Co.... 6

Horseshoes
Burden Iron Works....3d cover
Diamond Calk Horseshoe Co....2d cover
Giant Grip Horseshoe Co.... 23
Phoenix Horseshoe Co....4th cover

Horseshoe Calks
Diamond Calk Horseshoe Co....2d cover
Rowe Calk & Chain Co....Front cover

Horseshoe Nails
Capewell Horse Nail Co....Front cover
Standard Horse Nail Co.... ....4th cover
Union Horse Nail Co.... 7

Horse Stocks
Barcus Mfg. Co....3d cover

Kerosene Engines
Witte Engine Works.... 25

Lathes
Savidge, A. C.... 8

Lawn Mower Grinders
Root-Heath Mfg. Co.... 26

Motor Topping
Chase, L. C....Front cover

Nut Splitters
Whisler Mfg. Co.... 27

Oxygen
Linde Air Products Co.... 8

Paints and Varnishes
Felton, Sibley & Co.... 1

Patents
Jenner, H. W. T.... 22
Parker, C. L.... 27

Pincers
Peck, Stow & Wilcox Co.... 28

Pullers
Crane Puller Co.... 21

Punches
Champion Blower & Forge Co.... 3

Punches and Shears
Bicknell Mfg. & Supply Co....23 and 24
Peck, Stow & Wilcox Co.... 28
Plymouth Foundry & Machine Co.... 28

Screw Plates
Butterfield & Co.... 8
Buffalo Forge Co.... 7
Champion Blower & Forge Co.... 3
Greenfield Tap & Die Corporation..3d cover

Shaft Coupling
Bradley, C. C., & Son.... 26

Shears
Edwards, C. D., Mfg. Co.... 27
Simonsen Iron Works.... 4

Shock Absorbers
Champion Shock Absorber Sales Co., Inc. 23

Shoes
Leonard-Morton & Co.... 1

Spoke Augers
House Cold Tire Setter Co....4th cover

Starters
Bear Mfg. Co.... 23

Steel Stamps
Childs, S. D., & Co....Front cover
Ness, George M., Jr....Front cover

Stocks and Dies
Butterfield & Co.... 8
Champion Blower & Forge Co.... 3
Hart Mfg. Co....4th cover

Supplies
Campbell Iron Co.... 27
Wheel B, Top & Hardware Co.... 4

Swages
Champion Blower & Forge Co.... 3

Tires
Firestone Tire & Rubber Co.... 5

Tire Bending Machines
Buffalo Forge Co.... 7
Champion Blower & Forge Co.... 3

Tire Coolers
Wolfe, Matt L.... 23

Tire Heaters
Gogel Mfg. Co.... 27

Tire Setters
Buffalo Forge Co.... 7
House Cold Tire Setter Co....4th cover
West Tire Setter Co.... 27

Tire Shrinkers
Buffalo Forge Co.... 7
Champion Blower & Forge Co.... 3

Tongs
Champion Tool Co.... 6

Tool Grinders
Phoenix Horseshoe Co....4th cover

Trucks
Akron-Selle Co. 27

Tuyere Irons
Buffalo Forge Co.... 7
Champion Blower & Forge Co.... 3
Thompson Tuyere Iron Co....4th cover

Veterinary Remedies
Young, W. F.... 27

Vises
Butterfield & Co.... 8
Columbian Hardware Co....4th cover
Fisher & Norris.... 8
Prentiss Vise Co....4th cover

Vulcanizers
Shaler, C. A., Co.... 23

Wagons
Akron-Selle Co. 27

Welding Compounds
Anti-Borax Compound Co.... 2
Cortland Welding Compound Co.... 27
Doxey N. D. 23

Welding Outfits
Brooks, The, Machine Co.... 5
Superior Oxy-Acetylene Machine Co.... 27

Welding Plant
Bertschy-Bermo Co. 27

Welding Supplies
Linde Air Products Co.... 8

Wheel Compressors
Universal Wheel Compressor Co.... 28

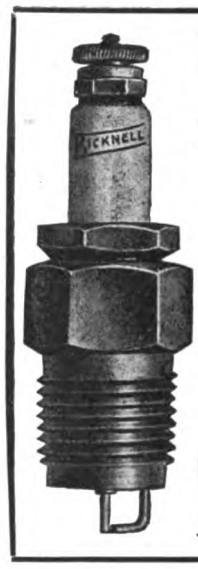
Wheel Dishers
House Cold Tire Setter Co....4th cover

Wheels
Electric Wheel Co.... 27
Empire Mfg. Co....4th cover

Woodworking Machinery
Buffalo Forge Co.... 7
Crescent Machine Co.... 6
Parks Ball Bearing Machine Co.... 28

Wrenches
Champion Tool Co.... 6

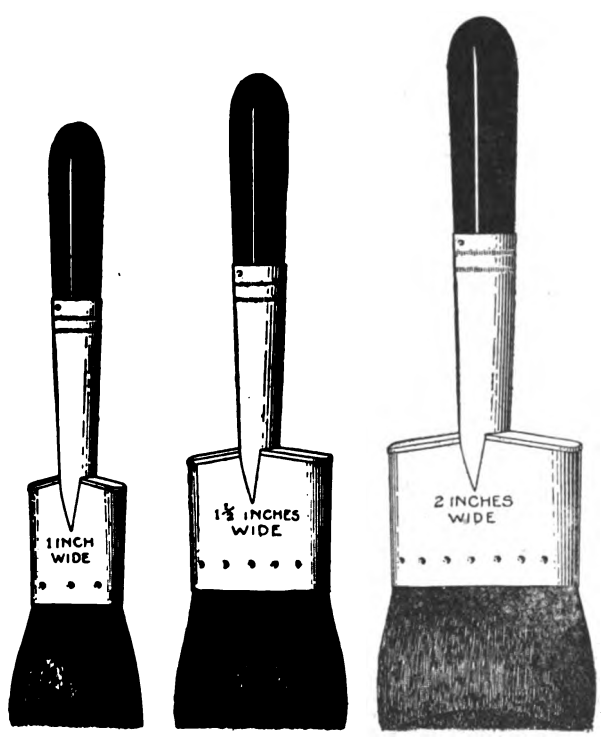
Wrenches (Knife Handle and Pipe)
Peck, Stow & Wilcox Co.... 28



The Bicknell
SPARK PLUGS
Made in ½ in., ⅝ in. and Ford Special
Retail For
75c
Splendid Profit to the Dealer
Write for Circulars and Prices
BICKNELL MFG. & SUPPLY CO.
Janesville, Wisconsin

IMPORTANT POINTS ABOUT PAINT AND VARNISH BRUSHES

A Set of Three Brushes and the Blacksmith and Wheelwright for One Year for $2.00.



Showing Brushes One-Half Actual Size.

Did it ever occur to you that there was much difference between a good paint or varnish brush and a poor one? Probably not. To most people a brush is just a brush. Yet an analysis shows that there is an almost measureless difference between a good brush and poor one.

For instance, a properly made Flowing Fitch brush is hermetically sealed, so as to keep the paint, or whatever may be used, from getting into the brush at the top and loosening the hairs. All such properly made brushes are solidly set in glue cement inside a leak-proof ferrule, and a whole row of neatly clinched nails are driven in at the end of the ferrule to give added security, and a guarantee that the hairs will not pull out.

A Fitch brush is *smooth*, *soft*, and *flowing*, and does not "mush" up or get flabby like a cheap brush, but holds its springiness. The trouble with cheap brushes is that the ferrule is nothing more than a single band of tin, open at the top, with a couple of nails jabbed through. When you use such a brush the cheap hair will pull out and scatter all over your work, because it is not held securely enough to stand the drag of the brush in painting or varnishing.

A brush may be washed with gasoline or kerosene oil, but to clean it thoroughly turpentine should be used. No brush used for painting should be used for varnishing.

We have recently made arrangements with one of the best manufacturers of these properly made brushes in New York to offer a set of Three in connection with a subscription to the BLACKSMITH AND WHEELWRIGHT for a year for an even $2.00. These brushes sell at retail for $1.40. It will be seen, therefore, that there is a substantial advantage in sending to us for the BLACKSMITH AND WHEELWRIGHT for a year, and for a set of these brushes.

Present subscribers can have their subscriptions extended for a year, and secure a set of brushes, on the same terms. These brushes are guaranteed in every respect, and though they cost more than cheap brushes would cost, they are far cheaper in the end, because of their lasting qualities and the good work that can be done with them. No man can afford to waste expensive paint and varnish on any vehicle by using a cheap and poorly constructed brush, such as is usually to be found wherever brushes are sold. The ordinary dealer in brushes himself as a rule has very little knowledge of the quality of the brushes he sells.

Remit by check or money order, and your name will be entered as a subscriber to the BLACKSMITH AND WHEELWRIGHT for a year, and a set of these brushes, which are just the right size and shape (see illustration, which is exactly one-half the actual size of the brushes), will be sent to you, postage prepaid.

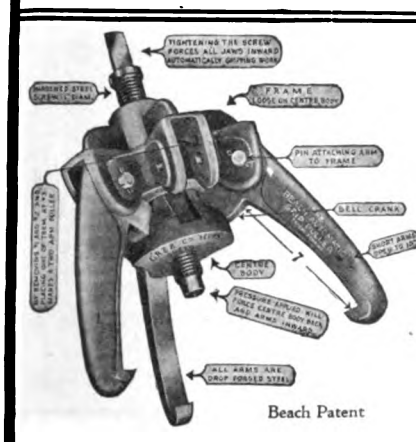
Address all orders to the

M. T. RICHARDSON COMPANY, Publishers

71-73 MURRAY STREET, NEW YORK

Digitized by Google

GREB AUTOMATIC GRIP PULLER



Beach Patent

Make Your Gear and Wheel Pulling Show a Profit.

A Powerful automatic one-man Puller, whicn adjusts to work instantly. Combination of two or three arms. Two complete sets of three arms.

Senior Size for heavy work, Capacity 1 to 18 in.
Junior Size for small work, Capacity 1 to 7 in.

Ten Days' Trial

If your jobber does not have them, we will send you one. Try it ten days. If not satisfactory, return it to us and we will refund your money.

We also make the Greb Rim Tool and Grebford Extension.

10 DAYS TRIAL

THE GREB COMPANY, 219 State St., Boston, Mass.

"GET-A-WITTE"

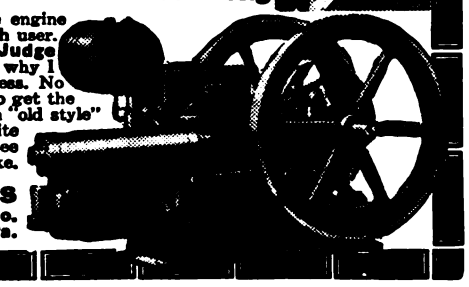
BUY ON YOUR OWN TERMS

KEROSENE ENGINE
DIRECT FROM FACTORY—FACTORY PRICES.

Own your farm or shop power at lowest cost. Get as much power for half the price, using kerosene. Choose your own terms—Cash, Payments, or No Money Down as arranged for. Save $15 to $200 buying direct—all fully explained in my new book—sent FREE on request.—Ed. H. Witte, Pres.



WITTE Engines
Stationary—Portable—Saw-Rig



are all made in the largest exclusive engine factory in the world dealing direct with user. My Free Factory Book, "How To Judge Engines", tells the whole story—tells why I can make a better engine and sell it for less. No need to pay higher prices than I ask to get the kind of an engine you want, or accept an "old style" or "back-number" to save money. Write for my new illustrated factory book and see just what a big offer I am able to make.

Witte Engine Works
2440 Oakland Ave. Kansas City, Mo.
2440 Empire Bldg. Pittsburgh, Pa.

940 Pages instead of 824 — **NINTH EDITION** — 3362 Illustrations instead of 2000

$4.46 prepaid **DYKE'S AUTO ENCYCLOPEDIA** $4.46 prepaid

Entirely re-written, hundreds of illustrations and many new subjects added. Practically a new book. A non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 50 Instructions—Simplified and Practical.

3362 Illustrations—the kind you understand at a glance.

2 Supplements, part printed in two colors, treating on the construction, operation, repairing and adjusting of the **FORD** and **PACKARD**—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.

776 illustrations and 279 pages on Electric Ignition, Electric Starters and Generators, etc.

81 pages and 79 illustrations on the Delco system alone.

60 pages and 254 illustrations on Adjustments, Tests, etc., of leading **Electric Systems.**

184 pages and 1189 illustrations on Repairing.

Oxy-Acetylene welding. **Axle, Differential** and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.

27 pages and 180 illustrations on **Tires and Tire Repairing.**

44 pages and 119 illustrations on **Carburetion.**

89 pages and 291 illustrations on **Engines** and **Parts.**

16 pages on **Digest of Troubles.**

6000 lines to the **Index.** This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. **Index** begins on **colored** paper, easy to refer to.

Dictionary is also included, which gives the meaning of motoring terms.

Inserts: There are five—printed in colors. **New** features you never before saw or heard of in one of the inserts.

Additions to the Ninth Edition:

TRUCKS, TRACTORS, MOTORCYCLES, AIRPLANES and LIBERTY ENGINE

HOW TO BECOME AN EXPERT AUTOMOBILE MECHANICIAN

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion subject so thoroughly, you can adjust any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

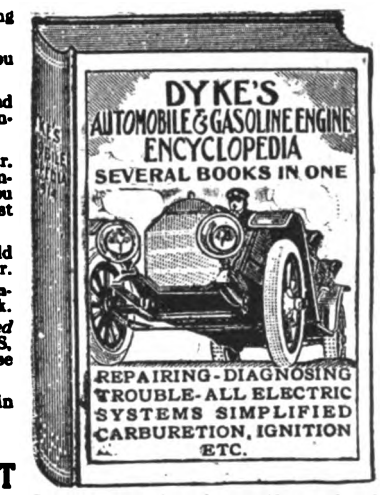
You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical Automobile book in America. Price $4.46, prepaid.

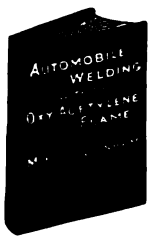
Address all orders to

THE BLACKSMITH & WHEELWRIGHT
73 MURRAY STREET NEW YORK



It's worth ten times its cost if only placed on the shelf and used as a reference.

JUST PUBLISHED



AUTOMOBILE WELDING

WITH THE OXY-ACETYLENE FLAME

By M. KEITH DUNHAM

167 Pages **Price $1.00** Fully Illustrated

Sent Postpaid to Any Part of the World.

This is the only complete book on the "Why" and "How" of Welding.

EXPLAINS in a simple manner apparatus to be used, its care, and how to construct necessary shop equipment. Proceeds then to the actual welding of all automobile parts, in a manner understandable by everyone.

Gives principles never to be forgotten. Aluminum, cast iron, steel, copper, brass, bronze and malleable iron are fully treated, as well as a clear explanation of the proper manner to burn the carbon out of the combustion head.

AUTOMOBILE OWNERS, GARAGE AND SERVICE STATIONS, BLACKSMITHS AND MACHINE SHOPS, as well as industries using the oxy-acetylene flame, will find this book of the utmost value, since the perplexing problems arising when metal is heated to a melting point are fully explained and the proper methods to overcome them shown.

CONTENTS

CHAPTER I.—APPARATUS KNOWLEDGE.

Oxygen Supply—Care of Oxygen Cylinder—Acetylene Generator—Care of Generator—Regulators—Care of Regulators—Creeping Regulators—Gauges—Care of Gauges—Welding Torch—Care of Welding Torch—Effects of Heat—Hose and Goggles.

CHAPTER II.—SHOP EQUIPMENT AND INITIAL PROCEDURE.

Preheating Agencies—Welding Table—Location of Welding Outfit—Starting the Welding Outfit—Adjustment of Flame—Principle of Welding—General Welding Knowledge—Welding Rods and Fluxes—Choice of Tip—Expansion and Contraction.

CHAPTER III.—CAST IRON.

Simple Welding—How to Hold the Flame—Hard Cast Iron—Pin Holes and Blow Holes—Lug on Cylinder—Water Outlet—Cylinder Welding—Compression Head—Finishing and Testing—Scored Cylinders—Cylinder Parts—Fly Wheels—Pistons—Crank Cases—Babbitted Bearings—Valve Guides—Preserving Threads—Conclusion of Cast Iron.

CHAPTER IV.—ALUMINUM.

Use of Welding Knowledge—Puddle System—Flux System—Comparison of Systems—Welding Rod—Preparation of the Weld—Inlet Manifold—Arm of Crank Case—Welding the Arm Without Taking Out the Motor—Break in the Body of Case—Welding Cold—Wrong Method of Setting Up—Lug or Boss Welding—Preheating the Case—Gas Preheating Flame—One Side or Both—Collapse of Weld—Broken Bearings—Direction of Welding—Shrinkage Cracks—Missing Parts—Finishing—Die Mould Castings—Body—Other Parts.

CHAPTER V.—STEEL

Welding Knowledge—What the Flame Does to Steel—The Welding Rod—Simple Welding—Position of Flame—Reinforcing the Weld—Frame Welding—Lengthening the Chassis—Tube Housings—Worn Parts—Gear Welding—Case Hardening—Light Metal Welding—Gasoline Tank—Welding Adjacent to Rivets—Shaft Welding—Construction of Parts.

CHAPTER VI.—MALLEABLE IRON, COPPER, BRASS, BRONZE.

How to Detect Malleable Iron—Brazing Malleable Iron—Rear Housing—Reinforcing the Braze—Brazing Tube to Housing—Building Up Worn Parts—Copper—Brass and Bronze—Silver Soldering.

CHAPTER VII.—CARBON BURNING AND OTHER USES OF OXYGEN AND ACETYLENE.

Principle of Carbon Burning—Method of Operation—Lead Burning—Soldering—Case Hardening—Heating Uses.

CHAPTER VIII.—HOW TO FIGURE COST OF WELDING.

Oxygen Consumption—Dissolved Acetylene Consumption—Torch Consumption Test—Acetylene Generator Consumption—Cost Card—Conclusion.

ADDRESS ALL ORDERS TO

M. T. RICHARDSON COMPANY, 71-73 Murray St., NEW YORK

THE SCREW-CUTTING LATHE

How to select, set up, adjust and operate

By JAMES F. HOBART, M. E.

THIS book is a concise and exhaustive treatise on everything pertaining to the SCREW-CUTTING LATHE, including costs, erection, operation and adaptability. It is written by one who thoroughly understands his subject in all its details, and is so copiously illustrated that everything in it will be readily understood.

It will be found invaluable to those desiring to know just how a Screw-Cutting Lathe should be run.

There are ***92 illustrations,*** and the book is substantially bound in cloth. ***Price, $2.00.*** A copy will be sent postage prepaid to any address on receipt of price.

M. T. RICHARDSON CO.
PUBLISHERS
71-73 Murray St., New York

Digitized by Google

STERLING

HOOF PADS

Are sold on quality, but the price is right. The rubber heel is vulcanized permanently to the fibre composition back (patented). The pad is one solid piece. Try the back with a knife, or rasp—bend it—give it any test you like. Better still, put on a few pairs and watch them. Protectors also.

Sold only through the regular jobbing trade.

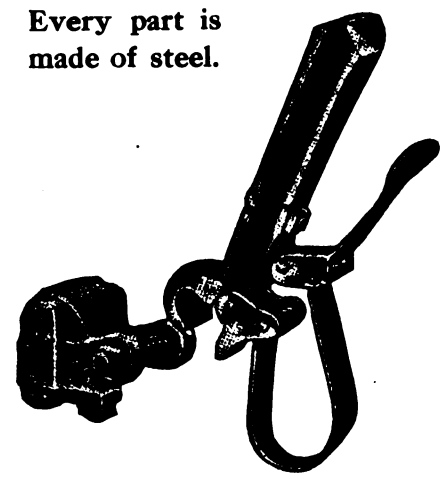
STERLING TIRE CORPORATION
RUTHERFORD, N. J.

EXPORT DEPARTMENT, 44 Whitehall Street, New York

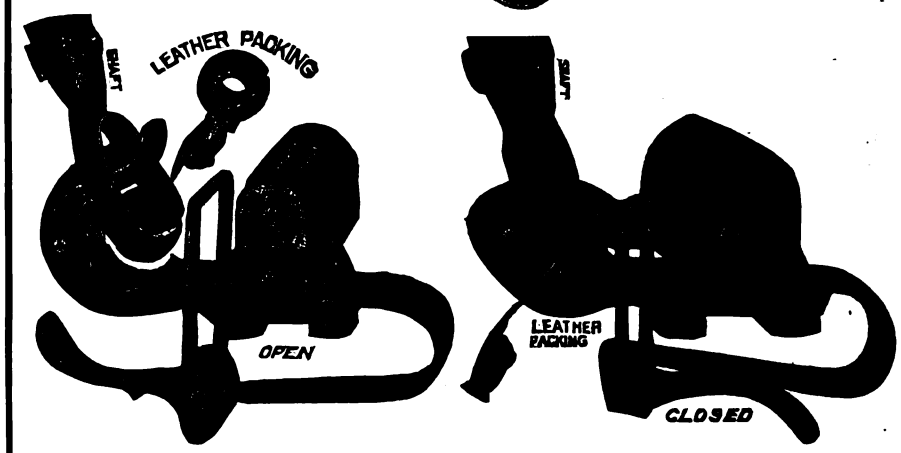
The Bradley Coupler

Every part is made of steel.

Your vehicles are not up to date without the Bradley Coupler.



Used on a majority of the better known vehicles.



Send for Descriptive Booklets

C. C. Bradley & Son, Inc.
Syracuse, N. Y.

INDIAN CHIEF
Black-smiths' **VISES** Horse-shoers'



BOKER CUTLERY & HARDWARE CO., Inc.
Sole Sales Agents
101-103 Duane Street, New York City

Solid Box—Solid steel drop forged jaws faced with crucible tool steel. Improved screw of one piece of forged steel. Built right throughout.

THE COLUMBUS FORGE & IRON CO., COLUMBUS, OHIO.

"IDEAL"
LAWN MOWER GRINDER

A BIG MONEY-MAKER.
Many of our customers **make $300** in one season. **You** can do as well.

Patented
Dec. 29, 1908
Mar. 1, 1910



"You Grind It as You Find It."

Grinds all makes of Mowers perfectly in 15 minutes without removing wheels, ratchets or reel-knife. Has perfect Skate Sharpener Attachment for sharpening skates. Operated either by hand or power. Ball-bearing; easy running. Will do the work so much BETTER, QUICKER and EASIER you cannot afford to be without it. Nearly 10,000 in use. Fully guaranteed. Sold on easy-payment terms.

WRITE TODAY for catalog and full information.

Also makers of the "PEERLESS" Horse Lawn Mower Grinder.

THE ROOT-HEATH MANUFACTURING CO.
137-149 Bell Street, PLYMOUTH, OHIO

Digitized by Google

TO LIKE WHAT YOU HAVE TO DO IS NEXT TO HAVING A GOOD TIME.

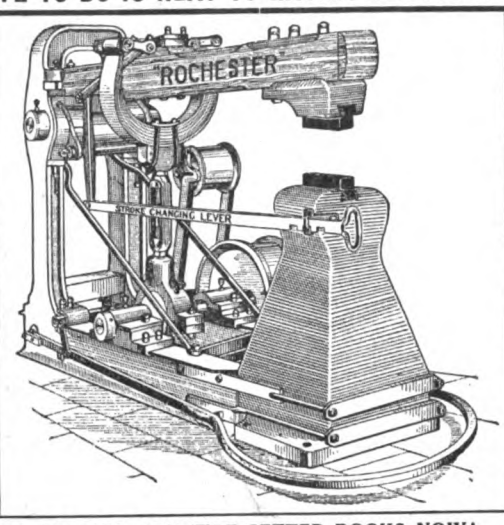
THE ROCHESTER HELVE HAMMER

Every Mechanic Likes to Operate the Rochester Helve Hammer.

WHY? BECAUSE

They are adjustable for length of stroke while running, have non-crystallizable I-beam frames and separate, heavy weight anvils. Long stroke provides for handling larger work than other hammers of the same head sizes and the springy forging blows delivered by the solid hickory helves combine advantages of forging and drop hammers—do special die work which cannot be duplicated by hand.

6 SIZES
8-30 lbs.
2 Styles of Frames



THE "WEST" HYDRAULIC TIRE SETTER

WRITE FOR OUR HELVE HAMMER AND TIRE SETTER BOOKS NOW!

WEST TIRE SETTER CO., ROCHESTER, NEW YORK.



Free 512 PAGES OF BARGAINS

POST PAID

WE WANT TO SEND YOU THIS 512 PACE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

Tells how you can work up a profitable auto supply and repair business.

Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories
1117 W. 11th Street, Cleveland, Ohio, U. S. A.

YOU CAN WELD STEEL AS EASILY AS IRON

CLIMAX WELDING COMPOUND TRADE MARK REGISTERED AUG. 22 1905.

Especially adapted for welding tires, axles, springs and all lap welding.

Either of these compounds will weld steel at the lowest possible heat that steel can be welded. Also protects steel at high heat.

Owing to our improved process of manufacturing, these compounds do not boil off and waste in the fire, but adhere to the metal when applied.

FOR SALE BY ALL LEADING DEALERS IN BLACKSMITH SUPPLIES IN UNITED STATES AND CANADA

BORAX-ETTE FOR STEEL TRADE MARK REGISTERED AUG. 22 1905 A PERFECT WELDING FLUX

PREPARED ESPECIALLY FOR WELDING FAR SUPERIOR TO COMMON BORAX

A flux which causes the steel to weld like iron. Not necessary to apply between the lap, but may be applied to the outer surface of the work, the same as borax. Has no equal for plow work. Just the thing for welding toe-calks so they can't knock off.

Large Free Samples Sent upon Request

CORTLAND WELDING COMPOUND CO.,
CORTLAND, N. Y.

Edwards Shears

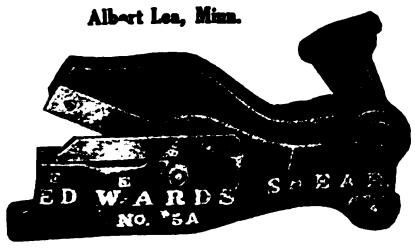
For twenty-four years the **Two Leading Low Priced Shears** in the U. S., representing the **Greatest Value** for the **Least Money.**

No. 5, weighs 200 lbs., cuts 4x½ inch soft steel.
No. 10, weighs 430 lbs., cuts 4x¼ inch soft steel.

At their price you should have had one long ago. **Order one** from the first iron man that calls on you. **They All Sell Them.**

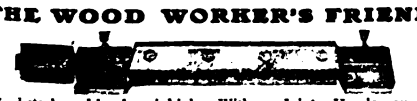
Write for descriptive circular and prices.

C. D. EDWARDS MFG. CO.
Albert Lea, Minn.



What is it worth to you to have a correct list of over 300,000 Business Firms in New England?
You may have just such a list for only $7.50
Write the Sampson & Murdock Co.
246 Summer St., Boston, Mass.
and ask for the New England Business Directory

THE WOOD WORKER'S FRIEND



Wood stock and lumber is high. With our Jointer Heads you can buy rough lumber of any kind and dress it to suit your job. Saves time, money and lumber. Would this be any object to you? If so, get circulars and prices. Sold on 30 days' trial. Mfd. by
Whisler Mfg. Co., Gibson, Iowa

PATENTS

C. L. PARKER
Ex-Member Examining Corps, U. S. Patent Office
Attorney-at-Law and Solicitor of Patents

American and foreign Patents secured. Trade marks registered. Searches made to determine patentability, validity and infringement. Patent suits conducted. Pamphlet of instructions sent upon request.

McGill Building WASHINGTON, D. C.

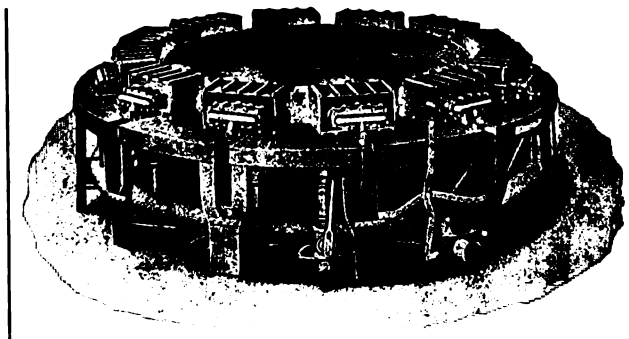
Campbell Iron Company

WHOLESALE SUPPLIES

Still carry a complete stock of Wagon, Blacksmith Materials, Farrier Supplies, as well as Tools, Hardware Specialties, and Duplicate Parts for Fords.

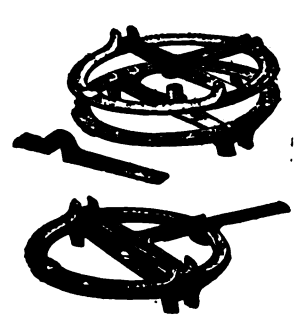
Write for General Catalogue.

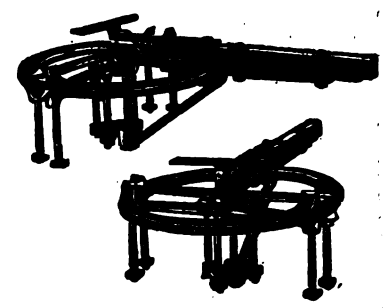
817 Cass Avenue St. Louis, Mo.



TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas, Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.

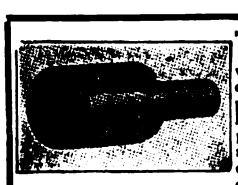
OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.





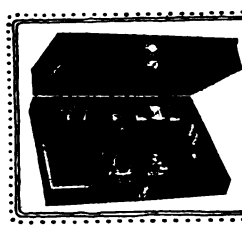
Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE COCEL MFG. CO, TOLEDO, OHIO.



THE only successful Chuck to hold square taper shank wood bits and drills so you can use them in your drill press. See the spring. It keeps the drills from dropping out of the chuck. Made right. Priced right. If your dealers won't supply you we can.

WHISLER MFG. CO., Gibson, Iowa



NIEHOFF DEFECTOMETER

THE ONLY TESTING INSTRUMENT ON THE MARKET FOR LOCATING SHORTS IN A MAGNETO. ACCURATE AND TIME SAVING. A NECESSITY IN EVERY GARAGE

PAUL G. NIEHOFF & CO. INC.
232-242 E. OHIO ST. CHICAGO, ILL.

"GEARS AND WAGONS"

Selle Gears Forty years of success has placed **"Selle Gears"** and Wagons in the hands of the largest wagon users in the world. Express and Transfer Companies, Department Stores, etc., specify **"Selle Gears"** and will take no other after once tried. **230 Page Catalog Free.**

THE AKRON-SELLE CO. Akron, Ohio

WELDING PLANTS, $25.00 to $300.00

Designed for all purposes. Small cash payment; balance, three to six months. Every mechanic and shop should have one.

BERTSCHY-BERMO CO. OMAHA, U. S. A.

ATTENTION, BLACKSMITHS!

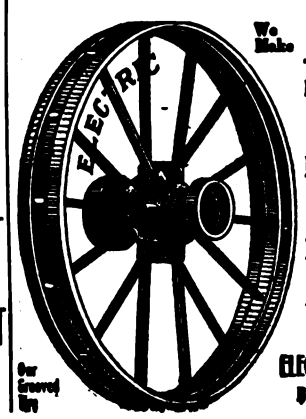
BE SURE IT'S A SUPERIOR Welding and Cutting Outfit you purchase. ACETYLENE GENERATORS. Welding Supplies. Price Popular. Service Immediate. Quality Superior. Write for catalog and price list. Agents wanted.

SUPERIOR OXY-ACETYLENE MACHINE CO.
Manufacturers of Everything for the Welder
HAMILTON, OHIO

IT PAYS TO ADVERTISE IN THE

BLACKSMITH AND WHEELWRIGHT

WRITE FOR ADVERTISING RATES



Our Grooved Tire

We Make STEEL WHEELS
To Fit Any Axle
Plain or Grooved Tire

Steel or Hickory Axles
Any Size
A Full Line of Wood and Steel

Farm Trucks
With Steel or Wood Wheels

Write for Large Catalog and Prices

ELECTRIC WHEEL CO.
Box N, Quincy, Ill.

THICK, SWOLLEN GLANDS

that make a horse **Wheeze, Roar,** have **Thick Wind** or **Choke-down,** can be reduced with



ABSORBINE

also other Bunches or Swellings. **No blister, no hair gone,** and horse kept at work. Economical—only a few drops required at an application. $2.50 per bottle delivered. Book 3 R free.

ABSORBINE, JR., the antiseptic liniment for mankind, reduces Cysts, Wens, Painful, Swollen Veins and Ulcers. $1.25 a bottle at dealers or delivered. Book "Evidence" free.

W. F. YOUNG, P. D. F., 55 Temple St., Springfield, Mass.

Digitized by Google



Gillette Portable Electric Clipping, Shearing and Grooming Machine for Direct or Alternating Currents.

"Gillette" Clipping, Grooming and Sheep Shearing Machines

Experience of a quarter-century in making flexible shaft Hand and Power Machines for Clipping Horses, Mules, Dogs, Cows and for shearing Sheep, Etc., has given us an expert knowledge of this art.

"GILLETTE" Clipping machines and parts are guaranteed as to materials and workmanship.

"GILLETTE" cutters are unexcelled and can be used on any stated make of flexible shaft clipping machine. Efficiency is our aim.

Grinding and repairing is our specialty.

Renewal and repair parts carried on hand.

Gillette Clipping Machine Co.
129-131 West 31st Street
NEW YORK, N. Y.

Illustrated Price List Free.
Order Direct or Through Your Dealer



Gillette Model "1918" Ball Bearing Hand Power Clipping Machine.

PLYMOUTH COMBINED HAND POWER PUNCH AND SHEAR

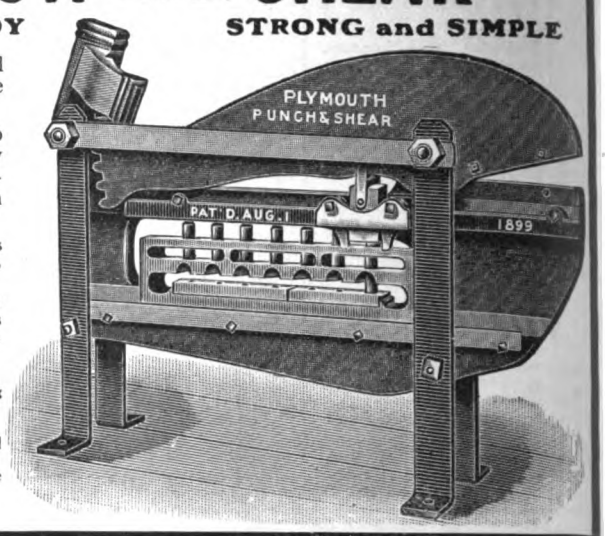
ALWAYS READY — STRONG and SIMPLE

No lost or misplaced Punches — always in the machine.

Punch Rack shifted to position for use of any punch in a moment without the need of a wrench or any other tool.

Seven different size punches with every machine, ¼, 5/16, ⅜, ½, ⅝, ¾, and ⅞.

Will punch ½ in. hole in ½ in. iron or its equivalent. Shears 4x½ or 3x⅝ or 1 in. Round Iron.



Manufactured By
PLYMOUTH FOUNDRY & MACHINE CO.
PLYMOUTH, WISCONSIN

For sale by all Heavy Hardware Jobbers and Blacksmiths' Supply Houses.

The Perfect Power Hammer



Note the difference in construction over other makes:

Extra Long Guides, insuring a direct movement of the ram without any side motion, which causes guides and springs to break on other Hammers.

The only Hammer made with a disk attachment with special anvil for sharpening harrow and plow disks.

A recently invented **Friction Clutch** fitted with **Ball Bearings,** absolutely controls the operation of the Hammer by foot pressure from the lightest tap to the heaviest blow. This ease of operation makes the Hammer particularly well adapted for plow work, as you can get as light a stroke as you desire.

Will ship to any responsible party on approval. If not as represented, no sale.

Made in two sizes:

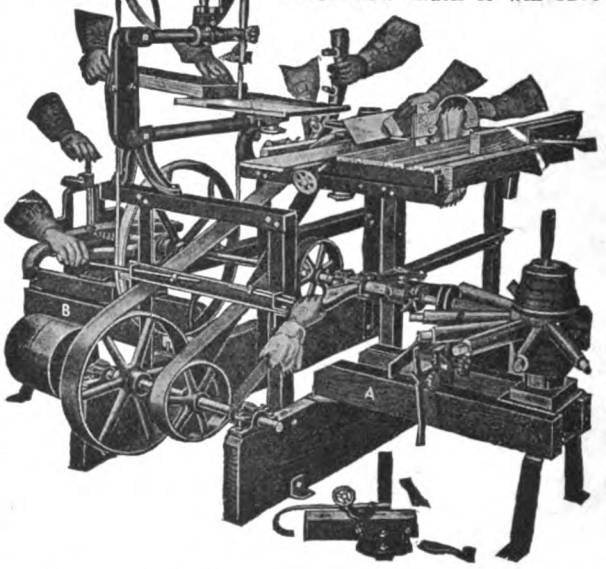
3 inch square, 40 lb. ram—shipping weight, 1,150 lbs.
4 " " 80 " " " " " 1,800 "

Write any jobber for prices, or

Macgowan & Finigan Cordage Co.,
204 North Third St., ST. LOUIS, MO

PARKS WAGON SHOP SPECIAL

You may think you don't need this practical woodworker in your shop. Take advantage of our trial offer, and be convinced how much it will save you. **Machines sent on trial anywhere in United States and Canada.**



Machine is a combination of Circular, Rip and Cross Cut Saws,
22" Band Saw,
12" Jointer,
Rim Rounder,
Felloe Borer,
Spoke Tenoner,
All ready for instant use. No Changing.

Light size takes 2 to 3 H. P., heavy size 3 to 4 H. P.

Write for catalog and full information about how a woodworker should be arranged to be convenient to operate.

Parks Ball Bearing Machine Co.
North Side Station
Cincinnati, O.

MAKE BIG MONEY QUICKLY
UNIVERSAL WHEEL COMPRESSOR

For Automobile and Truck Wheels

With the old way of doing it—you have had a heart-breaking job of getting wheels sufficiently compressed and joints properly closed before putting on the tire or rim.

Now you can do it good—very good, and quickly at the same time.

That's how you make the money—you'll get trade from miles around as soon as they find out you've got this machine—no man wants his Auto or Truck laid up for days or weeks—he wants his wheel fixed quickly so he can go about his business, and he's willing to pay the price.

If you want to double your income, write to us this very day—don't put it off.



This machine is constructed so the compressing ring can be moved like a turntable. No belts, pulleys nor power needed. Takes up very little space. Can be easily moved.

Universal Wheel Compressor Co.
Cedar Rapids - - Iowa



PEXTO

No Slip to This Grip

Snap! The jaws close like a vise. A twist, a pull and out comes the nail.

With Pexto Shoeing Pincers there's *no slipping, no binding.* The jaws open wide and close without sticking.

Made in three sizes, 10, 12 and 14 inches.

High-grade steel gives Pexto Blacksmiths' and Farriers' tools their strength, experienced toolmakers their superior workmanship and finish. There's a large line to pick from, including pincers, nippers, parers, butterises, farriers' hammers, etc.

Every tool bears the P. S. & W. guaranty. This means not only right materials and construction but right design for the purpose. Ninety-six years of experience in manufacturing and a great organization stand behind this guaranty.

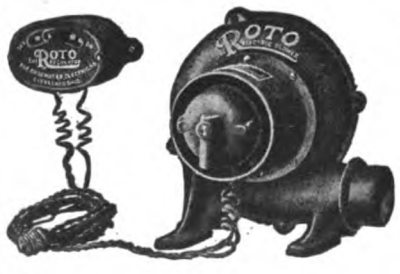
Ask your dealer.

THE PECK, STOW & WILCOX CO.
Mfrs. of Mechanics' Hand Tools, Tinsmiths' and Sheet Metal Workers' Tools and Machines. Builders' and General Hardware.
SOUTHINGTON, CONN. CLEVELAND, OHIO

Address all correspondence to 209 West Center St., Southington, Conn.

100% American for 100 Years (Founded 1819)

The ROTO ELECTRIC BLOWER ONLY $30.00



Write for information about our special cash price of Twenty-Nine Dollars

SAVE TIME! SAVE MONEY!

Are you still blowing your forge by hand? Do you know this time is WASTED? Install a ROTO Electric Blower and SAVE this time. It is the greatest *time and labor saver* you can put in your shop. It will let you do *twice* the work, do it *better—quicker—cheaper.* You will then say, like hundreds of our customers,

I wouldn't sell my ROTO for $100.00 if I couldn't get another.

Buy direct and *save the middleman's profits* of $10 to $20. The ROTO is used in several departments of the U. S. Government. You can rely on it. Write for more information or, better yet, mail the coupon today and try this blower in your own shop. If not satisfied, send it back at our expense. That's fair isn't it?

Send the Coupon—Do it Now

THE ROSEWATER ELECTRIC CO.
5516 KINSMAN ROAD, CLEVELAND, OHIO

Send me by..... .....An AIR COOLED ROTO BLOWER with one year's guarantee, complete with cord, plug and Speed Regulator. I will return it to you at the end of 30 days, if it does not give me entire satisfaction, and if I keep it, I will pay you $30.00 at the end of 30 days.

Name.....Address.....

Current.....Voltage.....Cycles.....

Your Electric Light or Power Company Will Give You This Information.

Digitized by Google

THE NEW YORK PUBLIC LIBRARY

ESTABLISHED 1880

The Pioneer Journal of its Class

THE BLACKSMITH & WHEELWRIGHT

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U. S. Patent Office.

Entered as Second-class Matter March 4, 1880, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Published Monthly.

Vol. LXXIX. No. 3 NEW YORK, MARCH, 1919 TERMS: One Dollar a Year. Foreign, $1.50. (6s. 3d.)

A Blacksmith's Accessory

HAMILTON ROLLER BEARING INSERTS

For Automobile Springs



Double Blacksmith Profit
33% on sale—25% on installation

One Blacksmith Sold and Installed 200 sets in 3 months

These bearings put new life into old springs, eliminate shock, vibration, rattle, squeaks and friction.

Ford Complete Set - $4.75
Large Car Sets - - $9.75

For Particulars Write

HAMILTON MANUFACTURING CO.
943 So. Grand Ave., Los Angeles, Cal.

SAMPLE OF WELDING COMPOUND FREE

TRADE MARK

BLACKSMITHS!

Let me send you a trial package free and you will use no other. Anchor Welding Compound has no equal for strength. It welds the hardest steel. No hammer needed. Good for both big and little jobs. Try it.

Write to-day and mention The Blacksmith and Wheelwright.

N. D. DOXEY, ELMIRA, N. Y.



Saw Those Heavy Bars ON A MARVEL Power Hack Saw

Machine stops when work is cut off. Requires very little power.
Price is Low. Write Us.
Ask for reply by return mail.

ARMSTRONG-BLUM MFG. CO.
340 N. Francisco Ave., Chicago, Ill., U. S. A.

STEEL STAMPS
BURNING BRANDS
RUBBER STAMPS
STENCILS
GEO. M. NESS, JR.
61 FULTON ST. NEW YORK
Send for price list.



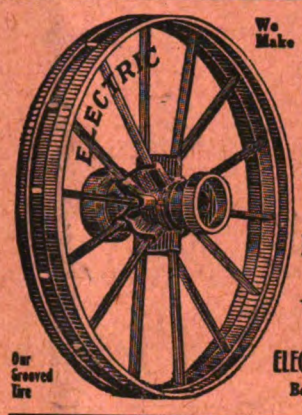
THE only successful Chuck to hold square taper shank wood bits and drills so you can use them in your drill press. See the spring. It keeps the drills from dropping out of the chuck. Made right Priced right. If your dealers won't supply you we can.

WHISLER MFG. CO., Gibson, Iowa

The Campbell Iron Company

WHOLESALE SUPPLIES

Still carry a complete stock of Wagon, Blacksmith Materials, Farrier Supplies, as well as Tools, Hardware Specialties, and Duplicate Parts for Fords.
Write for General Catalogue.
817 Cass Avenue St. Louis, Mo.



We Make STEEL WHEELS To Fit Any Axle Plain or Grooved Tire

Steel or Hickory Axles Any Size

A Full Line of Wood and Steel Farm Trucks With Steel or Wood Wheels

Write for Large Catalog and Prices

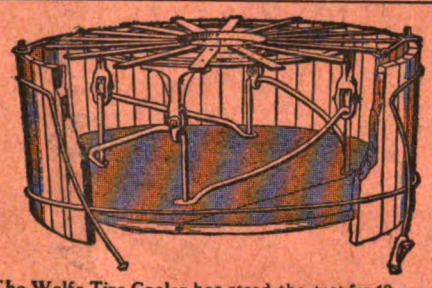
ELECTRIC WHEEL CO.
Box N, Quincy, Ill.

YOU CAN'T CUT OUT A BOG SPAVIN OR THOROUGHPIN but you can clean them off promptly with



ABSORBINE
TRADE MARK REG. U.S. PAT. OFF.

and you work the horse same time. Does not blister or remove the hair. $2.50 per bottle, delivered. Will tell you more if you write. Book 4 R free. ABSORBINE, JR., the antiseptic liniment for mankind, reduces Varicose Veins, Ruptured Muscles or Ligaments, Enlarged Glands, Wens, Cysts Allays pain quickly. Price $1.25 a bottle at druggists or delivered. Made in the U. S. A. by
W. F. YOUNG, P. D. F., 55 Temple St., Springfield, Mass.



The Wolfe Tire Cooler has stood the test for 12 years in many of the best shops, and proven all that is claimed for it. The machine is right, so is the price.
Write for circulars.
MATT. L. WOLFE, WEST CARROLLTON, OHIO



HORSESHOES In Stock

Ask for Stock List



ROWE CALKS
Screw and Drive
ROWE CALK & CHAIN CO.
Plantsville, Conn.

THE SANDBO STARTER
—Two Compression—
FOR FORD
Write BEAR MFG. CO.
Rock Island, Ill.

DO IT RIGHT—SHOE WITH
"Capewell" Nails

Your customers will be pleased. You will be satisfied. One can hardly expect to get the best results unless he uses the best materials.

Quality is the all important requisite in a horse nail. Good looks without quality is of no benefit to the horseshoer.

What the expert workman wants in a nail is just the right degree of stiffness so that it will drive where he wants it to go, and just pliability enough to clinch easily without breaking.



These Capewell Nails
in any size or pattern drive easiest and hold best. They never break at the clinch nor buckle in driving.

Proven by years of actual service to be superior. The Capewell is not the cheapest nail regardless of quality but the world's best at a fair price.

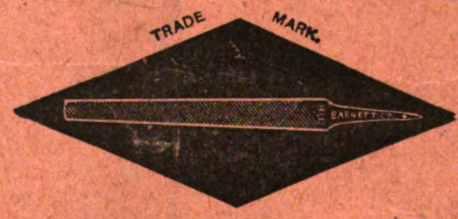
—MADE BY—
The Capewell Horse Nail Co.
Hartford, Conn.

LARGEST MAKERS OF HORSE NAILS IN THE WORLD



THE TEETH IN
BLACK DIAMOND RASPS
ARE MINGLED
So as to Cut Clean and Free and Leave no Furrows in the Work

Twelve Medals of Award by Jurors



At International Expositions

C. & H. BARNETT COMPANY
Black Diamond File Works, PHILADELPHIA, PA.
Owned and Operated by NICHOLSON FILE CO.
Copy of Catalog sent Free to any interested file users upon application.

AETNA STEEL TOE CALKS
Made by THE AETNA NUT CO., Southington, Conn.
BLACK HORSE BRAND

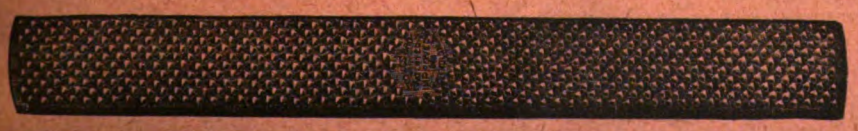
BEST SHAPE
BEST SPUR
TO DRIVE
BEST STEEL



TOE AND HEEL CALKS

SOLD BY ALL DEALERS

Stokes Bros.' Improved Horse Rasps
Every Rasp Warranted Perfect

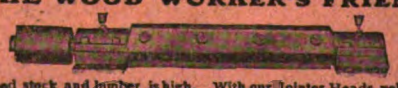


STOKES BROS. MFG. CO., Freehold, N. J., U. S. A



SUREGRIP CALKS
American Calk Co.
DETROIT, - - MICH.

THE WOOD WORKER'S FRIEND



Wood stock and lumber is high. With our Jolster Heads you can buy rough lumber of any kind and dress it to suit your job. Saves time, money and lumber. Would this be any object to you? If so, get circular and prices. Sold on 30 days trial. Mfd. by
Whisler Mfg. Co., Gibson, Iowa

UNIFORMITY

SHELDON AXLES AND SPRINGS

HAVE LONG BEEN

INTERNATIONALLY FAMOUS

For Their Superiority In

DESIGN, MATERIALS and WORKMANSHIP

REASON:

Sheldon Took Guesswork Out of Axle and Spring Manufacturing

which means

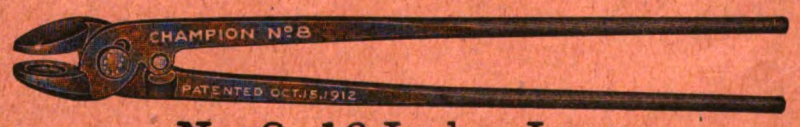
UNIFORMITY OF PRODUCT

Sheldon Axle & Spring Co., Wilkes-Barre, Pa.

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge

Nothing to get out of order.



Will hold securely any size of shoe.

No. 8 16 Inches Long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

Weights, 1¼ to 3 lbs.

This Hammer is the most popular Sharpening Hammer on the market.

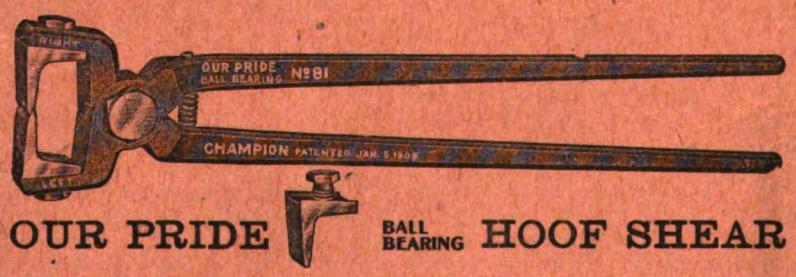


Corrugated Pein.

IT GIVES RESULTS.

No. 12 ELECTRIC SHARPENING HAMMER

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.



OUR PRIDE BALL BEARING HOOF SHEAR

Blades easily replaced when worn out.

All parts interchangeable.

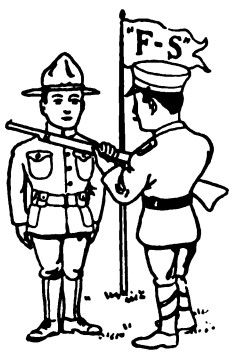
Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY, - Meadville, Pa., U. S. A.

THE LIVINGSTON CO., 131 E. 23rd Street, NEW YORK, Eastern Representatives

Digitized by Google

"F-S" PAINTS



"F-S" Products Stand the Most Rigid Inspection.

Your good work will stand even higher at inspection when you use "F-S" Superfine Coach Colors on your carriage, coach and automobile bodies. The best of material is used as in all "F-S" products—ground in gold-size Japan.

FELTON, SIBLEY & CO., Inc.

Manufacturers of Colors, Paints, Varnishes since 1863

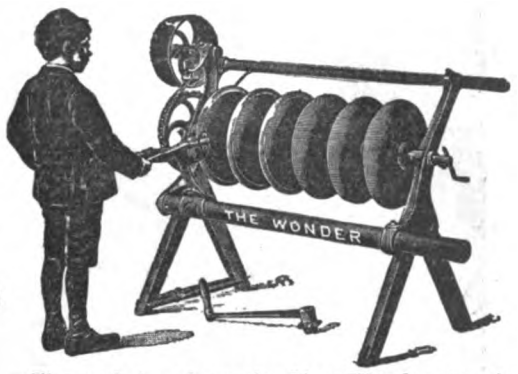
136-140 North Fourth Street, Philadelphia

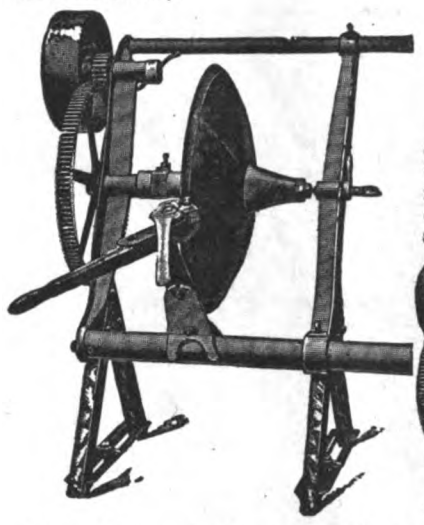
(147)

THE WONDER DISC SHARPENERS

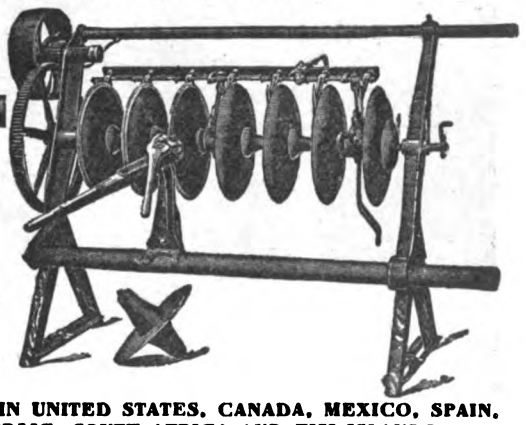
BUILT LIKE A LATHE

This cut shows the Little Wonder at work on a whole section of discs. This machine is especially adapted for sharpening disc harrows. While the Little Wonder is being successfully used to sharpen plow discs of 22 inches or less, we would recommend the Giant Wonder where disc plows are used extensively.





The cut below shows the Giant Wonder at work on a seven-disc section without removing discs, thereby saving one-half the time and labor, as in many cases you can sharpen a whole section of discs while your competitor is taking his off the shaft the old fashioned way.



The above cut shows the Giant Wonder at work on disc plows. Will sharpen any size from 12 to 32 inches in diameter.

FOR SALE BY LEADING JOBBERS IN UNITED STATES, CANADA, MEXICO, SPAIN, AUSTRALIA, ARGENTINE REPUBLIC, SOUTH AFRICA AND FIJI ISLANDS.

A. E. DURNER, Manufacturer EVANSVILLE, WIS., and BRANDON, MAN., CAN.

ADDRESS ALL INQUIRIES TO

A. E. DURNER; Head Office, Evansville, Wis.

Both size machines are equipped regular, long enough to take in 8 disc section. Special length furnished for 10 and 12 disc section at small cost.

I hold the original patent on this style sharpener. I could build them cheaper, but I won't. I would build them better, but I can't. Write for testimonials from your neighbor. Did you ever buy a cheap machine that gave satisfaction?

THINK ABOUT IT, THEN BUY A WONDER.

Get a GTD Screw Plate
with O. K. Drop Forged Dies

REG U.S. PAT OFF GTD

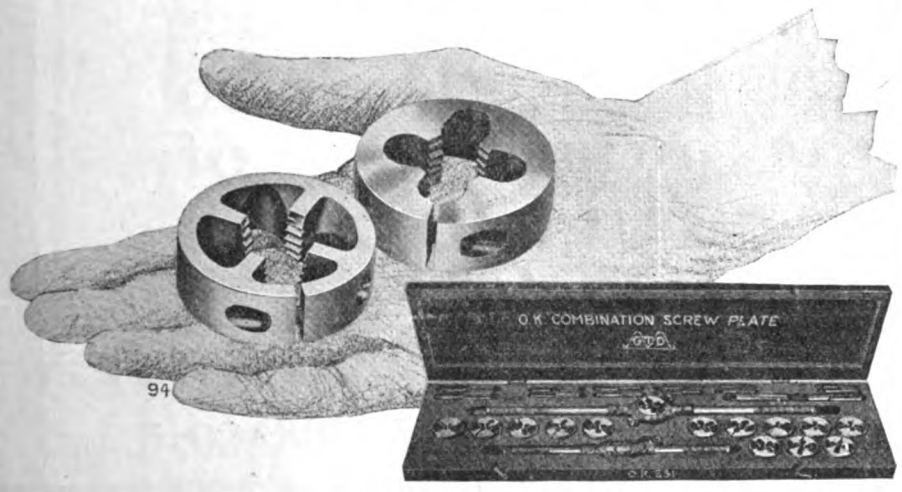
No Blacksmith Shop is complete without a GTD Screw Plate. Not only will it recut jammed threads, but new threaded parts can be made—and it's mighty hard to get spare parts now-a-days.

GTD Screw Plates are made in over a hundred assortments. Yours is among them.

Write for New Small Tools Catalog No. 40 describing Screw Plates, Taps, Dies, Reamers, etc.

Greenfield Tap and Die Corporation
Greenfield, Massachusetts

NEW YORK, 28 Warren St. CHICAGO, 13 So. Clinton St. Detroit Office, 74 Congress St. W
Canadian Plant, Wells Brothers Company of Canada, Ltd., Galt, Ontario



Would You Sell Your Life For $65?

You wouldn't part with even an arm or a leg for that figure, would you?

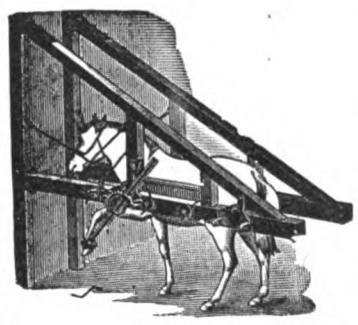
Yet every vicious horse you shoe is likely to do more damage in the twinkling of an eye than can be repaired at several times the cost of **Barcus Stocks.**

When you place a horse in a Barcus Stock, he is harmless—he cannot hurt either you or himself. Costing only $65 it is cheap insurance, indeed.

BARCUS STOCKS not only furnish the logical way to observe "Safety First," but they are also a positive aid to good shoeing. The BARCUS is a modern Stock—automatic working parts instead of the bothersome ropes, straps and blocks that made the old style stock almost more of a nuisance than a help.

If you don't know about **Barcus Stocks** you owe it to yourself and your family to write **at once** for the complete details.

The Barcus Mfg. Co.,
Wabash, Ind.



Please send me full particulars regarding your Horse Stocks without any obligation on my part.

Name.....

Town.....*State*.....

Digitized by Google

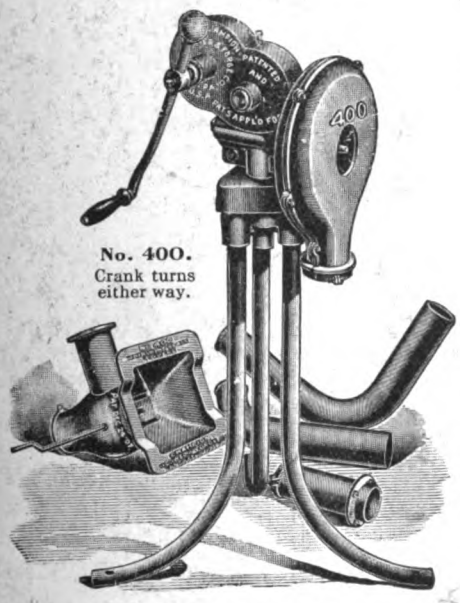


Digitized by Google

THE FAMOUS CHAMPION BLACKSMITH TOOLS

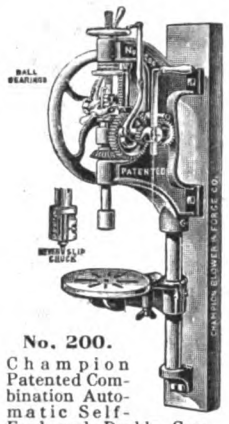
CHAMPION BLACKSMITH TOOLS HELPED TO WIN THE WAR



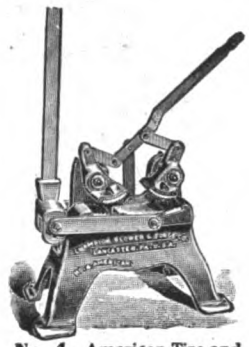


No. 400. Crank turns either way.

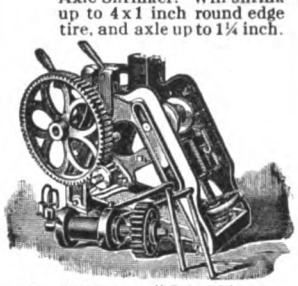
FAMOUS 400



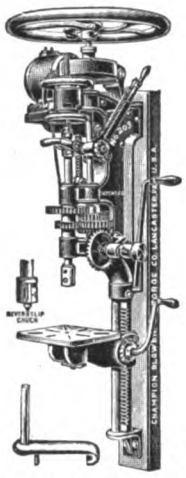
No. 200. Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



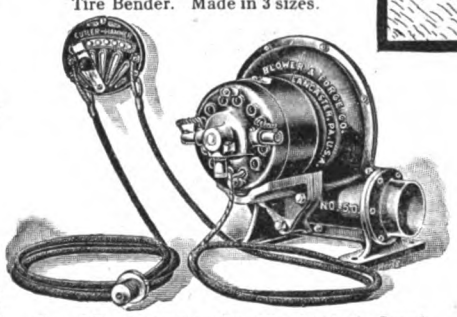
No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



The Champion "Columbian" Tire Bender. Made in 3 sizes.



No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.



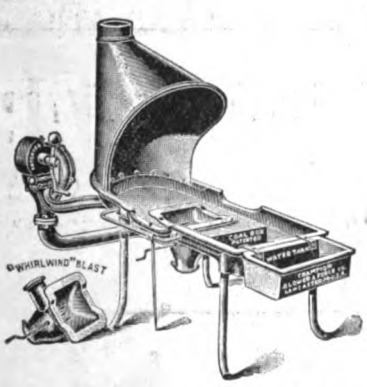
No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower.



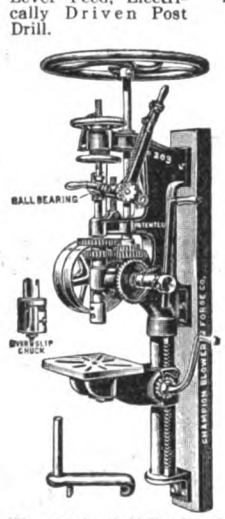
No. 408. Steel Blacksmith's Forge.

Don't Fail to Get Our 1918 Catalog

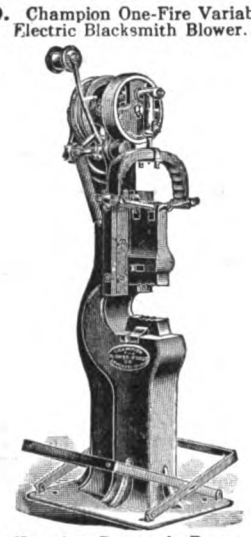
Before purchasing a Hand Blower Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



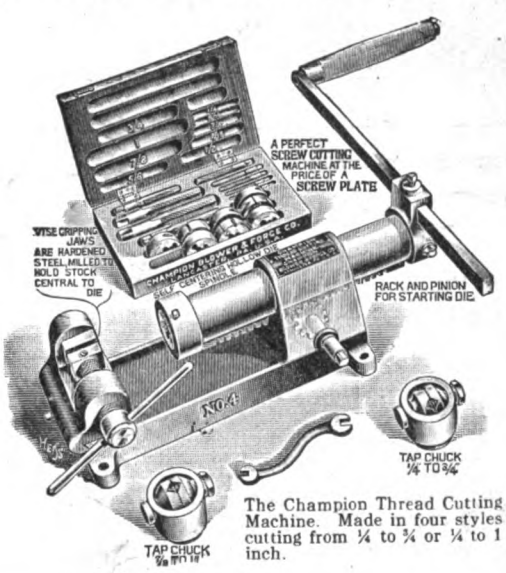
No. 433. Cast Iron Blacksmith's Forge



No. 203. Self-Feed and Double Compound Lever Feed Drill.



Hercules Patented Power Hammer. Weight of ram, 65 pounds.

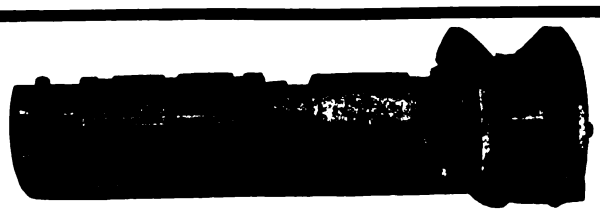


The Champion Thread Cutting Machine. Made in four styles cutting from ¼ to ¾ or ¼ to 1 inch.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

Digitized by Google



This is the No. 88 Wagon Maker's outfit, 9 in. Jointer Head and 4 in. pole rounding head.

DO IT NOW!

What? Write for 1919 catalogue No. 15, this contains valuable information for the wood worker and illustrates and describes a line of medium priced wood working machines within the reach of the small as well as the large shops.

Complete Jointers, 5 in., 9 in., and 13 in. sizes, heavy iron and steel construction. Quick, easy adjustable features.

Little Shaver 5 in. Bench Jointer. Price only..... ..... **$30.00**

Cutter Heads, circular, square and slotted, for wood frame jointers, prices from **$10.00** up.

Combined outfits, Jointer Head and Saw Arbor all on same shaft. Combined 9 in. Jointer Head and 4 in. Pole rounding head. Also, we make Saw Arbors, Emery Stands, Buffing Stands, Countershafts. Address

W. L. Sherwood **Kirksville, Mo.**



Gillette Portable Electric Clipping, Shearing and Grooming Machine for Direct or Alternating Currents.

"Gillette" Clipping, Grooming and Sheep Shearing Machines

Experience of a quarter-century in making flexible shaft Hand and Power Machines for Clipping Horses, Mules, Dogs, Cows and for shearing Sheep, Etc., has given us an expert knowledge of this art.

"GILLETTE" Clipping machines and parts are guaranteed as to materials and workmanship.

"GILLETTE" cutters are unexcelled and can be used on any stated make of flexible shaft clipping machine. Efficiency is our aim.

Grinding and repairing is our specialty.

Renewal and repair parts carried on hand.

Gillette Clipping Machine Co.

129-131 West 31st Street

NEW YORK, N. Y.

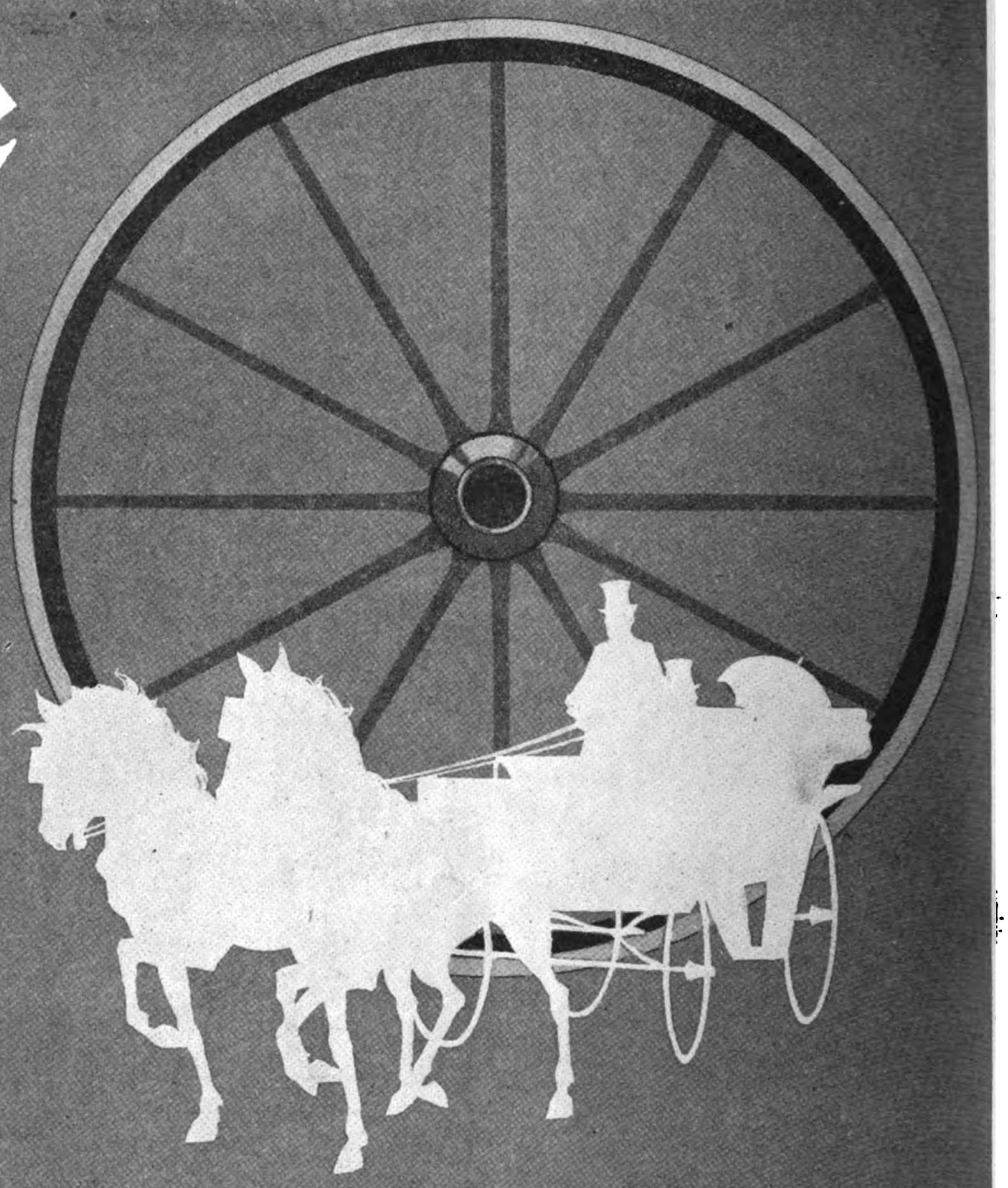
Illustrated Price List Free.

Order Direct or Through Your Dealer



Gillette Model "1918" Ball Bearing Hand Power Clipping Machine.

Firestone Carriage Tires

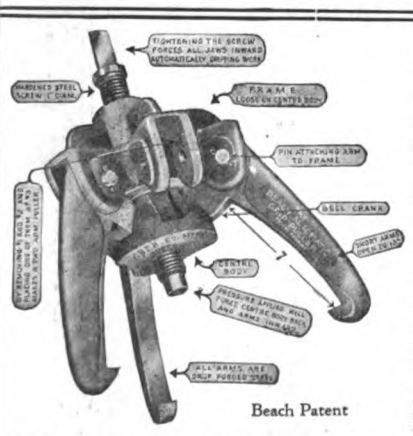


THERE are many reasons why the most exclusive trade demands Firestone equipment and looks up the Firestone dealer.

Of course the first reason is the well-known Firestone name, a sufficient guarantee. But there are interesting records of leadership in service. Write for them.

FIRESTONE TIRE AND RUBBER CO.
FIRESTONE PARK AKRON, OHIO
BRANCHES AND DEALERS EVERYWHERE

GREB AUTOMATIC GRIP PULLER



Beach Patent

Make Your Gear and Wheel Pulling Show a Profit.

A Powerful automatic one-man Puller, which adjusts to work instantly. Combination of two or three arms. Two complete sets of three arms.

Senior Size for heavy work, Capacity 1 to 18 in.
Junior Size for small work, Capacity 1 to 7 in.

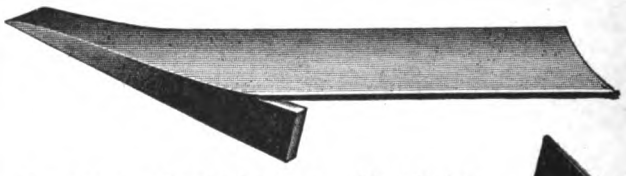
Ten Days' Trial

If your jobber does not have them, we will send you one. Try it ten days. If not satisfactory, return it to us and we will refund your money. We also make the Greb Rim Tool and Grebford Extension.

10 DAYS TRIAL

THE GREB COMPANY, 219 State St., Boston, Mass.

STAR STEEL SHAPES



Plowshares Landside Plates Plow Points
Listershares Landside Points Seeder Points
Moldboards Shovel Points Subsoilers
Cultivator Shovels Drill Points

Soft Center *Solid Cast* *Crucible Steel*



STAR MANUFACTURING CO.
CARPENTERSVILLE, ILL.

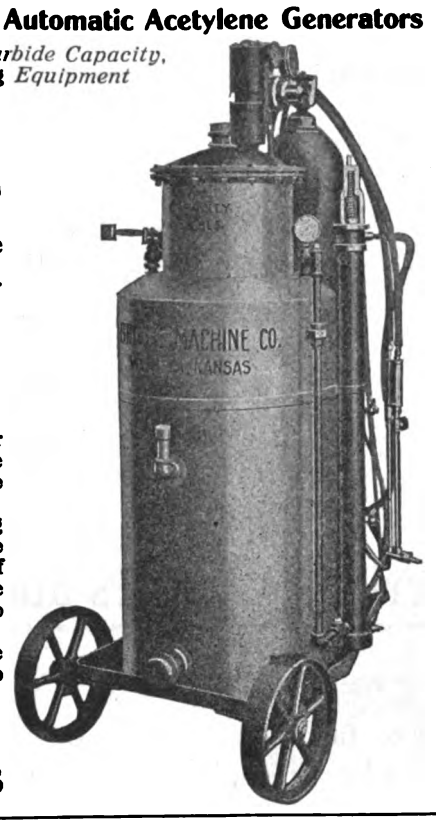
Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

GO AHEAD!

Brooks Portable Automatic Acetylene Generators

25 and 50 lb. Carbide Capacity, with Welding Equipment



Anyone Can Go Ahead With

Brooks Welding and Cutting Apparatus

because it's a complete idea—and anyone who looks at an idea to see if he can use it and not to see if he can get along without it—will soon be looking for larger quarters to accommodate his growing business.

Brooks Equipment is Now the Most Important Part of the Tool Equipment in a Metal Working Shop for Both Repairing and Manufacturing

The satisfied customer is the kind that counts—your most valuable asset. It takes quality to satisfy—to bring repeat orders. It costs money to get new customers—it costs more to lose them. Quality work will hold them all. You can't produce quality work without quality equipment.

Brooks Equipment hit "Mr. Slip-Shod Method" a terrific body blow—he took the count! GO AHEAD! Write us a letter, we'll tell you the whole story!

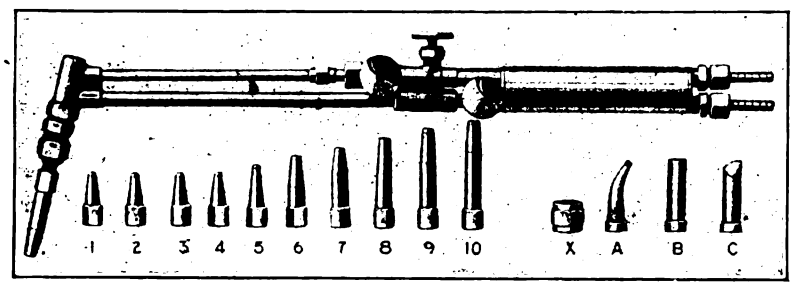
The Brooks Generators are all equipped with the well-known Brooks Flash-Back exhaust safety valve which is located on top of the dry chamber pipe at the side of the generator tank. This flash-back safety valve eliminates all chances of bursting the dry pipe, if a back-fire should occur from operating the welding or cutting torch. It opens and releases the force the same as the exhaust valve on a gas engine. It is the greatest safety device ever put on an Acetylene Generator.

The Brooks Machine Co. manufactures welding and cutting torches, automatic acetylene pressure generators, both portable and stationary. This means complete equipment to take care of any and all kinds of welding and cutting. If you can tell us the nature and quality of your work, we can advise you fully as to the size and kind of equipment to meet your requirements best.

All products manufactured by the Brooks Machine Co. are guaranteed for one year against defective workmanship and to be made of first-class material and to do all we claim for them.

Go Ahead!—Write to Us Today!

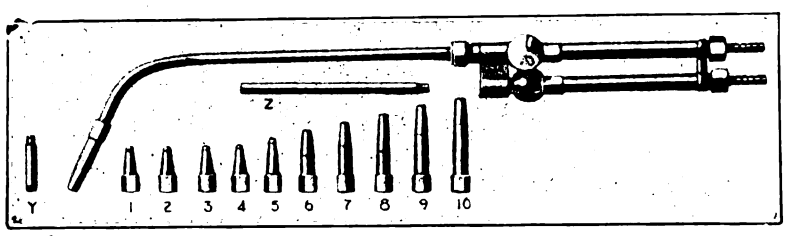
The Brooks Machine Co., 219-229 W. Lewis St., Wichita, Kansas



Brooks Universal Welding and Cutting Torch

10 Welding and 3 Cutting Tips.

This Torch is made in lengths of 20 inches over all. With it, either welding or cutting can be done by simply changing tips. This Torch is adapted to all classes of welding and cutting of metals within range of the Oxy-Acetylene welding or cutting process.



Brooks Commercial Welding Torch

8 Welding Tips and 1 Extra Extension. Larger Tips Furnished on Request.

The above cut shows Torch made up to 21 inches over all. It can be lengthened or shortened, according to the requirements of the work, by changing blow pipes. One extra plow pipe is furnished regularly which makes the torch 28 inches long. On request, pipes of any length may be furnished.

By taking off the tip elbow head and screwing the welding tip on direct to the short extension, it can be converted into a straight torch, which is often convenient.

The Brooks Commercial Torch will handle all welding work within the limit of the process. This Torch is especially well adapted for pipe line, boiler and machine shop welding.

The Better Your Equipment The Bigger Your Profits

Buy CANEDY-OTTO

AND INCREASE YOUR INCOME

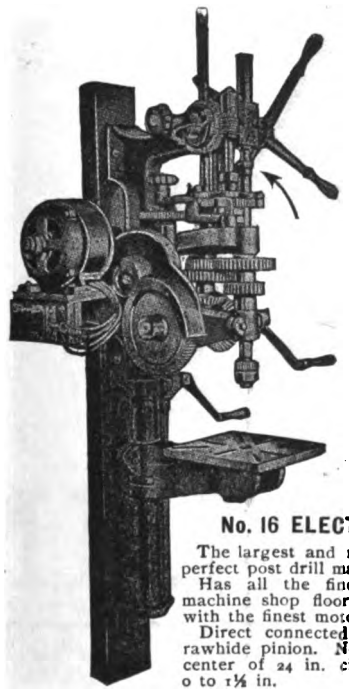
Once Tried, Always Used : There's a Reason—Quality



No. 19 DRILL

A low-priced combined hand and power self-feed drill.

Drills to center of 16½ in. circle.



No. 16 ELECTRIC DRILL

The largest and most mechanically perfect post drill manufactured.

Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.

Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1½ in.

OVER 200 DIFFERENT STYLES

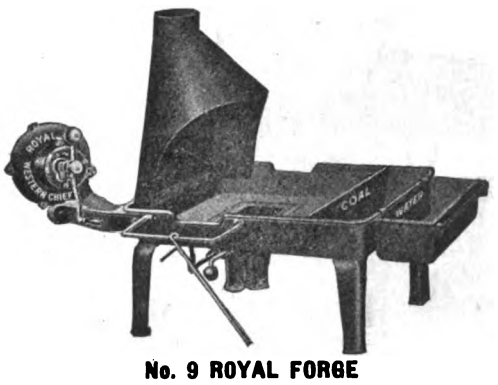
SEND FOR CATALOGUE No. 12



No. 100 ROYAL FORGE

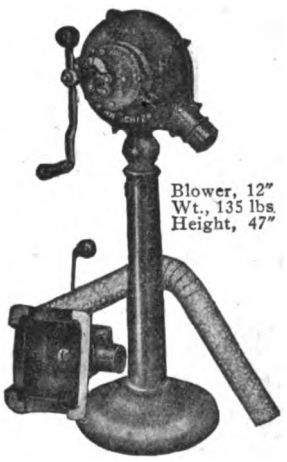
The most popular forge ever made.

Fan, 12 in. Hearth, 31½x45½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x50 in. Blower, 12 in.



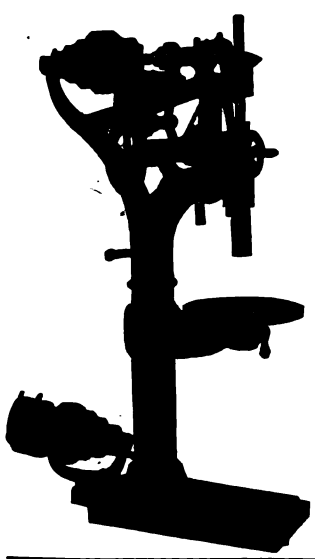
Blower, 12"
Wt., 135 lbs.
Height, 47"

ROYAL BLOWER

(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.

Fire pot is 8x9 in. inside.



No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.

All machines are tested before leaving the factory, and guaranteed in every respect.

Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

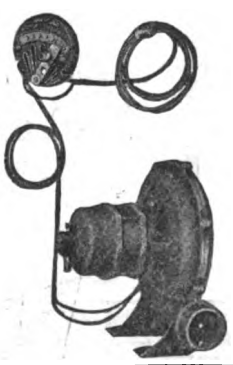
Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS



No. 1 1/2 SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.

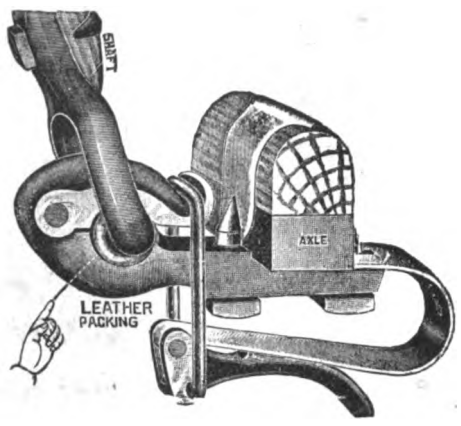


No. 8 ELECTRIC BLOWER

The best outfit money can buy.

Digitized by Google

BRADLEY

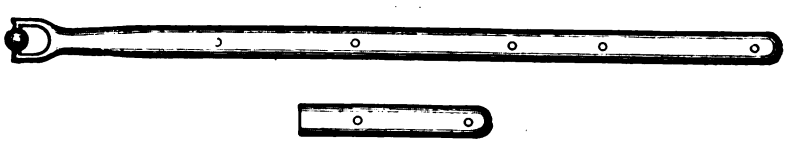


Ball-Bearing

Carriage Couplers and Long Shaft Irons

BEAR IN MIND

That we furnish both "Ball Bearing" and "Holdfast" in short or stub lengths and in full length Shaft Irons to your pattern.



These are made from Round Bevel Edge Steel, 1⅛x9/32 **inches.**
Any length desired—T pieces welded or not.
Irons punched and bent to pattern.

Let Us Quote You on Your Requirements

C. C. BRADLEY & SON, Inc.
SYRACUSE, N. Y.

"IDEAL"
LAWN MOWER GRINDER

A BIG MONEY-MAKER.
Many of our customers make $300 in one season. You can do as well.

Patented
Dec. 29, 1908
Mar. 1, 1910



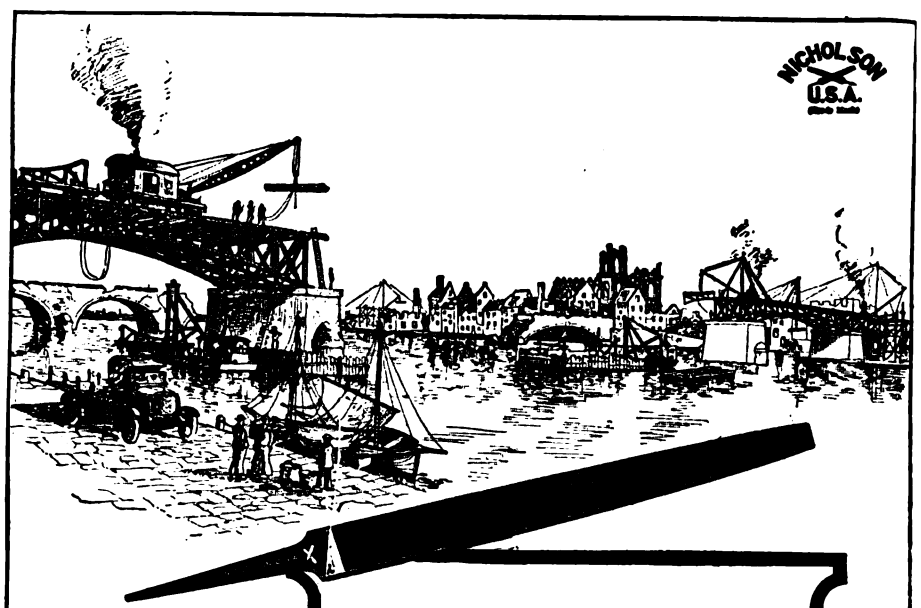
"You Grind It as You Find It."

Grinds all makes of Mowers perfectly in 15 minutes without removing wheels, ratchets or reel-knife. Has perfect Skate Sharpener Attachment for sharpening skates. Operated either by hand or power. Ball-bearing; easy running. Will do the work so much BETTER, QUICKER and EASIER you cannot afford to be without it. Nearly 10,000 in use. Fully guaranteed. Sold on easy-payment terms.

WRITE TODAY for catalog and full information.

Also makers of the "PEERLESS" Horse Lawn Mower Grinder.

THE ROOT-HEATH MANUFACTURING CO.
137-149 Bell Street, PLYMOUTH, OHIO



American Steel Rebuilds the Bombed Bridges of France

Spanning her blood-bought rivers, new bridges reach their steel meshed arms from either shore and meet in a grip to France Redeemed.

America's shops have a world wide work of destiny repairing the ravages of many a stricken field—renewing the halted pace of world advancement.

NICHOLSON FILES

will contribute as splendidly to reconstruction as they did to the waging of victorious war. The Files that cut the FASTEST and SMOOTHEST.

Write for File Filosophy—a fifty-years' education in Files and Filing in an hour's reading.



Nicholson File Co.
Providence, Rhode Island,
U. S. A.

STERLING
PADS and PROTECTORS

Sterling pads are one solid, inseparable piece. The tough, pliable, waterproof back, made of our patented rubber and fibre compound, is vulcanized (not cemented or stitched) to the resilient rubber heel. They will never pull apart. STERLING Pads and Protectors are waterproof—do not swell, shrink or get soggy in stable moisture.

They are best for the horse's hoofs, and best for the shoer's business.

We sell exclusively through the regular jobbing trade. Please ask us for Samples.

STERLING TIRE CORPORATION
RUTHERFORD, N. J.

Digitized by Google

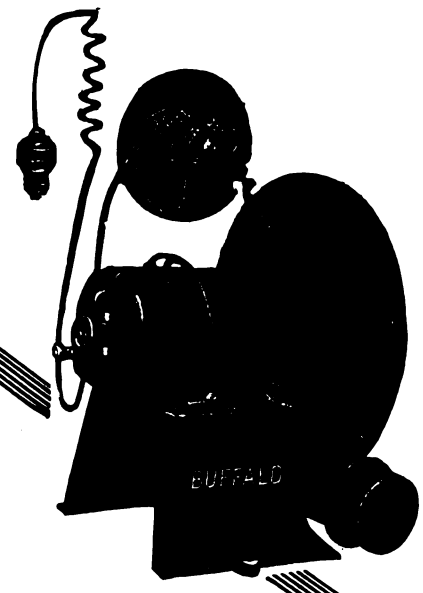


No. 228-E Forge

32 x 44 in. hearth. Suitable for practically all blacksmithing work.

No. 2-E Electric Blower

Can be installed in any blacksmith shop—saves hand blowing.



Forty years of experience and knowledge of Blacksmith Shop requirements has placed Buffalo Tools so far ahead of any others, that once you see them you'll say "good-bye" to the other kind.

"Buffalo"

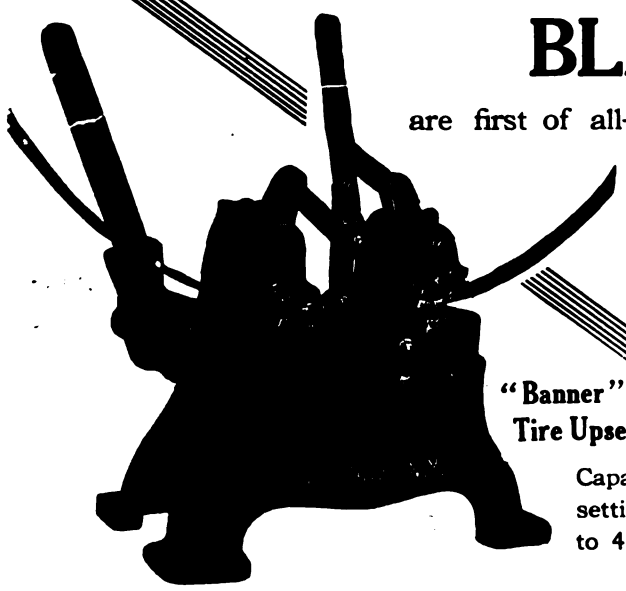
BLACKSMITH TOOLS

are first of all—dependable. They will stand up under continuous service—and hard service, too.
They are constructed of good material, by skilled workmen.

These are facts you should keep in mind, when buying Blacksmith Shop Equipment.

We'll be glad to mail you a copy of Catalog 179 6

Buffalo Forge Co.
Buffalo, N. Y.

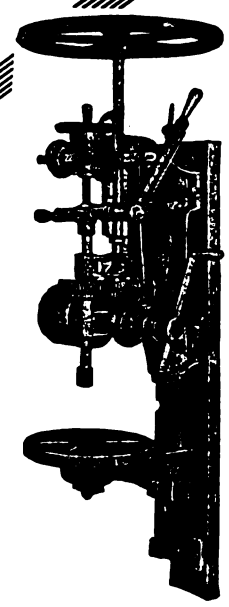


"Banner" Tire Upsetter

Capable of setting tires up to 4 x 1 in.

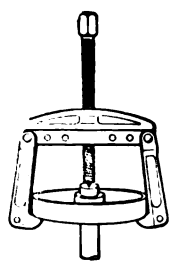
No. 221

Multi-compound automatic self and lever feed, 22 in. swing, drills to 1½ in. hole. Fitted with Suregrip chuck.

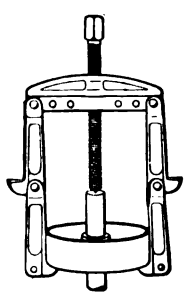


INCREASE THE USEFULNESS
OF YOUR
CRANE PULLER

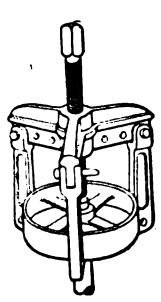
With this New Locking Arm. Absolutely Locks the Puller on the Work, making it a one-man tool



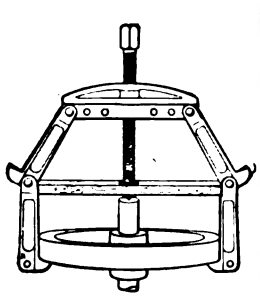
Two-Arm Puller removing work near end of shaft.



Work beyond reach of one set of arms.



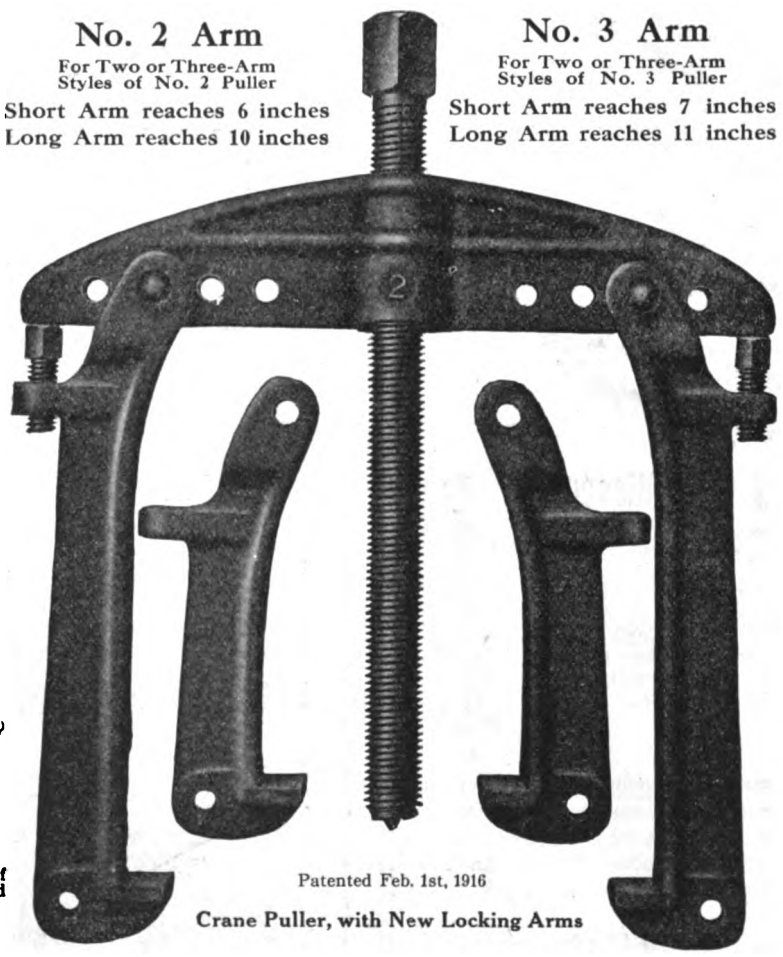
Three-Arm Puller pulling from three points will remove collars and work that cannot be started with the two-arm pullers.



Two-Arm Puller on work of large diameter (a piece of wood being used as a spreader).

No. 2 Arm
For Two or Three-Arm Styles of No. 2 Puller
Short Arm reaches 6 inches
Long Arm reaches 10 inches

No. 3 Arm
For Two or Three-Arm Styles of No. 3 Puller
Short Arm reaches 7 inches
Long Arm reaches 11 inches



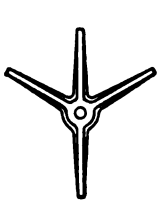
Patented Feb. 1st, 1916

Crane Puller, with New Locking Arms

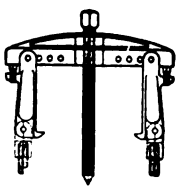
Materials and workmanship absolutely guaranteed. We will replace any part that is defective, without question and absolutely free of charge, upon return of same to us.

Pictures on both sides show different styles of Pullers and Attachments for a wide range of work.

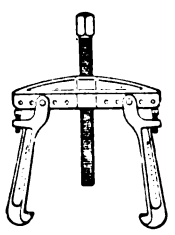
Repair season is here, write today for Price List or order from your Jobber.



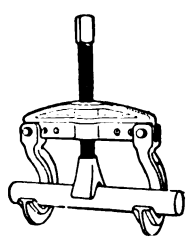
Crowfoot Beam



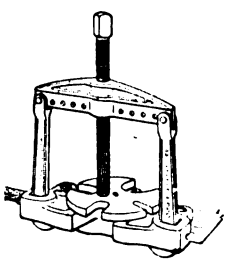
No. 0 Two-Arm Puller



Patent Locking Arm



Pipe Bending and Shaft Straightening Attachment



Arbor Press Base

CRANE PULLER COMPANY, 54 LAKE STREET, ARLINGTON, MASS.

Digitized by Google

LINDE OXYGEN

From Coast to Coast 65 Producing Plants and Distributing Stations provide an unlimited supply of Linde Oxygen for users everywhere.

LINDE SERVICE means no investment except for oxygen actually received—no expensive overhead or upkeep charges.

Linde Oxygen may be obtained from any of the following Linde Plants and Distributing Stations where a large suppply of charged 100 to 200 cu. ft. cylinders is kept on hand constantly to insure immediate shipments.

Mail or telephone your order to THE LINDE AIR PRODUCTS CO., at the nearest point. **Shipments will be made on day order is received.**

PRODUCING PLANTS AND WAREHOUSES

Alabama
*Birmingham
10th Ave. & 28th St.
California
*Emeryville, Oakland
*Los Angeles
1405 Mission Road
Colorado
*Denver
S. B'way & Exposition Ave.
Connecticut
Hartford
1095 Main Street
District of Columbia
Washington
9th & Maryland Ave., S. W.
Georgia
*Alanta
Plyant St. & Southern R. R,
Savannah
OgeecheeCanal,So.of BaySt.
Illinois
*Chicago
3633 Wall Street
East St. Louis
6th & Walnut Ave.
Peoria
721-731 So. Washington St.
Indiana
*East Chicago
S.E.Cor. Kennedy& 145th St.
Fort Wayne
414 E. Columbia Street
*Indianapolis
2819 Roosevelt Ave.
Iowa
Davenport
118 Harrison Street
Des Moines
117 W. 5th Street
Kansas
Wichita
Rock Island Ave. & 2nd St.
Kentucky
Louisville
126 East Main St.
Louisiana
New Orleans
861 Fulton Street
Maryland
*Baltimore
25th & Montebello Ave.
Massachusetts
Cambridge
25 Waverly Street
Springfield
Napier Street
*Worcester
961 Southbridge St.
Michigan
*Detroit
St. Aubin Ave. & Newton St.
Grand Rapids
Pearl Street by the Bridge
Minnesota
Dulutb
Seventh Ave., West
*Minneapolis
1809 Hennepin Ave.
Missouri
*North Kansas City
14th & Charlotte St.
*St. Louis
4218 Forest Park Blvd.
Nebraska
Omaha
1007 Jones Street
New Jersey
*Elizabeth
Linden Ave.
Newark
354 Plane Street
New York
Albany
Montgomery & Colonie Sts.
*Brooklyn
475 Driggs Ave.
*Buffalo
Broadway and Ideal Sts.
*Utica
Walnut & Schuyler Sts.
Ohio
*Cleveland
802 East 72nd Street
*Cincinnati
Stanton & Mellish Aves.
Columbus
310 Dublin Ave.
Dayton
521 E. First Street
Lima
338 East High Street
Ohio
Toledo
441 South Erie Street
*Youngstown
601-621 Jones Street
Oklahoma
Oklahoma City
27 E. Grand Ave.
Tulsa
1 North Boulder St
Oregon
Portland
15th & Hoyt Streets
Pennsylvania
Allentown
211 Gordon Street
Erie
1502 Sassafras Street
*Norristown
*No. Philadelphia
19th & Cambria Streets
Pittsburgh
16th & Pike Streets
*Trafford
Tennessee
Chattanooga
212-238 King Street
Memphis
203 Washington St.
Texas
*Dallas
Harwood and Coombs St.
Houston
Cedar and Baker Sts.
San Antonio
512 Dolorosa St.
Utah
Salt Lake City
112 West Second St., South
Virginia
*Norfolk
22nd St. and Colonial Ave.
Richmond
1709 E. Carey Street
Washington
*Seattle
Henrietta St. & 8th Ave., So.
Spokane
121-123 S. Madison St.
Wisconsin
Manitowoc
810 Quay Street
*Milwaukee
36th St. & National Ave.

(Star) * Designates Plants.

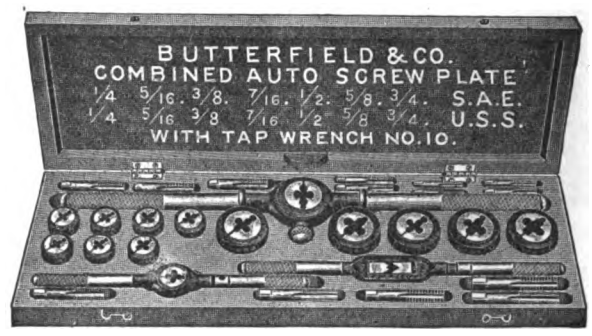
Other Plants and Distributing Stations are planned for other industrial centers throughout the country and will be established as fast as and wherever the local demand for oxygen warrants.

THE LINDE AIR PRODUCTS COMPANY

Largest Producers of Pure Oxygen in America

Forty-Second St. Building NEW YORK

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

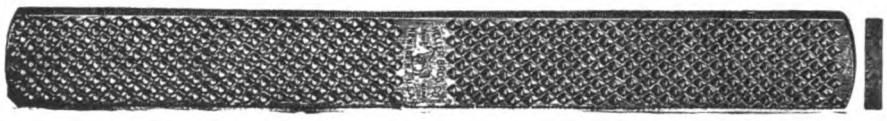
Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.

New York Store: 126 Chambers Street

The Horse Rasp of Quality



Ask your Dealer for the

IMPROVED HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, **"Slim," "Light," "Slim Light"** and **"Fine Cut."** Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial. New catalogue mailed **free** on application.

HELLER BROTHERS CO. *Established in 1836* **Newark, N. J.**

Extract from page 324 of the June, 1917, issue of The Horseshoers' Journal.

Horseshoeing business in Albany opened very quietly this spring. In fact, we still feel the harmful effect that the drive calks has done the business, but strikes in the building line has also effected trade, a large number of horses owned by contractors are remaining unshod, and are still carrying their winter shoes of drive calk variety. (to May 10th) CHARLES W. KIRK.

ARE YOU *in this boat?*



John Wiseman Says to Bill from Missouri:



"It's time for a lot of you fellows to wake up. Ram your hand down into your pocket and see if the cash jingles with the merry sound as of yore.

"If not, why not?

"There's a Reason, of course. And that reason is that you've been using calks that the owner can replace himself. Naturally his horses come less frequently to your shop. You have less business—less cash to jingle in your jeans.

"Do you get the idea?"

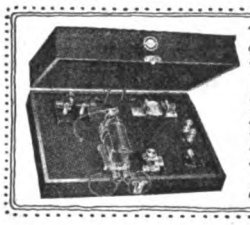


Every set of welded calks you put on helps to keep your shop full because the horses must be brought to you to have the worn calks replaced. And the users are satisfied users, too.

Use SWEET'S TOE CALKS—"The Cold Cut Dreadnaught."

Franklin Steel Works, JOLIET, ILL. CAMBRIDGE, MASS. HAMILTON, ONTARIO.

No. 2.



NIEHOFF DEFECTOMETER
THE ONLY TESTING INSTRUMENT ON THE MARKET FOR LOCATING SHORTS IN A MAGNETO. ACCURATE AND TIME SAVING. A NECESSITY IN EVERY GARAGE
PAUL G. NIEHOFF & CO INC
232-242 E. OHIO ST. CHICAGO, ILL.

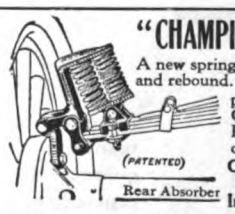
BAUER KEROSENE ENGINES

Write for Free Catalog before you arrange to try any engine. Sizes 2, 3, 5, 7, 9, 12, 15 and 18 H-P. Low Prices. Cash or Terms. 60 Days Trial, 5-year Guarantee.
BAUER ENGINE CO.
110 Bauer Block, Kansas City, Mo.



"CHAMPION" SHOCK ABSORBERS For FORD CARS

A new spring suspension which absorbs jar and rebound. A wonderful E-Z ride suspension. (E-Z to attach.) Guaranteed by manufacturers. Exclusive sales; big profit for dealers, agents and owners.



Champion Shock Absorber Sales Co., Inc.
Indianapolis, Ind., Mfrs., Dept. B

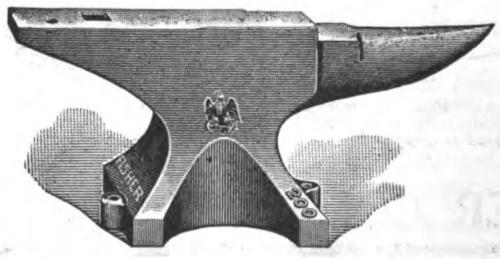
1843 **EAGLE ANVILS** 1919

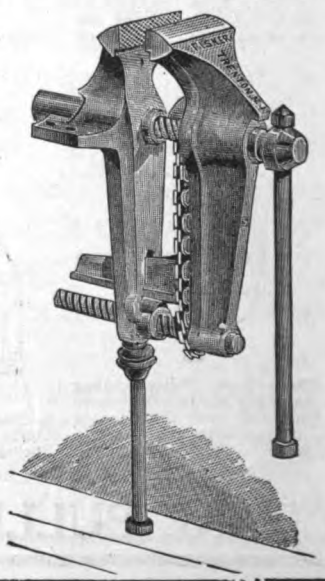
AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE

BLACKSMITH AND WHEELWRIGHT

Vol. LXXIX. No. 3. NEW YORK, MARCH, 1919. TERMS: ONE DOLLAR A YEAR

Design, Construction, Operation and Repair of Automobiles and Motor Vehicles

Part XIV—Efficient Engine Operation, Various Adjustments and How the Car Is Controlled

WHEN you notice a person operating an automobile it probably never occurs to you that the work (or pleasure) entails considerable practice and knowledge, as well as ordinary skill. Even the average driver may not realize that the knowledge is necessary, perhaps that is why the average driver frequently complains that the car mileage per gallon of fuel is low.

There are two ways of operating a machine, the right and the wrong; the economical and the extravagant. Suppose you were forging a piece of metal and wanted to heat it to a white heat. Would you put it in the fire, heap the coal around it to the depth of two or three feet and let the coal burn? Or would you put in just enough coal and use plenty of air?

In the first case, you might possibly obtain a white heat, but you would waste both time and coal. In the second case, however, you would obtain all the heat in the coal without undue waste.

A gasoline engine is just like a forge fire in one way. Give it too much gasoline and it doesn't develop its full power despite the fact that it burns up the gasoline. You can usually tell when an engine is getting too much gasoline by the appearance and smell of the exhaust. Black clouds of smoke or black smoke coming from the exhaust indicates too much gasoline.

Engine Must Have Air.

Just as it was necessary for you to feed air to the forge fire, so it is necessary for you to feed air to the engine. There is a difference however; the air and gasoline must be mixed. This is done by means of the carburetor as has been explained in a former article. Gasoline is fed into a mixing chamber through a needle valve and into this chamber air is drawn by the suction of the engine.

On most carburetors both the needle valve and the air inlet are adjustable. The simplest form of carburetor such as is used or

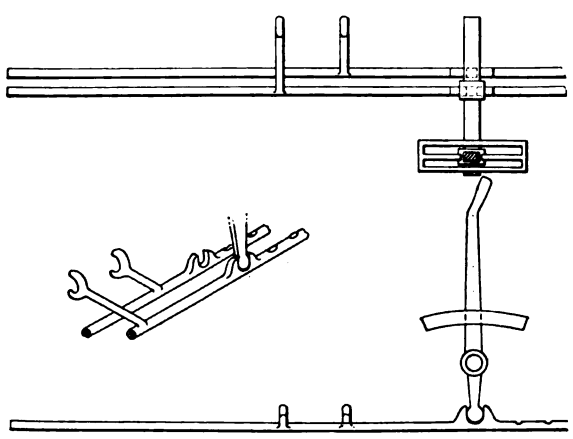


Fig. 64—Details Showing How Gear Shift Lever Operates Through Forks to Sliding Gears.

the Ford car has but one adjustment; that of the needle valve, while the more complicated machines have a number of adjustments.

To adjust the simple form of carburetor one should first close the needle valve entirely by turning it clockwise or towards the right. Then the needle valve should be turned toward the left one full turn.

Then the engine should be primed by pouring about a teaspoonful of gasoline into the priming cups or into the cylinders through the spark plug holes. Then the engine may be started. If it runs for three or four seconds, then pops back into the carburetor, indications are that the engine is not getting enough gasoline so that the needle valve should be turned one more full turn to the left.

If on the other hand the engine acts sluggish the needle valve should be turned very slightly toward the right while engine is running. In the latter case one should turn the needle valve slowly toward the right until the engine pops back or backfires into the carburetor, then it should be turned toward the left again until the backfiring ceases. In this way one can obtain the best efficiency—that is get the most power out of the least gasoline.

The second form of carburetor usually has an adjustable needle and an adjustable air valve. This form of carburetor is also fitted with what is called a primary air passage or primary intake. The air valve itself is called the auxiliary air valve and is designed to furnish more air at high engine speeds.

Adjusting Second Type.

To adjust this form of carburetor the auxiliary air valve should be closed entirely by screwing down on the adjustment so as to bring more tension on the valve spring. The needle valve may be opened and the carburetor adjusted just as directed above for the cheaper types.

After the adjustment is had so that the engine will run at low speed without popping back into the carburetor, the air valve should be opened one or two turns. Then the throttle should be opened suddenly and the action of the engine noted. If the engine speeds up quickly, the adjustment is fairly correct.

If a backfire indicates too much air, then the auxiliary air valve must be closed slightly. If the engine does not pick up quickly or does not respond to the throttle it simply shows that not enough air is being admitted at the higher speeds. In this case one should turn the auxiliary air adjusting screw in such a way as to lessen the tension on the spring and give the carburetor more air.

Other carburetors, in addition to the auxiliary air valves have an air opening which is termed an economizer. In reality these economizers are nothing but auxiliary air inlets and are adjusted after the auxiliary air valve has been adjusted. Combining all of the rules which we have into one set of instructions, so as to fit all carburetors, we arrive at the following:

General Rule for Adjustment.

In adjusting any make of adjustable carburetor, first close all air valves on the carburetor by means of the adjustment screws. Do not, however, plug up the primary air inlet. Open the needle valve one full turn, prime and start the engine.

Adjust the needle valve so as to get the best results at a low speed, then slowly open the auxiliary air valve, occasionally opening the throttle and speeding the engine. Open the auxiliary air valve until the engine will accelerate smoothly without backfiring.

Finally adjust the economizers, opening them as far as possible without causing the engine to backfire at its various speeds. Bear in mind that when the explosions pop back into the carburetor, they indicate too much air or not enough gasoline.

There is another test for imperfect combustion, that repairmen should know—a test that can be applied to any engine which is fitted with priming cups—a test that should not be made, however, unless the top of the engine is clean and unless there is a good circulation of air under the hood.

Open one of the priming cups while the engine is running at a normal speed. If the gasoline and air form a perfect mixture the fire which comes from the priming cup when the cylinder explodes will be almost colorless or slightly blue; much the same as the blue

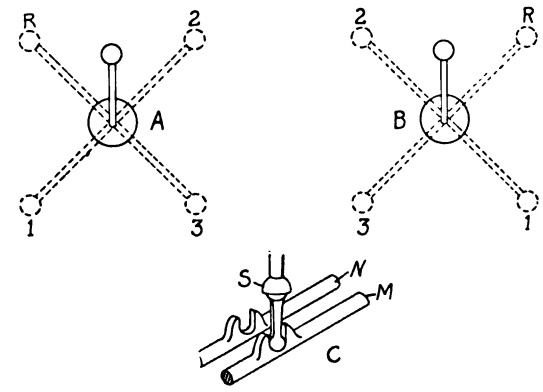


Fig. 65—Types of Gear Change Sectors and Details of Ball and Socket Shift.

flame on a blue flame oil stove or a plumber's gas torch. If too much gasoline is present, however, the flame will be red.

In ordinary operation there is one other factor which counts considerably, that is the management of the spark lever. You will remember in one of our installments we dwelt upon the timing of the engine and said that the spark should occur at the top or after the piston had passed the top center.

As an experiment sometime, you might remove a spark plug and while the engine is being turned by hand, notice how small the spark really is. It is nothing more than a pin point. When you realize that a gasoline engine in an automobile is traveling at the rate of one thousand turns per minute or more, you can realize how quickly this little spark must ignite the whole mixture in order to keep the engine running up to speed.

Gasoline Does Not Explode.

Gasoline and air when in the engine as a matter of fact, do not explode. They burn very rapidly. Taking these two facts into consideration, one can see that if the spark is formed slightly before the time it is needed the mixture in the cylinder should have time to burn and explode before the piston is at the working part of its stroke.

For that reason the spark in most engines, while they are being operated at their normal speed, should occur before the piston reaches its top center. As the speed of the engine decreases the spark should occur nearer top center. As the speed increases the spark should be advanced still further.

If there were no way to control the spark and it were fixed so as to occur before top

Digitized by Google

center, the engine could not be cranked safely by hand, for it would have a tendency to kick back or run backward.

The spark lever, then, is put on cars for two reasons. First—so that the engine can be started without danger to the operator, and second, so that the spark can be advanced to a point where the explosion gives its maximum efficiency. If the spark is advanced too far, the explosion works against the piston, tending to drive the engine backward and the engine will knock.

In actual practice, an engine should be started with the spark fully retarded. As soon as it begins operation, the spark should be advanced as far as possible without causing the engine to knock. When the car is being driven up a hill, if the grade is steep, the spark must be retarded slightly, or the engine will knock.

Only actual experience enables one to operate the spark lever so as to give the engine its highest efficiency.

We now come to the practical operation of an automobile in so far as driving a machine on the road is concerned. Perhaps the simplest form of drive is had in the Ford car.

The Ford Drive.

The Ford car is fitted with three pedals and a steering wheel, upon the latter is mounted the spark and throttle levers, of which we have spoken. The first pedal at the extreme left controls the high and low speed clutches. When this pedal is pushed as far forward as it will go, the band around the low speed cone is compressed and the car moves forward at low speed.

When one gets into the car, however, he will notice that this pedal is held at the center. This is accomplished by the emergency brake lever at the left of the car. When this lever is pulled backward, the clutch pedal is carried to the neutral position where no gears are engaged and where the engine runs idle without affecting the rear wheels. If it were not arranged this way one could not start the engine without moving the car.

The first process in starting a Ford car after the engine has been started is to hold the clutch lever at the neutral position with the foot and move the emergency brake lever forward as far as it will go. This action releases the clutch pedal. Then the clutch pedal may be pushed forward easily into low speed and the car will move forward slowly.

As soon as the car gains momentum the clutch pedal should be let back into high speed. As this pedal passes the neutral position the throttle should be closed somewhat and the engine retarded.

In a Ford car, should one desire to go backward the clutch pedal at the left should be held at this neutral or central position and the middle pedal pressed forward. The pedal at the extreme right is to operate the service brake.

In driving any car, one should carefully locate the clutch and brake pedals and be ready to press them in a case of emergency. This statement applies to practically all gasoline operated cars on the market with the exception of the Metz.

One should not make the mistake, however, of holding one's foot against the clutch pedal. This will invariably result in clutch slippage and wear. One should apply the brake only after the clutch has been disengaged, else the engine will fight against the brake in its endeavor to push the car forward, resulting in wear upon the brake and strain upon the engine.

The Metz Drive.

The Metz car is fitted with two controlling pedals; the service brake at the right and the clutch pedal at the left. In order to control this machine after the engine is started, the change speed lever should be moved so as to bring the friction disc nearly to the center of the driving disc in the forward position.

Then the clutch lever should be pressed in slowly until the car starts. As soon as the car has gained momentum the clutch should be released, the speed change lever moved so as to bring the friction disc further out upon the driving disc and the clutch pedal pushed in and so on until high speed is attained.

Reverse is had in the same way except that the friction disc is carried to the opposite side of the center of the driving disc.

Sliding Gear Transmissions.

Practically all of the sliding gear types of cars are fitted with but two control pedals—the clutch at the left and the service brake at the right, but there are a great number of gear shift arrangements. When we described the transmission gear-set, you will remember that there were two sliding gears on the main driving shaft which were moved along the shaft to mesh with gears upon the countershaft. The countershaft gears were controlled indirectly through the clutch.

Figure 64 shows roughly how the sliding gears are controlled by the change gear lever. The two sliding gears are moved in their places by two sliding rods upon which are two sliding gear shifting forks.

The two gear shift shafts are controlled by the gear shift lever which may be located either at the driver's right or left, depending upon the make of car. Let us consider a minute figure 65, which shows two types of selectors.

Standard Type of Shift.

That at A is the standard ball shift type. No matter whether the ball type of shift or the H type is used, the principle is the same, and the positions are as shown. That shown at A is called the standard shift mainly because it is adopted by the majority of car

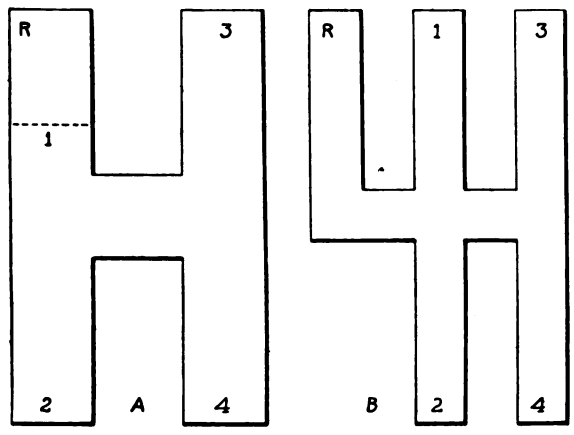


Fig. 66—Four Speed Gear Shift Arrangements.

manufacturers. We will assume that it is located at the center of the car on the driver's right.

With the car standing at the curb, the gear shift lever should be at the center or at the bar of the H. The engine is started, while the clutch is in. You will remember that the clutch is engaged at all times except when the clutch pedal is pushed forward.

After the engine has been started the clutch pedal is pushed as far forward as it will go and the gear-shift carried along the bar of the H toward the operator, then pulled backward to the position as shown in the sketch A at figure 1. The clutch pedal is then slowly released and the car moves forward in low speed.

The engine should then be speeded slightly until the car is moved fairly fast in the low speed gear. There is no necessity for racing the engine, however, as some operators do. As soon as the car has attained sufficient momentum, the clutch pedal should be pushed forward, the gear shift lever carried to the center, thence through the bar of the H to the second position as shown in A. The clutch pedal should then be released and the car will continue to move forward at a slightly higher speed.

As soon as the car has gained momentum, the clutch pedal must be released and the change lever brought back to the third or high position. If one wishes to speed the car, one need but press both the clutch and the brake levers. There is no necessity for moving the change lever from the third position at the time, but if the car is to be brought to a full stop the change gear lever should always be brought to neutral before releasing the clutch pedal.

Upon inspection of the drawing B, one will see that the relative arrangement of the various speeds is practically the same. B in reality is an inverted view of A. One will notice that the second and third speeds are on the same side of the H, while to change from first to intermediate the change gear lever must be carried through the bar of the H. This latter type of gear shift is adopted by a number of popular cars.

How the Gears Are Moved.

If one will inspect the sketch C one will see just how movement of the gears is accomplished. At the neutral position the gear shift lever S holds both the change gear shifts M and N at the center. The forks on N and M hold the sliding gears at neutral or free from the gears on the countershaft. When S is brought toward the operator and pulled backward then the change gear shaft N is carried forward.

When S is brought to the center across the bar of the H the ball on the end engages with the fork on the shaft M and when S is pushed forward M and its sliding gear are carried backward.

A Four-Speed Gear-Set.

A number of the larger cars are fitted with four speeds and reverse instead of three speeds and levers. The same type of H selector is used but the arrangement of the speeds is somewhat different.

The two standard types of four-speed car shifts are shown at A and B in figure 66. The low speed as shown by 1 in figure A is separated from the reverse by a small latch which prevents one from inadvertently throwing the shift lever into the reverse. Such a mistake cannot happen in the shift shown at figure B because the reverse has a separate gate.

The Engine as a Brake.

In driving a car the first thing that the operator should learn is that the engine together with the clutch and the gear-set make one of the best brakes possible—not for stopping the car particularly, but for cutting down the speed.

Suppose, for instance, you were driving down a steep mountain. You knew that the trip would occupy an hour or so, or would mean steady application of the brakes all the time. Before you reached the bottom the brake fabric would be in a pretty bad state. The brake drums would be overheated and perhaps the brakes would fail to work at all.

A good driver, in such a case, would mesh the low-speed gears and cut off the ignition from the engine. When the throttle was closed, the rear wheels through the transmission would drive the engine at a high speed forward. The vacuum formed in the cylinders as well as the compression would tend to retard the forward movement of the car without bringing undue strain on any part.

If the braking effect were too great, the intermediate or high-speed gears could be used. If the clutch action were particularly smooth and the brakes failed to work in an extreme emergency on a bad hill, the driver might be justified in throwing in the reverse and while the engine were running at a low speed easing in the clutch.

Such a procedure should only be adopted in an emergency as a last resort, however, as there is great danger of stripping the gears. On the Ford car while the high speed is engaged the reverse pedal can be used very satisfactorily as a brake.

Changing Gears Downward.

In changing gears, the amateur encounters but little trouble if the change is made from low to intermediate and from intermediate to high. When, however, he desires to drop back from high to second or from second to low, he encounters difficulty.

When high speed is engaged, the countershaft gear does not rotate at such a high speed as the corresponding gear on the main drive shaft. For that reason the speed of the countershaft gear must be increased somewhat before it will mesh with the driving gear properly.

Let us explain how the change should be

Digitized by Google

made from high to intermediate. With the car traveling at a high rate of speed, the expert driver throws out the clutch and brings the change gear lever to neutral. Then he lets the clutch back in again and increases the speed of the engine considerably by opening the throttle. This increases the speed of the clutch and the counter-shaft gears. Then he throws the clutch out again and carries the gear change lever to the intermediate speed.

As soon as the gears have meshed, the clutch is thrown in again and the car proceeds at second speed. Considerable practice is necessary to accomplish this noiselessly, but every driver should be able to do it because frequently he finds himself in the middle of a hill with the gears meshed in high speed and he must get back into second as quickly as possible.

The question is often asked, "How can I find the location of the speeds if the selector is not marked?" Let us refer again to figure 65 and the two standard types of selectors. Suppose you were asked to take control of a car fitted with one of these types, but did not know which type it was. Naturally a simple way to find out would be to jack one of the wheels from the ground and try out the various speeds. This would take time, however.

Locating Speeds.

There is another and an easier way. Suppose you were to place the gear change lever at its forward position on the left side of the sector. Then you were to engage the clutch easily and slowly, watching the action of the car all of the time. If the car tended to move forward you would know that the change lever was in the second speed and the type was as shown at B.

If the car tended to move backward you would know that the top of the selector was similar to that shown at A. From this data you could locate the other speeds.

There is one point to bear in mind in operating a sliding gear transmission. Never engage the gears while the clutch is in. On the contrary, however, you may disengage the gears while the clutch is in, if the car is moving forward on smooth ground or down hill but not up grade. Never try to force the gears in mesh if they grind or there is danger that the teeth will be stripped from them.

(To be continued)

In a Clay County Smith Shop

An Article About a Blacksmith Who Didn't Want to Do Automobile Repair Work Because It Interfered With His Regular Business

BY JAMES F. HOBART

Down in muddy Clay County, right in the very heart of Illinois, the writer one day last January walked into a little one-fire smith shop and found the smith very busily engaged in prying a pressed steel shape over the rear axle housing of an ancient truck-converted Ford which had just made the journey from a point in northern Iowa.

"That's the right thing to do, Mr. B. Smith," said the writer; "horse-shoeing now-a-days is fast going up-chimney, so get into auto-work while the getting is good. I am glad to find another shop which has realized that the shoeing business will never again be what it used to be, and that the way to take the 'bull by the horns' is to grab right on to automobile repairs and hang fast to it!"

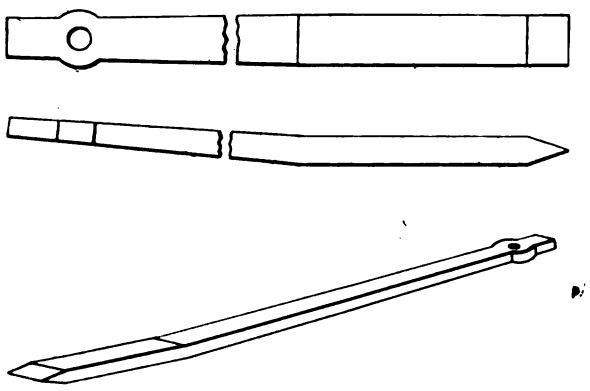


Fig. 1—The Handy Crowbar.

"Naw!" said the smith as he threw down a home-made crowbar with which he was prying the new Ford part into place on the ancient car. (This bar, as shown by Fig. 1, had been made from a defunct wagon axle and seemed to be a very useful tool around the shop.) The smith allowed that he intended to "finish it up a bit" as soon as he found time for the job, but the axle, evidently badly worn and thrown aside, had been cut apart in the middle, or near that point, the bearing portion squared in regulation crowbar style, and a bit of cast steel welded into the sharpened end of the bar. Evidently, finishing the forging of the part which was once the middle of the old axle, would make a fine tool of the crowbar.

"Naw!" repeated the smith. "I don't want none of this 'ere gas-wagon work just because I haven't got time for it. I have more than I can do at smithing. Yes, 'Horse Shoeing and General Blacksmithing' is what this shop claims to do, and there in that frame hangs a paper which shows that I am a 'licensed practical horseshoer.'

"Yes, that paper was issued to me by the State of Illinois and I allow that I won't need to take up automobile work for some time to come yet. See those wagons out there? Five of them in front of the shop and four more in the back. Well, all of them are waiting for repairs, which I do as I can between shoeing jobs and other work.

"This auto? Well, it is only a pinch bar and monkey wrench job, as you see, and I did it to accommodate the owner, who is going a few hundred miles east after his long pull from Iowa. You see, we got this repair from the garage there, right across the street. He sends all his smith work here to my shop and I just put this repair in place to help the owner along, as the garage man couldn't touch the work for several hours.

Various Kinds of Work.

"Keeps me a-going? Well, I guess. See that partition? Well, I keep that door closed in winter. Makes it easier to keep the shop warm, but in the other room, which is same size as this, you will see—here's a sketch of the shop (Fig. 2)—I keep a couple of gas engines, two grinding wheels, a circular saw and a cider press. Yes, I make lots of cider in the autumn.

"Now, in this side of the shop there is the forge and wood bench, and you can see a good woodworker's iron vise on that bench, too, while here is the metal working bench with a good ironworker's vise on that. A pipe vise, too? To be sure. I do about all of the water piping and pump work in this town, and as there are lots of flowing mineral springs around these parts, there is quite a bit of piping to be done, so I do it.

A Wood Sawing Gasoline Outfit.

"Did you look just outside the back door of the shop; no? Well, there's another gasoline engine out there, a six-horsepower Fairbanks & Morse, mounted on four steel wheels and with a 36-inch circular saw attached. We use that for sawing up firewood among the neighbors, and that business is mostly run by my two boys, who are just going through high school. They get excused now and then of an afternoon and cut up a pretty good sized pile of wood. I have seen them clean up a sixteen cord pile of hardwood—cut 12, 14 and 16 feet long, and saw it into stove lengths in two and a half hours.

"Two men are supposed to go with the outfit, so the two boys can run it themselves and charge a dollar an hour for net time of sawing. Five men are needed to saw in good shape, but the customer is supposed to furnish three more men, so only two go with the outfit. Sometimes when there is more than the boys can attend to I take a hand with the machine while the boys are in school, but they manage to saw most of the wood used within two or three miles of this shop. They will get out in the morning and set the machine at a customer's wood pile before school; then as soon as school lets out in the afternoon they will have the engine running and wood falling apart in a great hurry.

A 12-Inch Smokestack.

"That's some stack, isn't it?" remarked the smith as he saw the writer examine closely the arrangement for taking away smoke and gas from the forge fire. "There isn't another smokestack like that within one hundred miles, I'll warrant, and I tell you, stranger, the forge fire hasn't got a thing on that smokestack. You never see any smoke around the shop. The stack gobbles it all right in and I don't need any hood to guide the smoke up the chimney, either.

"You see, this stack is part of an old boiler smoke pipe. I got hold of it in a junk yard. It is 16 feet long and 12 inches in diameter. The top extends above the roof about three feet. Wish it was a couple of feet taller, but that is all there was of the stack and it works all right. Here is the way I fitted the stack. (See Fig. 3.) I just put a flat dab of concrete on the forge back of the fire and when the concrete had hardened the old stack was up-ended, stuck through the hole in the roof and placed fair on top of the concrete, which served as a support for the stack, which was not fastened in any way save by resting on the concrete and bearing against a sheet of galvanized steel through which a hole was cut to lie on the slant of the roof and to fit the stack at that angle.

"This caused the cut in the roof plate or collar to be a long oval and there are six inches of clear space around the stack before wood is reached. A round-topped hole was cut in the lower end of the stack (as shown at A) and it was my intention to make the area of this opening the same as that of the cross section of the stack. And, I seem to have come near enough, judging by the manner in which this stack 'gobbles' every bit of smoke and gas from the forge fire.

"I tell you, sir, the great trouble with the smoke removing apparatus used by smiths is that they are not large enough to do the work. How many times have you seen a forge, with a hood above it, perhaps, and a 6-inch stovepipe leading away to some chimney in which perhaps a small crooked flue receives the end of the 6-inch pipe? Such

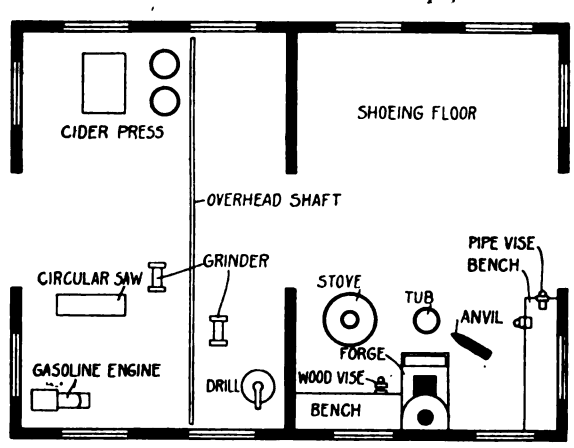


Fig. 2—A Sketch of the Clay County Shop.

an arrangement may work after a fashion, when it has become well heated, but no wonder that when the fire is built on a cold morning, the smoke rolls out upon the shop floor in heaps and bunches. Make the smoke pipe from a forge fire at least ten inches in diameter and there never will be any trouble in getting rid of smoke from the forge fire.

"A lot of my work," said the smith, "comes

Digitized by Google

in the shape of bent and twisted track and machinery for unloading hay from wagons into barns. It seems to me that the hay-fork tracks are all made too light and I know that most of them are not set properly. There are too few hooks to hold the tracks in place and the hooks which are used are not properly supported. Either they are placed upon too light timbering to begin with, or the timbers are not stayed often enough but what a sudden heavy jerk upon the trolley will pull the supports out of place sufficient to buckle the very light steel tracks.

"When the stress comes upon a bit of track it comes all in one place and it all must be carried by that particular bit of track. So, unless there is a hook right at the point of stress, the track is bent or twisted and I have a job coming right to me first time the farmer comes to town!"

File-Pointing Horseshoe Nails.

During the writer's visit to this interesting shop he noticed (after school it was) one of the smith's sons at the wood bench, very busy with a file and a carton of shoe-nails. After watching the movements of the lad for some time without being able to determine the cause of his activity, conversation was made with the lad and it was found that he was going over each one of the five-pound package of nails and that nearly two-thirds of the nails would be filed a bit on the point.

The writer was somewhat astonished at this operation and moved around so as to read the printed words on the carton, and was still more surprised to read the name of a popular manufacturer thereupon. In reply to questions the lad said: "I don't know how it is, but lately Dad makes me go over all the nails and touch up about half of them as you see me doing. It is only lately that this operation has had to be done and I do not know whether it is caused by a rush of work in the nail factory driving the nails out before they are fully finished, but it surely looks that way.

"There never used to be any trouble with nails, but lately they do seem, about half of them, to need filing up a bit at the points. Perhaps when war times are over a bit more I won't have to do this chore." With an eight-inch mill file, with each nail held, one at a time in the fingers, the point of the nail bearing just over the edge of a square-edged, freshly planed bit of board, the lad gave two or three light strokes with the file upon the bevelled side of the nail, right at the point, and then gave another very light stroke on the straight side of the nail, just as though he were removing a turned-up edge or "burr" therefrom.

Sharpening Ice Skates.

"Wish I had a round file," said the other boy of the smith as he worked away at the runner of an ice skate which he was trying to hold and file in the metal working vise. He had caught one end of the runner between

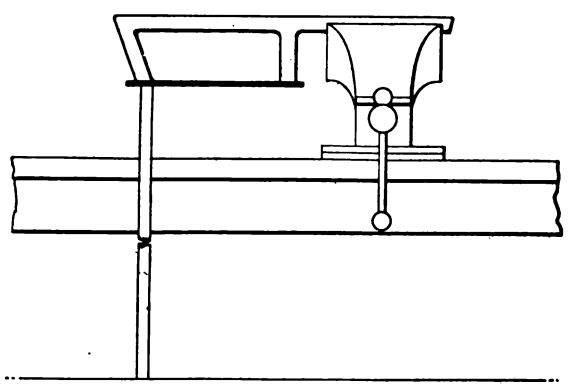


Fig. 4—Supporting the End of a Skate.

the vise jaws and with the other end of the skate bobbing up and down the lad was trying to sharpen the runner by draw-filing it, a 12-inch mill file being used for that purpose, with one end grasped in each hand. "Let me help you a bit," said the writer to the lad who was making such hard work of it. "Get an old broomstick and a saw," and the stick was cut just long enough to reach from the floor to the under side of the skate and thus steadied the overhanging runner so that a decent file-cut could be made.

"Don't try to draw-file at first," said the writer. "Cut right across the runner first, filing in the usual manner and watching closely the file-marks, see that they do not cut down over the corner of the runner. In this manner work down the entire length of runner until all the rounded corner has been removed; then take the file in both hands and draw-file all the cross marks off. This will enable you to see exactly what you are doing to the skate runner; show where to file and where not to.

"Perhaps it may be well to file and then

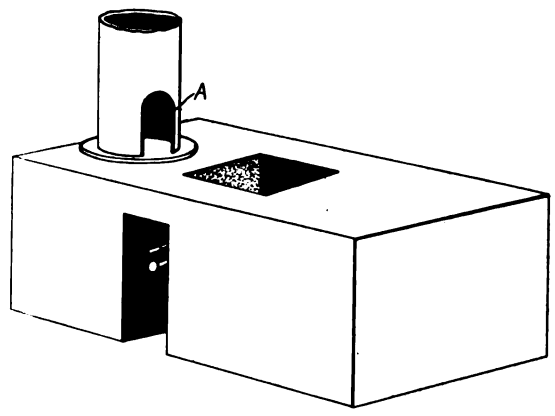


Fig. 3—How the Stack Was Fitted.

draw-file two or three times in succession before the skate has been sharpened to suit. By working alternately thus the skate runner can be brought down to a straight or slightly curved bottom, with square, sharp corners, so much desired in skates to enable the skate to 'bite' the ice. The skate may then be grooved with a round file if desirable, but skates so grooved, while good for beginners, are not capable of making as much speed as when worked off flat on the bottom edge.

"And, son, another thing—when you can sharpen skates with a file you may regard them as not being first-class skates. The runners of really good skates are so hard that a file will not touch them and the sharpening must be done with a grinding wheel of emery, carborundum or something similar. But you can use the same method of alternate cross and lengthwise grinding so as to 'see what you are doing' to the runner, and not to grind off too much at one place and too little at another. And, son, now that the skates are well sharpened, give them a good oiling before you leave the shop, and be sure to keep the runners off the ground when you have the skates on your feet!"

Two Sets of Hammers.

"Here, son, said the Smith as he put a heavy horseshoe in the fire, "just change the hammers on the anvil and bench, will you?" The lad removed a couple of ballpene hammers from bench and forge and replaced them with the regulation smith's forging hammers, the hammer on the bench at the vise being exactly like that on the anvil. "I always kept two hammers alike," said the smith. "Then I can have one at the vise and another on the anvil and never have to stop and see whether the hammer is at the vise or at the anvil. It saves me many a minute during the year and is a very handy little trick, once you get used to working that way. But, were you to try it, you would at first be sure to have both hammers either at the vise or on the anvil, and then you would be very apt to say something!

Look Out for the Nervous Horse.

"Here, John, lead that bay horse away from the shop door a bit. He is a nervous brute and is right against the door. Somebody may come into the shop while you are under the horse and he might whirl around and make you drop his hoof, and I never like to drop a horse's hoof once I get it up, especially if it be a nervous, high-strung horse. It is apt to make them think they can lay down on you at their pleasure, so take no chances and don't let go a hoof if you can possibly help it until you are ready to lay the hoof down!

"And now, boys," said the smith, "let's all take hold and strip out that 3-inch axle and straighten it before supper. And say, stranger, do you see any spare time around this shop for automobile work? Good day, sir; don't hurry. Must go? Well, be sure to come again!"

SHARPENING THE SCREWDRIVER.

BY CHAS. E. DURYEA.

Everyone knows how to sharpen a screwdriver, of course. This well-known tool is so common that every mechanic considers it perfected and never gives it a thought, while others give it no attention at all. The result is that too often it resembles a cold chisel rather than a device to fit screw heads and turn them.

Assuming that whatever is, is right, does not speed progress. A much better way is to adopt the rule that whatever is, may be the best there is, but can almost certainly be improved. If anyone doubts this, let him look back ten years in memory to the things he thought perfected then. He will find many of them discarded now.

The following method of grinding screwdrivers must be evident to many, but I have never found it used in but one shop besides those under my influence. It is simply to hollow grind, and a hollow-ground screwdriver is as much better for screw turning than the flat kind as a hollow-ground razor is better than case knife for shaving.

The screwdriver wears in use at the corners until it gets a curved point, as at A, Figure 1, and a cross-section, B, near the end looks like a section of a simple magnifying lens. Evidently one should grind away the

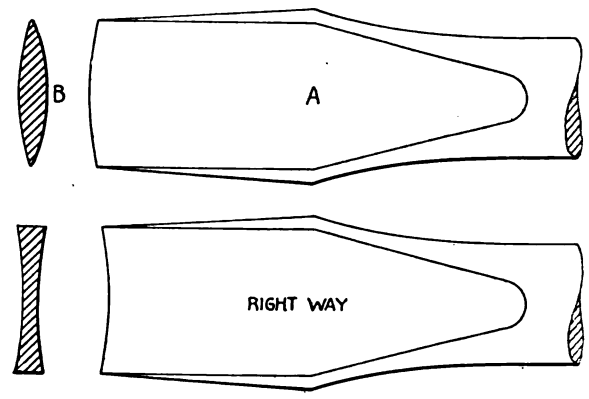


Fig. 1—Correct and Incorrect Way (B) Screwdriver Shapes.

metal where it does not wear away and leave it where the wear comes.

This is easily done by holding the blade in the plane of the wheel instead of in the plane of the axis, and extended radially, as

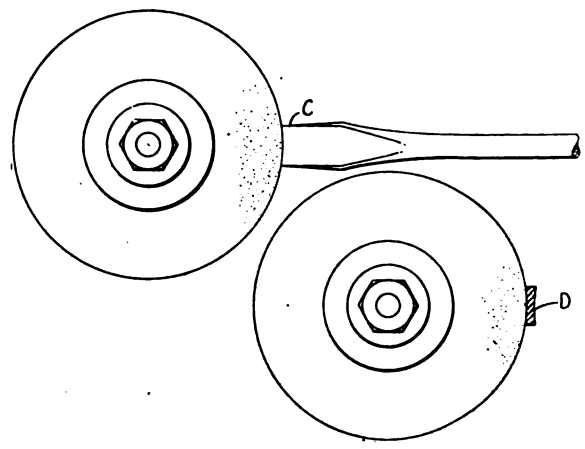


Fig. 2—Grinding the Screwdriver.

at C, Figure 2, when grinding the end, and when grinding the flats to hold it parallel to the wheel (as at D) spindle instead of tangental to the wheel.

The result is a driver that will hold, in screws, to the limit. It will not split screw heads, for it has no wedging effect. It will drive round or button-head screws without marring them, and it goes to the bottom and gets a full grip in the notch. Once use such a driver and one is not likely to ever prefer the usual shape.

Digitized by Google

The Rock Drill Blacksmith

Part VII—Various Cooling Liquids, Their Effects Upon the Steel and Heated Tempering Baths

Copyright, J. F. SPRINGER

In cases where there is no false bottom or where the bottom is provided with a considerable opening, trouble may arise. The thing to do is to put a screen across the tank at a suitable level.

Brine is the swiftest of the cooling liquids so far suggested. It is, in fact, so quick in its action that it may prove undesirable, especially for certain forms of bits. Naturally, however, it gives a fine degree of hardness.

Water—plain water—comes next. Bullens, one of the most recent authorities on the heat treatment of steel, has a decided preference for oil. He says: "The author is a firm believer in the use of oil for quenching, rather than water, and would recommend its use whenever conditions permit. Water cools the steel more rapidly, but its more drastic action increases the internal strain and consequent liability to fracture. Of course, in cases where it is required that the surface shall be glass-hard, or that the maximum tensile strength be obtained, water quenching is necessary."

Combination Quenching Baths.

There is a method of getting a combination of the effects of both oil and water. The quenching bath consists mostly of plain water or brine. On top floats a layer or film of oil. The hot steel, upon being immersed, first encounters the oil and in consequence experiences a lesser shock than it would upon meeting plain water or brine. As its immersion continues, the water or brine is encountered, but with the conditions such as to prevent the full severity of either of these liquids.

I do not know whether this method has been tried out for rock drill bits under actual commercial mining conditions; and so can not cite any examples of its practical use for bits. At the same time, I would urge the smith to experiment a little with this process, varying the thickness of the oil layer. The body of water must always be large enough to prevent the formation of steam.

Tempering.

The tempering of rock drill bits is probably but little done. But this does not mean that it is a useless refinement. Some of the oil treatments for hardening obtain, perhaps, a result somewhat similar. But, naturally, tempering requires additional work.

The object in view in tempering is to "let down" the strained condition consequent upon the hardening operation. When a piece of hot steel is suddenly quenched, it is "frozen," as it were. Some parts are under stronger stress than others. In short, while steel that has been hardened, but not tempered, may be exceedingly hard, this hardness may also be accompanied by a serious tendency to breakage. Tempering partially removes the strained conditions responsible for the brittleness. It consists in reheating the steel to a moderate temperature between 420 and 625 degrees. The higher the stopping point, the greater the toughening effect.

However, it is necessary to bear in mind that increases in toughness mean losses in hardness. Consequently, the blacksmith or other person having the decision to make must take account of the two things—the one thing working against the other. A compromise is the result. In fact, experience seems to indicate that tempering can be carried advantageously only a short distance with rock drill bits.

When the steel reaches 420 degrees, the surface will begin to show color, especially if the surface is bright. A very faint yellow first appears. As the steel gets a little hotter, this hue changes into a light straw color. Then, as the heating still goes on, a light yellow appears. This means 400 degrees F., and is the temperature which has been recommended for rock drill bits. (See Practical Stone Quarrying, 1913, by Greenwell and Elsden.) The further rise of the heat is now stopped by quenching the bit. Oil or water may be used.

The tempering best for a given steel that has been carried through a given hardness treatment will, it is to be assumed, vary with the requirements imposed by the rock and the method of drilling. Consequently, 440 degrees or light yellow is not to be viewed as a requirement that can not be modified.

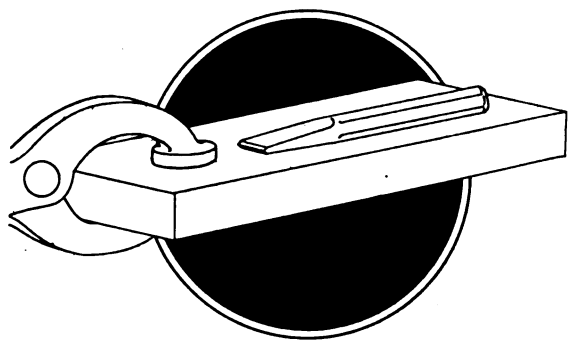


Fig. 1—Tempering a Tool on a Hot Iron.

I give a pretty full list of temperatures and corresponding colors, although for rock drills the whole list will probably never come into consideration.

Tempering Colors

Color.	Corresponding Temperature Degrees F.
Very faint yellow	420
Light straw	430
Light yellow	440
Pale yellow straw	450
Straw	460
Dark yellow	470
Deep straw	480
Brownish yellow	490
Yellowish brown	500
Brown	510
Purplish brown	520
Light purple	530
Purple	540
Dark purple	550
Light blue	560
Blue	570
Dark blue	600
Greenish blue	625

These colors are not to be understood as belonging to the metal itself, but rather to an oxide produced on the surface by the action of the oxygen in the air. They have nothing to do with the colors produced in the metal by the actual heating of the steel itself, which begins with a dull red at about 1,000 degrees F. The tempering colors have been exceedingly useful in times past as they furnished a pyrometer right on the work. But they are now passing out of use. The reasons they are being abandoned are several in number.

(1) They are not a sure indication of temperature, if the metal has been held at a temperature point for some time; (2) they are subject to misuse, because of variations in opinion; (3) they are difficult to determine under some weather conditions; and (4) they make it almost necessary to check the further rise of temperature by quenching. And there may be more.

A better plan for tempering is that which requires the reheating to be done in an oil bath kept from exceeding the required temperature. Thus, the bits are immersed in the oil bath, a lot at a time, when the oil has a temperature of, say, 200 degrees. The heat is then brought up to the desired point, say, 440 degrees. A mercury thermometer kept in the bath enables the operator to know how the heat is rising.

Heating in a Bath.

Too much emphasis can hardly be laid upon the advantage of heating in a bath. The necessity for quenching is by this means eliminated. This may need explanation. When tempering is done with the aid of colors, it is customary to use a means of heating that steadily increases the temperature. When the proper color appears, the blacksmith immediately plunges the work into water or some other liquid. The service performed by quenching is to halt the further rise of temperature. It does this service and does it thoroughly and well. The mere removal of the work from the source of heat would not necessarily halt the temperature rise in an effective manner.

For example, suppose that the smith is engaged in tempering a chisel. He will, let us assume, proceed as follows: A slab or block of steel (Fig. 1) will be heated up, say, to a dull red and the chisel with its surface bright and clean laid on the heated block. As the block is much heavier than the chisel, it will rather rapidly impart heat to the latter. Soon the first color—a very faint yellow—will appear. The smith watches the chisel closely, shifting it if need be to promote evenness of heating along lines parallel to the edge. After a little, the color desired appears. The smith quenches the chisel at once.

If he should do nothing more than merely remove the chisel, he would probably find that the temperature would, for a moment or two, continue to rise, because of the heat which had already been imparted to the under side of the chisel, but which had not yet had time to penetrate to the upper surface. The quenching halts matters as they stand. It is possible, especially with thick work, that at the moment of chill full equalization does not take place and that eventually the under side is really softer than the top side.

If the work is simply taken off the block, the impartation of heat naturally ceases, but the underside is to be rated as hotter than the other. There will be an equalization at an intermediate temperature. That is, the tool will through its whole thickness reach a temperature higher than that indicated by the color.

The thickness of the work will probably be a large factor in determining how much greater the ultimate heat all through the mass will be than the one shown by the color indication. If so, then it will become a matter of guesswork to tell how much to allow in order to get the degree of softness desired.

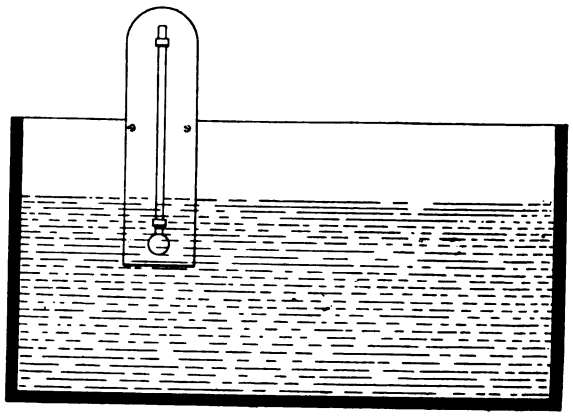


Fig. 2—An Ordinary Thermometer Can Be Used for Testing the Temperature of the Bath.

With an oil bath heated to the exact tempering temperature desired, the entire thickness of the work attains this temperature and no more. When the work is taken from the bath, it will of course get no hotter. Equalization will not take place because it is already existent.

One has, then, the same temperature throughout the mass. Consequently, all of the metal, inside and outside, has already reached its maximum and for that reason re-

Digitized by Google

ceived the same tempering effect. One of the things—perhaps the greatest of them—that makes the heating bath so valuable is its capability to equalize the heat all through the work and limit it to a maximum. The judgment of the smith does not have to be depended upon—a judgment which must certainly be affected by such things as the light available, this light being more or less subject to the time of the day, the season of the year, and the particular weather existent at the moment.

Another Point.

Still another advantage relates to the fact that with an oil bath, the tempering may be carried out on a lot of pieces at the same time. They are all put into the bath and allowed to reach the proper heat.

In view of the ease and certainty with which bits may be tempered by means of the oil bath, it would seem well worth the consideration of those in control whether tempering should not become as fixed a part of the routine of re-sharpening bits as the forging and hardening themselves.

Those already using old-time methods of tempering may, I think, do well to consider whether the oil bath does not provide a much better and a much more certain procedure.

Perhaps it will be well to quote at this point the language of D. K. Bullens, a recent authority on heat treatment matters. His remarks have to do with automobile gears, but have surely a very good application to rock drill bits with their thin parts needing the highest degree of hardness imparted to the whole. He says:

"An excellent example of the efficiency of bath tempering is illustrated in automobile gears. On account of the relatively thin section of the teeth as compared with the mass of the gear, exact tempering by the ordinary temper-color practice is rather difficult. The teeth, which should be the hardest, take the temper first, and are therefore the softest part of the gear as a whole. If the gears were to be tempered by revolving on a hot bar much better results would be obtained than by ordinary tempering, but the time and cost elements would prove excessive where hundreds of pieces were to be handled.

"By the use of a suitable liquid tempering bath thorough uniformity could be obtained throughout. Where, by the color method, the core of the gear would have the tendency to be too hard, the teeth perhaps too brittle or soft in places, and only the surface of the gear as a whole affected by the temper-color representing, say, 475 degrees F., by the more modern method the whole mass of the gear would have the physical properties as characterized the drawing temperature of 475 degrees F."

What one has the right to expect from the use of the oil bath method for the tempering of rock drill bits is as follows:

(1) Immaterial how deep the bits are immersed in oil, as only the hardened portions will be substantially affected.

(2) Uniform temper throughout the hardened parts.

(3) Exact tempering desired, whether the bit remains in the bath a moderate time or a long time.

(4) No quenching necessary.

The Oil Bath Itself.

The oil bath (Fig. 2) is properly prepared by filling partially full a suitable tank with a mineral oil having a flash point not less than 600 degrees F. The temperature is tested by means of a mercury thermometer. Certain of the animal and vegetable oils may also be used. I mention the following substances, together with their respective boiling points:

Glycerine boils at 554 degrees F.
Olive oil boils at 572 degrees F. (about).
Paraffin wax (soft) boils at 660 degrees F. (or higher).
Paraffin wax (hard) boils at 730 degrees F. (or higher).

I give these by way of suggestion. The mineral oil, with a sufficiently high flash point, is understood to be the liquid in general use.

As already stated, the work is put into the oil at a lower temperature than the one desired, say 200 degrees F., and the whole then heated up to the desired point. With a great many drill bits to handle, a lot may be treated at a time.

It is important that the faces and any other hardened part of the bits shall not come into actual contact with the metallic bottom of the tank, as it may very well be hotter than the oil. To meet this requirement a very good plan would be to provide an open-woven wire screen an inch or so from the actual bottom. This metal would then have approximately the same temperature as the oil.

The Lead-Tin Bath.

Just as in hardening a lead bath may be employed for heating purposes, so in tempering, a lead-tin bath may be used. The tin is added for the purpose of lowering the temperature of the melting point. The proportionate amounts of lead and tin vary with the melting temperature desired. It is, naturally, necessary to have the melting temperature lower than the tempering temperature, but it is not necessary to have it very much lower.

The following table is understood to have been given, in effect, by O. M. Becker. It is based, it seems, on the assumption that lead melts at 610 degrees F. This is decidedly lower than the point given by the Smithsonian Physical Tables, but may, for all that, be more correct for commercial lead.

Melting Points of Lead-Tin Mixtures.

Tin	Lead	Approximate temperature of melting point in degrees, F.
8	14	420
8	15	430
8	16	440
8	17	450
8	18.5	460
8	20	470
8	24	480
8	28	490
8	38	510
8	60	530
8	96	550
8	200	560

As the qualities of lead and tin will both vary and as the impurities will probably tend to lower the melting point below what it would be if the metals were absolutely pure, and as the metals may differ more or less from those on which the table may be based, it will be well to use the table as a guide and not as an infallible indicator of the results one will obtain with lead and tin of unknown qualities.

That is to say, for example, if one wishes to prepare a lead-tin bath to melt at 430 degrees with the view of using it at a somewhat higher temperature, say, 440 degrees, for the tempering of rock drill bits, he will do well not to consider the proportions of 8 parts tin and 15 parts lead as unalterable. If they give a good molten bath, not liable to solidification, when used at 440, then one rests content, and notes the particular brands of lead and tin and is careful to use the same next time.

If, however, the proportions mentioned give a bath too liable to solidification when used to temper at 440 degrees, one has only to increase the proportionate weight of tin. If the bath melts so far below the desired tempering point of 440 as to introduce difficulty of any kind, he may correct what is wrong by adding lead.

(To be continued.)

ONE ON CHICAGO.

The gimlet-eyed man, given to propounding conundrums, sprang a new one on a friend the other day.

"What," he asked, "is three-sevenths of chicken, two-thirds of cat, and one-half of goat?"

It was, of course, given up.

"Well," said the gimlet-eyed man triumphantly, "the answer's Chicago. 'Chi' is three-sevenths of chicken; 'ca' is two-thirds of cat and 'go' is one-half of goat."

Whereupon they threw him out of the place.—New Departure News.

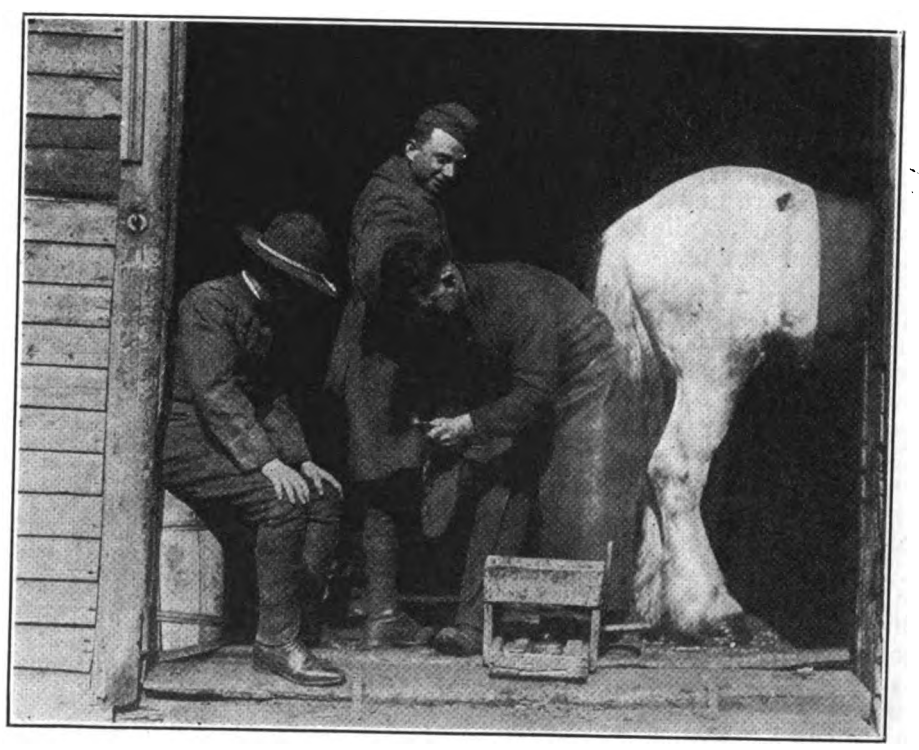
If you like this magazine and feel that it is useful and interesting, the one best way to show your appreciation, is to purchase your accessories and supplies so far as possible from our advertisers. Also write to our advertisers for catalogs, printed matter and prices, not forgetting to always mention the fact that you saw the advertisement in the Blacksmith and Wheelwright.

Taps and Heels While You Wait.

Here is a suggestion for our blacksmith readers who are looking for ways and means to enlarge their business. One might hang out a sign something like the following, "Horses, Mules and Men Shod," for it seems that "On the other side" our boys practiced real economy and had their shoes repaired by the blacksmith.

Instead of putting on a thin piece of supposedly leather, the smith shaped an iron shoe to fit the heel and with the hands skillful in the art of shoeing, hammered it into place.

Several of our ex-soldiers have claimed that for heavy walking and winter wear the scheme cannot be improved upon.



Have You Worn Off Your Heels? Then Go To a Blacksmith. Photograph Copyrighted by Press Illustrating Service.

Digitized by Google

The Metal Turning Lathe

Part 3. - Cross Tool Post Feeds, Screw Cutting, Lathe Tools and Various Types of Tail Stock Centers.

We have now had enough, perhaps, of the regulation of the speed of the lathe in order to meet the requirements of the metal in the work and the cutting tool, so let us give some attention to the management of the speed of the longitudinal feed.

When screw threads have to be cut, it is very necessary that, as the work turns, the tool be moved steadily lengthwise. For example, suppose we have to cut a screw thread having ten convolutions to the inch. This means that the tool that does the cutting shall be moved lengthwise of the work at such a rate that 1 inch will be covered for every ten turns of the work. There are perhaps a very few men who can make some kind of a screw thread by just depending on their nerve and steadiness and good judgment.

The way to cut a screw thread is, however, to put little or no dependence in these things for securing the proper regulation, but to make use of the lead screw of the lathe. This is a long screw arranged along the front of the lathe. The carriage which shifts along the lathe bed and which carries the tool post may be put in mesh with the lead screw. When this is done, one turn of the lead screw moves the carriage forward or backward one pitch of the lead screw.

Meaning of "Pitch."

The distance meant is the distance from the middle of one thread to the middle of the next thread, care being taken to measure parallel to the axis of the screw. A lead screw may have, say, six threads to the inch. The pitch is, in this case, exactly 1/6 inch. In order to cut a screw thread on the work, it is necessary to control the lead screw by the lathe spindle. That is, it is necessary to connect the two in such a way that when the spindle turns once the lead screw will advance the carriage precisely the right distance.

Take an easy example first. Suppose we want to cut 12 threads to the inch on the work. This means that the carriage must move forward exactly 1/12 inch every time the spindle turns round. If the lead screw has a pitch of 1/6 inch, then it will advance the carriage 1/12 inch in one-half of a turn. Consequently, what we have to do is to arrange matters so that one forward turn of the spindle will bring about one-half forward turn of the lead screw.

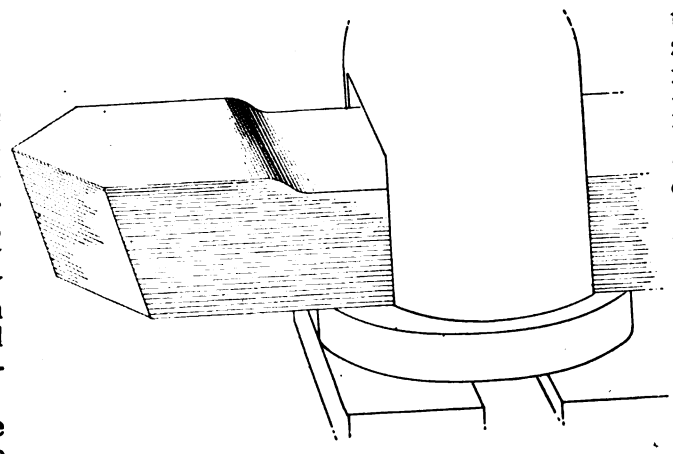
Now the spindle and the lead screw are parallel. In order merely to get the lead screw to rotate half as fast as the spindle, we have merely to put a spur gear on the spindle and arrange in mesh with it a second spur gear of double the size, this second gear being mounted on the lead screw. When this has been done, one turn of the spindle will bring one-half turn of the lead screw. This is at least part of what we want. We want in addition that the lead screw move the carriage in the proper direction, since we don't want to cut the thread backwards.

It is easy enough to reverse the direction of the rotation of the lead screw without changing its speed by putting an idle spur gear between the one on the spindle and the one on the lead screw. We don't even need to be careful as to the size of this intermediate gear. If the gear on the spindle is half the size of the gear on the lead screw then whatever the size of the intermediate gear the spindle and the lead screw will both rotate in the same direction and the latter will rotate at half the speed of the former. So much for this easy example. The matter is, however, of such considerable importance that it will be well to go somewhat further.

Suppose then that with the same lead screw it is proposed to cut a thread having 23 convolutions to the inch. What we have to do is to cause the lead screw to advance the carriage 1/23 inch during one turn of the spindle. The first thing we settle is this: How much of one turn of itself will the lead screw have to rotate to yield an advance of 1/23 inch. In one whole turn we get 1/6 inch. As many turns will be required as 1/6 is contained in 1/23. Dividing 1/23 by 1/6 we obtain 6/23 turn. We now have this result: For one turn of the spindle we must get 6/23 turn of the lead screw.

This is the same thing as saying that for 23 turns of the spindle we must have six turns of the lead screw. We can readily see that this is right. When the spindle has turned 23 times we should, for a thread having 23 convolutions per inch, have the carriage advance exactly one inch. This is just what it does in six of its rotations. So, then, we want a gear on the spindle and a gear on the lead screw such that 23 turns of the former will force six turns of the latter. If there are six cogs on the spindle gear and 23 cogs on the lead-screw gear, we shall get this result, for the reason that 23 turns of a six-cog gear will equal six turns of a 23-cog gear.*

From the foregoing, we get the following simple rule: Put on the spindle a gear having just as many cogs as the lead screw has convolutions to the inch, and on the lead screw a gear having as many cogs as the proposed screw thread has convolutions to the inch.



The Lower Edge of the Tool Should Slope Away from the Work. This Tool Is Shaped for a 60 Degree V Thread.

Learn This Important Rule.

This is a very important rule and should be thoroughly mastered. It will not be difficult to apply, after it is once comprehended. It is probably as simple a statement of what has to be done as it is possible to make. One or two points need attention. I can bring these out very well by means of examples.

Suppose the lead screw has eight convolutions to the inch and that you desire to cut a thread having 20 convolutions to the inch. According to our rule we put an eight-cog gear upon the spindle and a 20-cog gear on the lead screw. Let it be noted that both 8 and 20 are divisible by 4. Accordingly, we could use a two-cog gear on the spindle and a five-cog gear on the lead screw if we had such gears. A two-cog gear is, however, a ridiculous thing. So then we take some multiple of 2, as, for example, 16, 18, 20, 22, etc. The number of cogs for the lead-screw gear would be 40, 45, 50, 55, etc. In short, any numbers will do for the cogs of the two gears, provided only that they are in the ratio 2 to 5.

Take another example. Suppose we have a lead screw with seven convolutions to the inch, and desire to produce a thread with 5½ convolutions to the inch. We may, in such a case, use 2 inches for the standard, when the problem will be 14 convolutions of the lead screw to a 2-inch length and 11 convolutions of the proposed thread to a 2-inch length.

We follow our rule. On the spindle we put a gear having for its number of cogs, 14, 28, 42, etc., and on the lead screw a gear having for its number of cogs, 11, 22, 33, etc.

We could have gone ahead without bringing in the 2-inch standard length. That is, we could have applied our rule at once. In that case we should have required a 7 cog gear for the spindle and a 5½-cog gear for the lead screw. In order to get rid of fractions, we convert the numbers into 14 and 11, which is permissible since we have not altered the ratio.

In all this, we must not forget the intermediate gear, which is used to make spindle and lead screw rotate in the same direction. However, in changing gears to get the proper ratio for our screw-cutting, we may need to change the intermediate gear. The reason for changing it has nothing to do with the ratio. The intermediate gear has no effect on the ratio. A change may be needed, however, to put it in mesh with the gears on spindle and lead screw.

Cutting Tools.

In cutting screw threads, we use a tool whose nose is shaped on top to the exact size and form of the thread desired. This needs considerable explanation. The thread-cutting tool should be absolutely flat and horizontal on top, at least in the region of the nose. When this tool is adjusted in the tool post, it should be set so that the flat horizontal surface is really horizontal and at the exact level of the axis of the work. The top of the nose of the tool will then be in an axial plane of the screw that is to be. Its form and size should be exactly the form and size of an axial section of the desired screw when finished.

The thread-cutting tool will naturally have its forward edges possess a small deviation from the vertical. Let them slope, then, slightly in the general direction of the tool post as one looks down from the top face of the tool. This slope is needed for clearance. Aside from this provision for clearance, the tool front should have the same horizontal section all the way down. The front faces should be accurately shaped and ground to secure this. When this is done, the regrinding of the tool from time to time as it dulls will be simplified.

This tool will be moved forward lengthwise of the lathe by the lead screw. It will also be moved transversely to the lathe. This movement—the transverse feed—is ordinarily produced by turning the feed screw on the tool post. This is done by means of a hand wheel or a suitable crank.

We are now ready for an important point. There is only one feeding movement in cutting screw threads. The forward movement controlled by the lead screw has no effect on the cutting of the chip. This movement alone would result in no cutting. The chip is started and kept going by the feed through the tool post. The feeding then, in so far as the cutting of metal is concerned, is a hand-regulated operation. The responsibility rests entirely with the operator. All the cutting that is being done is being controlled by his right hand. A full understanding of this will surely make the operator pay rather more than ordinary attention to the transverse feed.

The thread, or perhaps I should say groove, is cut all over its surface at one time. The groove may be just begun and therefore shallow; or it may be deep and nearly to full depth. Either way, the tool cuts at both sides and in front simultaneously.

(To Be Continued.)

*A gear with only six cogs may seem objectionable. We can, however, double or treble the number provided we double or treble the cogs on the lead screw gear. Thus, with an 18-cog gear on the spindle and a 69-cog gear on the lead screw, we will get the very same results.

Digitized by Google

BLACKSMITH & WHEELWRIGHT

The Pioneer Journal of Its Class in the World.

Member of the Audit Bureau of Circulations.

PUBLISHED MONTHLY BY

M. T. RICHARDSON COMPANY,

71-73 MURRAY STREET, NEW YORK.

POST OFFICE BOX, 654. TELEPHONE—7377-7378 Barclay.

CHICAGO OFFICE, Lytton Building, 14 Jackson Boulevard

Entered as second-class matter at the Post Office in New York City.

M. T. RICHARDSON, President and Treasurer — F. R. WHITTEN, Secretary

M. T. RICHARDSON, Editor

FRANK L. AVERY, Managing Editor

F. R. WHITTEN, Advertising Manager — H. F. LUDINGTON, Western Representative

GEO. A. SMITH, Eastern Representative

FRANKLIN MYERS, Art and Copy Dept.

FOREIGN AGENTS:

NEW ZEALAND

MR. R. HILL, Matlock House, Davenport, Auckland, New Zealand.

GREAT BRITAIN

ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance.....$1.00
One Copy, six months, in advance.....60 cents
Single Number.....10 cents
Canadian subscriptions.....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English Money.

Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

ADVERTISING RATES SUPPLIED ON APPLICATION.

SPECIAL NOTICE

Subscribers failing to receive their magazine regularly will favor us by giving us notification to that effect.

CHANGE OF ADDRESS

Subscribers who desire the address of their paper changed should send us the old as well as the new address.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

Our Editor's Letter

QUITE a few years ago, I learned a lesson which has cheered me in my work every time I think of it; it has to do with praise and criticism.

At the time I worked for a shrewd, bright and business-like man. Things had gone along rather smoothly for nearly two months and I was rather worried so I walked into the president's private office with big question marks sticking all over me—I intended to find out just where I stood, by Heck!

I told him just what was on my mind—told him that he evidently didn't realize I was alive and that he hadn't spoken to me for nearly a month.

Well, I received my answer quick, right off the bat, as they say. "Let me tell you something," said he, "when your employer doesn't bother to criticize you, keep cool—it indicates that he is satisfied. When he is satisfied, he keeps quiet. When he has to bother with you half a dozen times a day, then begin to worry." I left the office with the feeling that I would be indeed happy if my employer never had to speak to me again.

In a way you, brother reader, are my employer and I suppose I should feel rather satisfied when I don't receive letters from you—evidently you are satisfied with the magazine or you would let me hear about it. Still, the rule works the other way, too. In looking over an industrial paper I came across the sentences, "Don't kick if the boss kicks; if you're worth kicking about, you're worth keeping. Men in authority don't waste time cutting specks out of rotten apples."

Personally I prefer to receive a steady stream of letters from the subscribers. I like to have you criticize the magazine if you don't like it. Perhaps you can suggest something that would help me a lot, an article that I could obtain very easily and one that would be of value to you. In fact, the series of articles "The Rock Drill Blacksmith" came from a Pennsylvania reader's suggestion.

"I'm a blacksmith in a mining town," he wrote, "can't you tell us something about rock drills?" Sure I could—glad to do it. So within two hours after I had received his letter, Mr. Springer, who is an expert in that line, had started the series.

I sit at my desk, with rumpled hair and wonder what in the old nick I'll put in the next Blacksmith and Wheelwright. I frantically look through all my letters for suggestions and if I don't find them, then I just fill the magazine with stuff that interests me, just because I don't know what you want the most. Still I'm not the one to be interested, I'm here to give you what you want, so please tell me. Send in your orders and I'll do my humble best to fill them whether they are on the bill of fare or not.

The Other Side of the Question.

LAST issue we had a number of suggestions relative to the automobile and truck business; how smiths in various parts of the country kept track of costs and how they took care of automobile work. In this issue we have jumped over to the other side of the fence for one of our contributors has told us about the smith who didn't care for automobile work—just because he made more money blacksmithing.

Mr. Hobart answers a number of questions which doubtless have vexed many of our readers.

The Industrial Situation.

THERE seems to be a wave of industrial unrest sweeping over the country, a dissatisfaction with working conditions, an idea that the working man is being held down by the capitalist.

It is not our intention to solve the problem or to suggest whether or not this unrest is justified. We want to tell a little story which may suggest a line of thought for the wise ones who can draw conclusions from facts.

In a certain New England city, well known for its shoe manufacturing plants, there was a small shoe shop operated by a man who was fair and honest. During the war, this shop was extremely active, wages of the employees increased and the employer being just paid his help slightly more than the average, because his profits were large.

With the cancellation of the army contract, however, business with him assumed a new phase, he was forced to compete with other employers who put out a cheaper product mainly because their labor cost them less money and so he told his help that he was unable to increase wages for the time being.

Though his employees were getting more money than they could in other shops, they were dissatisfied. "If he made money during the war and could afford to pay us more than the average then—surely he must be making more money now and can afford to pay us more," they said.

The general feeling of unrest reflected upon their work. They did not exert themselves and wasted as much time as they could, hoping that their employer would notice it and be influenced to pay them more money to keep them satisfied.

Things went along in this way for nearly two months before the crash came. The employer decided that he was not earning enough money on his investment, sold the business and went into another. The corporation which purchased the business cut the payroll five per cent., and replaced those who left with men from its own big factory.

Labor and Capital are in the same ship, if the ship goes down, Labor and Capital are both overwhelmed, therefore neither one can afford to rock the boat or scuttle it. They must pull together and try to reach a peaceable agreement.

A nation-wide strike on the part of Labor to enforce its dictates can work harm upon Capital, but still greater harm upon itself. Capital has the wherewithal to withstand a long siege, while the stomach of Labor might soon be empty.

Only by co-operation can the differences be settled and that co-operation must be based upon fact and figures. Labor must expect to be efficient and just in its demands or Capital will move elsewhere.

Farmers and Fraudulent Corporations.

AS the blacksmith more than any other mechanic comes in contact with farmers for making repairs to vehicles, shoeing horses, etc., he is in a position to warn his customers against fraudulent corporations. These in connection with oil, gold mines, automobiles, etc., are springing up all the time.

Farmers should be cautioned about having anything to do in any shape whatever with a new corporation which may be presented to them through advertisements or circulars or perhaps by personal solicitation.

The man who puts his money into a new corporation will have one hundred chances to one to lose it. When a new corporation is formed for any purpose to do anything that bids fair to produce profit there are plenty of men with capital who are willing to take stock in an enterprise known to be good.

The corporation does not have to go out into the world and solicit the aid of every Tom, Dick and Harry. The usual excuse employed is that the management is anxious that the dear people (they are always interested in the dear people) should have an opportunity to participate in the big profits they expect to realize. They will admit that they could sell the stock to capitalists but they do not want to do that, they want to give the farmers and others a chance at the good thing they have.

We trust our readers will take pains to talk this question over with all their patrons and point out to them the danger of listening to anybody or any proposition that is made to them in connection with any new organization, no matter how attractive it may appear or how cheap the stock may be offered, but to let all such things alone.

If a man has any surplus money to invest let him put it into a good mortgage or municipal or state or railroad bonds. Bonds are a lien on the property and are much safer than stocks.

A great many people are anxious to have their surplus money earn more than the usual six per cent or less. The greater the interest offered, the greater the risk always. There are not many first-class bonds either that are paying as high as six per cent. The great point to consider in making an investment is the **safety** of the **principal.**

We hope our readers will take this question up with all their customers and tell them to spread this news about fraudulent corporations among their friends as widely as possible.

Change the Sign Over Your Door To Include Auto Work

THE average blacksmith realizes that the automobile, the truck and the tractor gradually are replacing the horse-drawn vehicle, yet his old sign over his door still reads "Blacksmith and Wheelwright Work." He does not seem to care for the additional wording of "Automobile Repairs." Possibly because he feels that he does not want to add to his equipment. However, there are many repairs that a blacksmith can make on an automobile which fall in with his regular line of work.

Every day some automobilist smashes into a post, a tree, a car or team, and in a great number of instances, seemingly his machine is undamaged. As time goes on, however, perhaps he notices that the tires wear more rapidly than they should. Perhaps he notices that his machine is hard to steer. Yet he does not know what the trouble is.

Any blacksmith within ten minutes can

Digitized by Google

find this trouble. In one case it may be a bent front axle. It is possible that some of the tie-rods are twisted out of shape, or maybe the frame has been distorted slightly.

The repairman seldom knows how to straighten an axle. Even if he does know, he has not had experience enough to attempt it. The blacksmith, then, should be the person to make this repair and he can do this work if he advertises on his sign over his door.

A Story With Its Sequel.

Our readers will remember that in our January number we printed on page 342 a short poem entitled "100 per cent American." It dealt with a certain Mr. J. C. Wagner of Indiana who was not one bit satisfied with the tone of his german made Cuckoo clock and so, after considerable effort and planning on his part, naturalized the bird. His job was so really American that the bird now says "Bob White."

This little poem was based upon a short report in one of the New York papers and as soon as the poem appeared in the Blacksmith and Wheelwright our editor forwarded it to Mr. Wagner, asking if all the circumstances were based upon fact. Here is the reply we received:

Dear Sir:

Your letter with poem enclosed has just been received. Yes, I am the J. C. Wagner that naturalized the cuckoo clock to call Bob White. I reversed the bellows connection so that the high soprano whistle came after the alto. After reversing the whistle, a teaspoonful of sand poured into the soprano pipe or whistle raised the tone to the correct pitch.

If one teaspoonful is not enough to accomplish results, it is only necessary to give him or her more sand, until the right pitch is attained. It seems that a liberal dose of American sand is necessary to put the kibosh on kultur in a cuckoo clock; just as Yankee grit blocked german kultur at Chateau-Thierry. A battle in which my son took part, by the way.

In a later action, on October 10th, my son was wounded in action near Verdun; a piece of high explosive shell struck him above the ankle and fractured the shin bone. He is still in the hospital but we expect him home soon.

Composition of Damascus Steel

Experimenters Have Long Tried To Duplicate This Famed Metal

Wonderful stories have come down to us from olden times which recite the qualities of Damascus steel. We are living in what may justly be termed the age of steel; and one would scarcely expect that a former epoch could produce a steel which we have been able only with great difficulty to imitate. We have been able to make a steel which is perhaps as hard; and we have been able to make just as tough and elastic a metal.

But our success in combining excessive hardness with a high degree of toughness has been rather moderate. As we add carbon, or chrome, to give the desired hardness, the metal becomes brittle. The men of old, however, made sword blades, for example, which were marvelously hard, and yet possessed a genuine toughness. In short, as representing a combination of excessive degree of the one quality with a high degree of the other, Damascus steel of the best quality was probably far superior to any steel upon the modern market.

It is, indeed, doubtful whether we have produced any steel of our own capable of taking an edge equal to that attainable with the eastern metal. Saladin had, no doubt, a Damascene blade when, in his contest with King Richard of England, he cut a down and silk pillow in two and also a veil-like fabric of gauze.

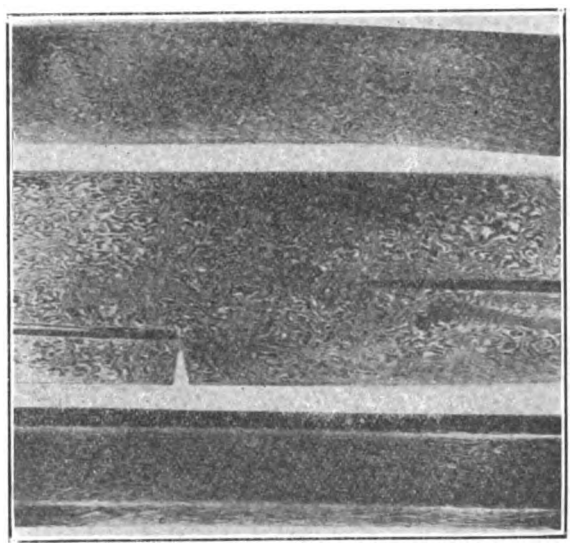
Whence came this wonderful metal which was introduced to Europeans largely by warriors returning from the Crusades? One of the most famous places where finished articles were produced was, no doubt, Damascus, the oldest city in the world. Famous sword blades came also from Isfahan, Khorasam and Shiraz (in Persia).

Although articles of Damascus steel were produced in Egypt, Persia, Syria, etc., it now seems pretty clear that the original birthplace of this most famous metal was India. This should not surprise one overmuch. India was, many centuries ago, the scene of much iron working. As Delhi stands a great monument consisting, apparently, of pure iron which was erected probably about twenty-seven centuries ago.

But the name, Damascus steel, has for so long a time been attached to the great military metal that it is scarcely likely that a change will ever be made. There is some prospect that this material may come into general use; but the old name will doubtless still persist.

Although specimens of this metal have by no means passed out of existence, its precise constitution and method of manufacture were lost from the memory of men very many years ago. The appearance of polished examples of Damascus steel is peculiar indeed. The best quality displays a kind of irregular pattern. Narrow and complicated stripings cover the surface. There is a solid background which may be of dark gray.

The appearance is not unlike that when a section is made through wood having a highly involved grain. Such markings characterized the metal. Some, who did not know how to produce them by making the steel, sought to imitate them. One method is to etch ordinary steel; another is to mingle different kinds of steel or steel and iron by a forging procedure. The pattern produced by the former method could be removed by polishing or other means; but in the latter case



the pattern was involved in the mass itself.

Nearly a century ago, the Director of the Mint at Paris sought to investigate the genuine Damascus steel and ascertain its true character. He concluded, as Capt. N. T. Belaïew tells us, that the eastern metal was ordinary steel but had a larger carbon content. He thought that it consisted of two different compounds of iron and carbon. That is to say, he conceived that Damascus steel might be a kind of double steel. He was, perhaps, on the right track.

In those days they knew nothing of pearlite. This is a constituent of all unhardened steel. It was only discovered in the latter part of the nineteenth century. Under a microscope of sufficiently high power, a properly prepared specimen of steel will disclose a kind of pattern, so that one might almost think he had before him a piece of Damascus steel having incredibly small markings. There are the same stripes, although perhaps not twisted about in just the same way. They are extremely narrow, averaging perhaps 0.00003 inch in width. These are not the markings seen with the unassisted eye on the polished blade of a Damascus sword.

But scientific research has disclosed the fact that the stripes consist alternately of pure iron and of iron carbide. This means that steel is not really a chemical combination at all. It is true that all the carbon is combined chemically with iron. This combination is the iron carbide. But the remainder is a totally different thing.

Now this French official, Breant by name, conceived, it would seem, that Damascus steel was something of this kind. And there is reason to think that he was in some sense correct. He seems likewise to have reached the conclusion that the molten metal should be cooled slowly.

A Russian, Anossow, took up the matter apparently soon afterwards. At first he thought that the Asiatic steel might be producible by adding a third substance; such, for example, as manganese, chrome, platinum. But these experiments did not produce much more than negative results. He concluded that Damascus steel was not a ternary alloy. But he thought that it might be a simple alloy of carbon and iron, similar to ordinary steel, but differing in the manner in which the carbon and iron were associated.

This explanation might account for the patterns. He, too, seems to have early come to a fairly correct conclusion. He apparently drops all thought of a third substance, and now insists upon the greatest possible freedom from impurities. He wants only two things in his steel—carbon and iron. Breant, it seems, had not realized the importance of excessive purity. But the Russian reaches—paying strict attention, no doubt, to the Frenchman's conclusions—a strong point of vantage when he becomes alert to these three things: (1) the utmost purity of the metal; (2) a slow cooling; and (3) a very high carbon percentage.

He seeks to manufacture his steel by a number of processes but comes apparently to prefer the Persian process. Iron and graphite are melted together in this procedure. As Anossow really made Damascus steel—some of which seems to have been of the highest quality—we shall do well to give him close attention. With him a very high temperature and a prolonged melting are important. In his day (about 1830-40) these requirements were rather difficult to meet. He could get the temperature, but his crucible was likely to collapse during the maintenance of the heat.

As quoted by Belaïew, he says: "One puts twelve pounds of iron into an ordinary crucible. Larger charges occasion difficulties in forging. The harder the metal is to be, the less iron one should use. In the present case the amount is reduced to 8 or 10 pounds. To this charge one adds graphite, dross from a forge and some fluxes (dolomite, etc.). After the material has been put into the crucible, one covers the latter with a clay cover, and starts up the blast.

"The fine particles of carbon must not be allowed to escape from the crucible during the process of firing. As a rule, the metal will have melted in 3½ hours. It is now covered by a thin layer of slag. A part of the graphite has been withdrawn by it and lies on its surface. At this moment the loss in graphite amounts to about one-quarter of a pound.

"The metal discloses longitudinal streaks not very pronounced in color upon a bright ground. If the graphite is of good quality, there will be a play of colors in addition. If the molten condition is maintained until four hours have passed, the loss in graphite will have increased and the metal will have a watered pattern. In another half hour the loss in graphite will have increased about one-third and the pattern will have a wavy design of medium size.

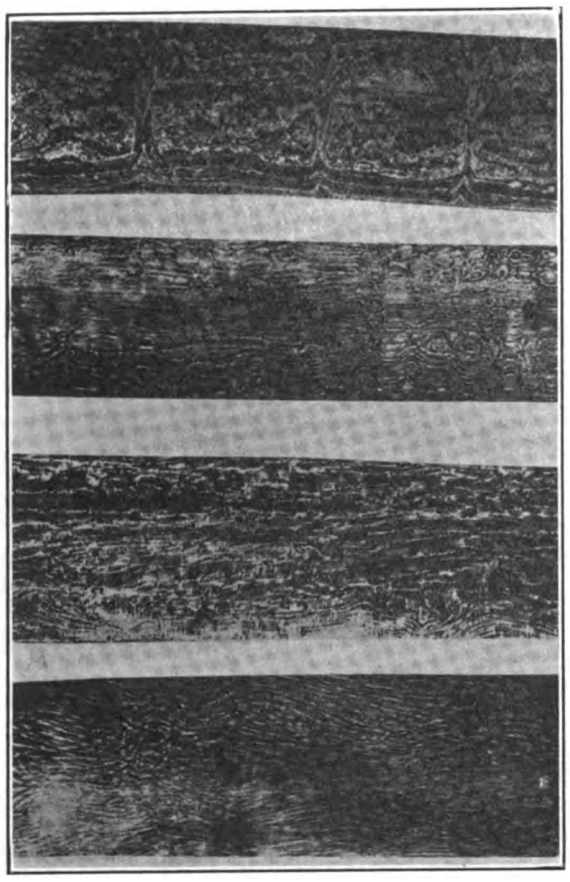
"The crucible will now show signs of giving way, so that the melting procedure becomes liable to failure and must be stopped.

Digitized by Google

However, if the crucible is still fairly upright, the melting may be continued another half hour. The loss in graphite will now amount to three-quarters of a pound; the metal acquires a net-like pattern of medium size and about one-half pound of slag collects.

"If the crucible has held together for five hours and the charge is not yet covered with slag, so that the blast can be continued, then one may continue for half an hour. In this case, the loss in graphite will often reach one pound or more. But it very seldom happens that nothing remains behind, if 1¼ pounds were put in at the start, and if on the other hand the slag amounts to three-quarters or one pound or more. The metal possesses a more or less coarse net-like pattern, often mingled with a step-like appearance."

A considerable percentage of carbon has now been absorbed by the iron. The blast is shut off. The crucible is allowed to remain in the furnace until it is cold or until at least it has become dark in color. The



contents are thus cooled gradually. A procedure of this general character is said to produce a very hard steel capable of being forged.

Anossow claimed that the best qualities of Damascus steel could be forged from a rod to a strip with but two heatings. Indeed, he would sometimes forge without heating, and found that the metal would extend itself without cracking, becoming red-hot under the process.

It will have been noticed, perhaps, that as the carbon content of the bath increased, the pattern of the surface changed. It passed from streaks or stripes to waves; then passed to net-like forms; and these gave rise to step-like patterns. This last was regarded as indicative of the best quality of Damascus steel. Indeed, the eastern people seem to have paid strict attention to the patterns as showing what the quality was.

It is astonishing the amount of carbon contained in this steel. As much as five per cent. seems to have been about the carbon content of the best qualities. Our ordinary tool steel contains only about one-fifth this amount. Two per cent. is about the maximum in our steels. Cast iron will have more; and so it resembles, in this respect, the Asiatic steel.

That this steel should be strong and tough is rather contrary to our present-day ideas. When ordinary carbon steel is allowed to cool slowly from a high temperature, we expect large grains and a loss of tensile strength. Forging and re-heating to a comparatively low temperature have a restorative effect. How shall we explain the toughness of the Damascus steel, assuming that it was made by the prolongation of the high temperature and a slow subsequent cooling?

A partial answer is perhaps to be obtained from the fact that Damascus steel swords and the like were probably always subjected to considerable forging. It is possible, too, that the carbon is associated differently with the iron, and that really we have a different metal.

The illustrations given herewith show fairly well the markings on Damascus steel blades.

THE EMPTY SLEEVE.

A Story With a Moral; Think It Over.

There were five of us in the smoking compartment of a train en route from Washington to New York. Two were soldiers who, it developed, had recently come from overseas. As we slowed up at Wilmington the blare of a brass band playing a patriotic air came from in front of the shipbuilding plant on the immediate river front. One of the civilian passengers joined the soldiers at the window.

"That's the way to do it," he said with enthusiasm. "See that great crowd of workmen. Those are the boys who made possible the winning of the war."

The soldiers glanced contemplatively at the crowd but made no comment.

The other civilian, an elderly man with the appearance of a merchant, or possibly a lawyer, asked mildly:

"What is the present wage scale for expert workmen, I wonder? I think I read in this morning's paper that some men somewhere were striking for an increase to a dollar an hour with overtime above eight hours."

The soldier nearest the window turned.

"I read that, too, sir," he said respectfully, "and it's hard to believe. We got a dollar a day over there, and all the shells the huns wanted to fire at us. This talk about big money in the factories here and the men laying down for more didn't listen good to us, eh, Jack?"

The other soldier nodded.

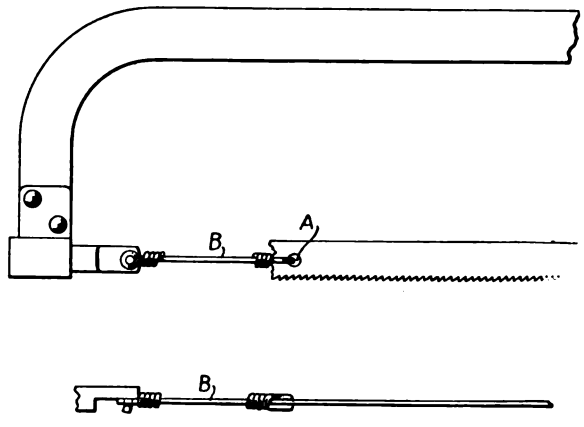
"I wonder what the boys in the plant over Easton way are going to say to me when I get back on the job?" he replied, shifting his position.

It was then we noticed that his left sleeve was empty.—From Industry.

USING OLD BROKEN HACK SAWS.

BY CHAS. E. DURYEA.

In these days of high costs and scarce material one should not throw away good stuff. If the end breaks from a new hack



How to Utilize Old Hack-Saw Blades.

saw, as in the figure, make a hole, A, near the break and use in a shortened frame or splice with a loop of wire, B. Do not spoil a drill trying to make the hole. Hold the end of the saw in the fire until it is red, prick deeply, and file or grind off the raised spot. This produces a hole which can be enlarged easily by reaming with the sharpened point of a small file. Clock springs can usually be perforated by the prick-punch and file method without softening.

Always use handles on files. Handles are cheaper than the same length of file. The handle enables the workman to work faster, easier and better. Longer strokes are taken and the file is worn the whole length. The worn-out file can be thrown away at the proper time instead of being saved because "some inches near the tang are still good." Corn cobs make fair handles if nothing better is at hand.

The Horse Hospital.

You hear about our Red Cross and what it has done for the soldiers, but little is said about another branch of the service, in



A Hospital for Four-Footed War Victims. Photograph by Underwood & Underwood, N. Y.

which our fourfooted allies are cared for.

Our illustration shows one of the horse patients being bandaged at a hospital in Kent. By prompt treatment of the wounded, many horses were put back into service in a very short time.

BRITISH CARE OF HORSES.

The horse hospitals created by our British allies, says E. G. See in the Revue de Paris, are models of management. While everything military with us appears poor and gloomy, among the Britons conditions are almost luxurious, or at least prodigiously comfortable.

Nothing is lacking in these establishments, however provisional they may be; separate rooms for operations and for the dressing of wounds; isolation posts for cases under observation; stalls for patients arranged according to kind and seriousness of injury, or malady (contagious or not); covered exercise tracks; recreation fields for convalescents; baths; drug stations, and so on.

Is it necessary to add that the personnel, the veterinary doctors and nurses are of the highest order? Also the recuperated horses are to be counted by the hundreds of thousands; and the economies realized reach into the millions.

Since the war began the English alone have sent about two and a half million horses into France. How many of these humble, faithful auxiliaries have fallen in the accomplishment of their tasks! Their acts of heroism, of devotion, of intelligence cover a vast field of story. Ask the soldiers. Few are they who have not some touching anecdote to tell.

Using Steel Letters and Figures.

Some machine parts need to be marked with steel letters or figures in order that said parts may be assembled properly with little trouble to the man in charge. Other metal parts of machines often require certain explanatory dimension figures to be stamped thereupon.

To stamp from two to a dozen or more

Digitized by Google

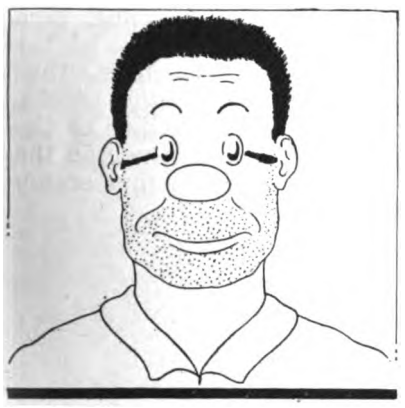
steel letters upon a smooth steel surface and have the characters all spaced evenly and impressed to the same depth, requires considerable "know-how" on the part of the workman who does the job. The first, and chief requirement is that the letters be all aligned evenly, and spaced the same distance apart. Even an error of 0.01-inch in either of the above requirements will make the lettering look like "a bum job".

To align steel letters properly, it is not well to trust to the eye in placing them to a line which has been scribed upon the surface which is to be marked or lettered. It is very hard to place a steel figure punch exactly to a line and still harder to hold the punch there while you hit it with a hammer.

The writer finds he can do good work by grinding the back of a piece of hack saw blade to an angle of about 30 degrees—to about the same angle, in fact, as the taper between the body of a steel letter and the hardened character upon the end thereof. The piece of hack saw thus prepared is clamped or otherwise fastened (cemented) to the metal to be stamped and the beveled edge of the saw is placed exactly along where the line of letters or figures is to be located.

With this "straightedge" in place, it is a comparatively easy matter to place each steel letter squarely against the hack saw straightedge and to space each letter the same distance from the one previously made. The depth to which the letters are driven may be regulated as it is possible to strike several blows, removing and replacing the steel stamp as many times as is required to drive each letter to the same depth.

When the letters are to be driven deeply and the burr raised around them by displacement of the metal as each stamp is driven into it filed off, then it is sometimes possible to space each letter by bringing it against the raised metal of the preceding letter in much the same manner that the file cutter uses the metal raised by the last cut made, as a stop for the chisel as it goes into place for a succeeding cut.



Honesty Is The Best Policy

What the Village Smith Knows About a Traveling Workman Who Cuts Prices

BY FRANK L. ALLEN

"Sure, go right ahead and get it done down at Pete's if you want to," said the village blacksmith to one of the farmers from the next town. The smith was tired and hungry and was just sitting down to his dinner pail lunch when the farmer came in. No wonder he was a bit sharp.

"Let me tell you something, stranger," he continued, "Just for this once, never again, you understand, I'll fix up that wheel at a lower price than Pete." (Pete was a "tramp" smith who had arrived in town about a week before and was getting quite a little work because his prices were low.)

"But I'll tell you right now, the job I do won't be worth half what I charge and this is why. I'm goin' to use some spokes out of that pile, some that I've discarded from time to time just because they weren't good enough for my regular customers, but when I get them in you won't know the difference."

"I'll spend about half a minute on the tire, more or less, just enough to stick the ends together. I won't bother to weld down the ends but leave a big hump on the tire. Guess I can find enough old iron to fit it out all right so that it'll last until you've paid me. Course you must pay me cash on the spot, like you do Pete, then when the wheel goes to pieces you can't refuse to settle on the bill.

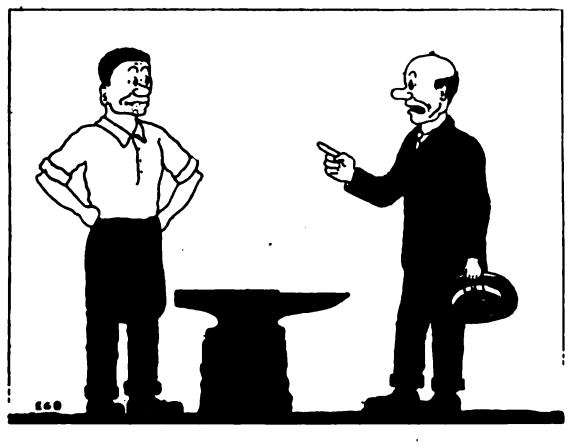
"Now, you understand, I'm giving you the inside facts. I'm telling you the whole truth 'cause I like to keep my reputation for bein' honest. I've got a reputation for good work in this town. When a farmer gets me to do a job, I do it right, and the farmer knows he can depend upon it. So I'm going to give you a receipt for your money and keep a copy of it to show when you put in a kick. I'm going to write on the receipt, 'Quality of this work not guaranteed, customer accepts job as it stands.'

"Not bein' one of my regular customers, let me tell you something about my work. I never put a price on a hard job before it is done. Course regular things like shoes, spokes, irons and such, I can give a price on, but I believe in bein' honest with my customers—I want them to be honest with me and pay me for my work.

"I always figure my time, cost of materials, and overhead costs into every job. I don't soak one customer too much just so I can favor another. I don't estimate a job, then add on a couple of dollars just to cover myself. If I need more money, I increase the price just a little bit on all of my work.

"I use only the best of stock on repairs; if I find any poor stuff, I throw it out, just like I did those spokes. If my customers kick about the price I tell them the reason. I can cut down on prices by using cheap materials but the saving in the end to the customer is nothing. The main part of a bill, anyway, is the labor charge. Suppose I put in twenty-five dollars' worth of work on a job which requires a dollar's worth of materials. In order to save money I use inferior things and save maybe ten cents. The job don't last very long and my customer is out the twenty-five dollars less the saving of ten cents. Maybe I'll be the fellow to save the ten cents.

"In a way, the ten cents that I save are worth more to me, perhaps, than the twenty-

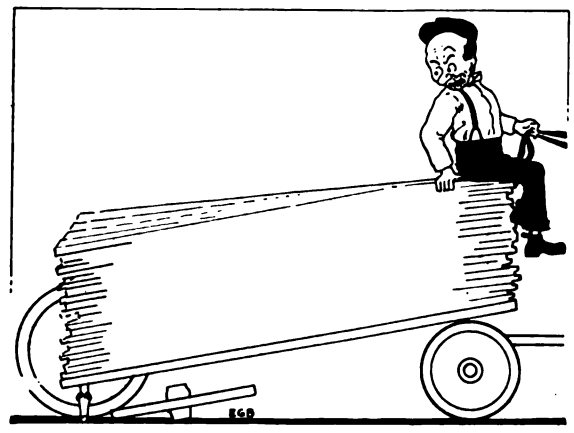


The Farmer Informs the Village Smith that Pete Will Do Work at Cut Prices.

five dollars you lose. But 'taint an honest policy. But so long as you are willing to take the chance, I'll do the job for you on that basis and give you the benefit of the ten cents, just to meet Pete's price, if you want me to.

"Reminds me of the job one of your neighbors had Pete do, 'bout two months ago, when Pete camped in the next town. You see, Pete's reputation grows over night. He lands in a town and within two days every farmer knows that he'll do work at cut prices. He puts in inferior materials, skimps on time and takes a chance on every job he puts out. Usually he stays in a town about three months, then beats it, leaving a string of debts a mile long and a bunch of farmin' machinery that's fit for the junk pile.

"Well, as I was sayin', your neighbor had a loose tire on one of his lumber wagons and after hearin' of Pete, decided he'd see what Pete would do the job for. Pete wanted a little ready money dern quick and right off



"Wheel Went Bad 'Bout Half Way to Town.

the reel said he'd fix the wheel for five dollars.

"He did it all right and collected the money. Before your friend had got the wagon home the wheel was just as bad as ever. He put in a kick to Pete but it didn't do much good 'cause Pete told him 'twas the fault of the wheel or the driver or the horse or the road or the weather, I forget which. Pete said he'd fix the wheel again for the same price.

"Finally your friend decided to let it go for a day or so. The next day, early, he started for town with the thing pretty well loaded and got about half way there when—'blooey' went the wheel and the wagon load slipped out onto the road. There he was, three miles from town with a busted wheel and a truck load of stuff.

"He had to walk back to the farm with the horses, hitch to another wagon and make the whole trip over, to say nothin' about the bother of unloadin' all the truck he had. His other wagon was so much lighter that it took him two trips to town to carry the stuff.

"That five dollars he paid to Pete cost him in the end about ten dollars' worth of wasted time and he had to have a new wheel. If that's economy, I'll miss my guess by a mile.

"Pete himself likes to tell the story of how he got the best of a tight-fisted farmer in the next State by the name of Hines. Last spring Hines got Pete to do some plow work for him, got him to give a price on quite a pile of stuff and then beat him down as much as he could.

"Goodness knows Pete's prices are low anyway but he cut them still more, figurin' to make a little something on the bunch of work from the farmer. He thought 'twould be a good ad for him and get him started.

"Well, finally when Hines had got the lowest price he could, he brought in one plow and told Pete that 'twas all he could afford at the time. Pete tried to get all his profit on just that one plow, and believe me, he made one rotten job; said afterwards he did it purposely.

"At any rate, the plow broke right in the middle of Hines' plowin', he couldn't borrow one for love nor money, Pete wouldn't repair it again and I don't know as Hines was anxious for him to, the other blacksmith was busy at the time and didn't want to take the responsibility of Pete's work, so Hines sure was up a tree. Finally he had to buy a new one and scrap the old one, but he wasted two good days tryin' to save a few cents.

"There's another story about Pete that he don't like to have people know. I happened to hear it from a chauffeur who came through the town a while ago. The chauffeur told me that Pete had cost him his job and this is how it happened.

"At the time of the wreck, Pete was in a town 'bout five hundred miles away from here, doin' just as he is now, cuttin' prices and using poor products. Just outside of the town an automobile broke down, busted a spring, I think the chauffeur said, he was the driver and in the machine were his employer, his employer's wife and a daughter.

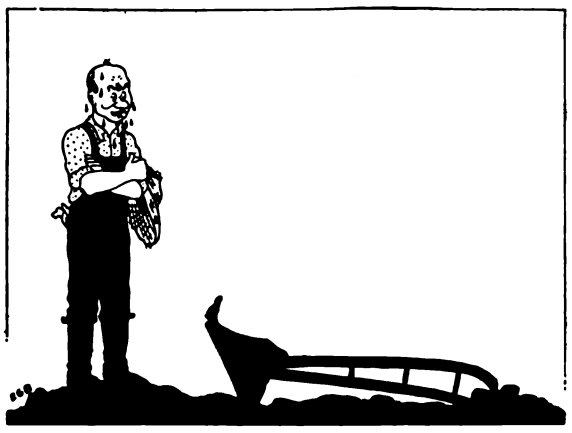
"The chauffeur managed to get the car

Digitized by Google

into town by usin' a piece of fence rail to hold the chassis away from the front axle and Pete's place bein' nearest stopped and had the spring fixed.

"Pete was so used to doin' bum work and hurryin', that he made a poor job of the spring which lasted only about an hour. The heavy touring car was movin' about forty miles an hour and just as the chauffeur slowed down for a curve the front wheels dropped into a rut and the spring broke again.

"As the spring snapped, the frame and body of the car dropped against the drag

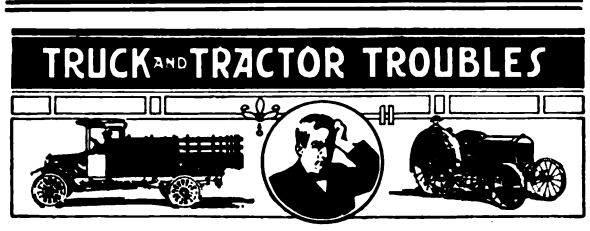


"Busted Down, Right in the Middle of Plowin'."

link which connects the steerin' gear with the front wheels and the car went into the ditch, over a wall, then turned over, killing the boss and injurin' his wife and daughter. The chauffeur managed to crawl out with a broken arm and a few other injuries and got help. 'Course he blamed Pete for the whole accident, but folks said the chauffeur was to blame so he had to get a job in another State.

"I contend that the best is always the cheapest in the end and that a blacksmith job should be done by the honest smith who is content to earn a reasonable amount of money and not by the fellow who sets the price and then tries to make as much as he can by skimping on labor and materials.

"You'll let me do your work at my price, did you say? Much obliged, I thought that you were the kind of man who was willin' to listen to reason. You can leave the wheel and I'll try to get it done by tomorrow afternoon. I'll use some new spokes and you can bet that the job I do will last and it won't cost you such a whale of a pile more than if you had Pete do it. Drop in and see me again."



We know that our "Blacksmith" readers either own automobiles or are frequently called upon to repair machines of this kind. If they don't, it is a pretty good plan to try for this sort of business and not let all of the money go to the repair men.

We also realize that the blacksmith has not had time to study very much about trucks, and tractors, and doubtless there are many questions that frequently arise in his mind. For that very reason we have started this department.

We want all of our readers to feel that they may ask us any question they choose relative to trucks, tractors or automobiles. We don't mind if our readers ask a great number of questions, in fact, ask us as many as you please and we will answer them by letter. Not only will you have our answer to your question, but your question will be published in this column and our other readers will send in their answers; in that way you will have your problem solved by many different people and probably in many different ways.

This service costs you nothing, except the price of a subscription. If you are our subscriber we want you to feel that you can call upon us for any information that you desire.

Wiring of Oldsmobile.

From Edgar G. Lee, Wyoming.—I notice that Brother Tom Benner of Illinois wants a diagram of the Oldsmobile Model 53. I can give him a diagram of this system, but would advise that he send to the Dayton Engineering Laboratories at Dayton, Ohio, and get their "Delco Service Manual" specifying the diagram he wishes. If he will specify this diagram as it was in The Blacksmith and Wheelwright, he will get a better diagram than any of his brother smiths can give him, as these manuals are put out by the Delco experts.

In regard to the kind of steel used in auto springs, which another brother inquired about, I will say there are several kinds. One quite common kind is Vanadium steel treated with carbon and especially tempered. This steel is very hard to weld to itself or foreign steel. Another steel which is used is ordinary three per cent tool steel, carbon treated. This is the most common steel.

Entries In Prize Photograph Contest

Probably you have noticed that when a couple of people gaze earnestly into the air or into a show window, more persons are attracted, brought by curiosity. This rule works in many ways. A man doesn't like to be left behind, to follow the crowd; he likes to be in the lead—leastwise most men do. That's the reason we expect to receive a regular rain of photographs for our next Blacksmith and Wheelwright, entered in the photograph contest.

In the first place let us tell you how easy it is to enter the photo. Just sit down, fold the picture in heavy brown paper or in an envelope, take your pen, write Blacksmith and Wheelwright, 71 Murray Street, New York, on the wrapper, lick a three-cent stamp, attach it to the bundle and drop it in the mail. Be sure to put your own name on the back of the photograph so that we will know who sent it.

After you have sent the picture write a letter telling that you have sent the picture under separate cover and if you have time write us about your work, your shop or about the amount of automobile repairs you do. That's all; you don't have to be a subscriber, you don't have to enclose any stamps, or you don't have to write on the typewriter.

Now let's tell you what you will receive in return for your trouble. As soon as we have had the cuts made of the photograph, we will return it to you, undamaged, just the way we received it. As soon as the magazine has been printed we will send you the halftone cut which was used to print the picture; the cut is worth from $3 up, depending upon the size. Your printer, or any printer can use the cuts to print on your letter or bill heads.

And besides the above, you stand a chance of winning either of the regular prizes as announced in our last issue.

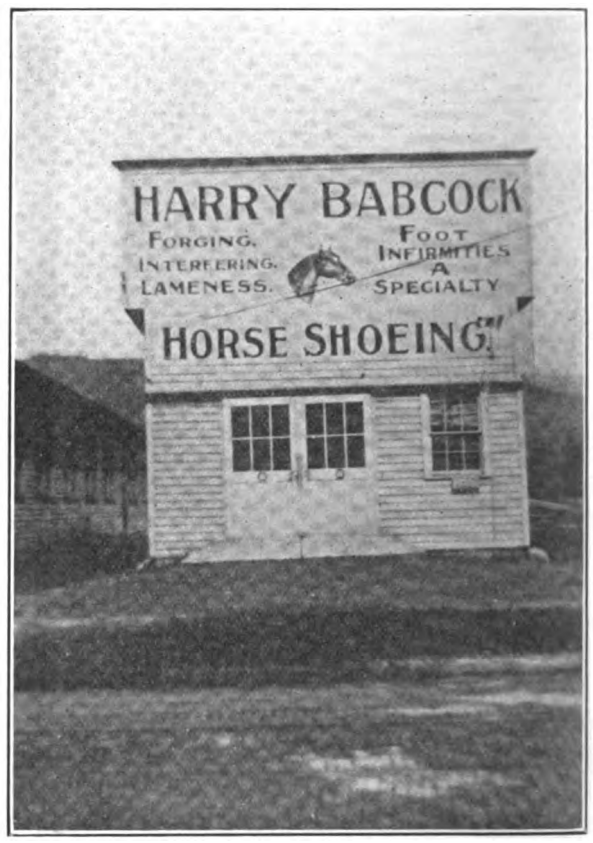
PRIZE PHOTO NO. 2.

From Harry Babcock, New York.—I am sending you a floor plan of my shop which might be of interest to some of the blacksmith readers. The windows at A are at the back of the building and there are five of them.

The other side where the horses stand is well lighted, since there are six windows on this side. The little circles at B indicate electric lights. There are three of these at the front and they reach to within 3 ft. of the floor. When not in use they hang up out of the reach of the horses.

The other lights reach to about 2 ft. of the floor and are shown by the letters C. You will notice that one of them hangs over the anvil D and you will also notice that this anvil is near the window where I can get lots of light. I have a L. S. P. calking machine located beside the chimney and to the left of my anvil as shown at E. I put it in this position because it is near the anvil as well as near the fire.

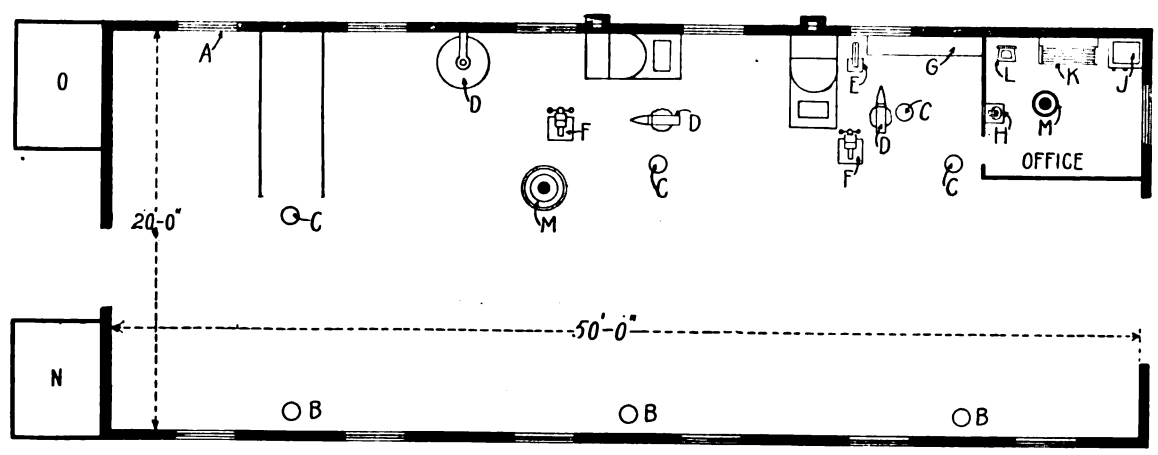
I can take a shoe out of the fire, turn one-quarter of the way around toward the right, put the shoe in the machine, turn the heel without moving out of my tracks, then turn around one-quarter further to the anvil, square the heel with a hammer on the anvil D, stamp it with the National stamp



How Mr. Babcock's Shop Looks in Front.

and after turning one-quarter more around, place the shoe in the vise F to rasp off the edge or round corners. Then completing the turn I place the shoe in the fire again.

It is what I call a handy layout, and saves a lot of time. I don't have to walk all over the place. The toe calks I keep between the forge and the office in a box at G. I can get any size toe or heel calk, sharp or blunt, by taking three or four steps from behind the anvil. In order to save time, I placed the telephone H in the office right near the door.



Plan View of Mr. Babcock's Shop.

Digitized by Google

There is a hole cut in the partition so that I don't need to open the door, and walk into the office. In my office there is a safe at J, desk at K, a chair at L and a small coal stove at M. I always aim to keep the drive calks, leather pads, rubber pads and rubber shoes in the office. Then I can keep them under lock and key. The mail box is located directly beneath the office window and the mail drops in on the office floor beside my desk. I use a lot of hand-made shoes as I do shoeing on anything from Shetland ponies to big draft horses as well as race horses. The shoes which I carry in stock are arranged long heel No. 8, then No. 8 regular, long heel No. 7, then No. 7 regular, and so on down to No. 0. The front shoes are kept on the front side of the joist and the hind shoes are hung on the rear side of the joist. Both are arranged in the same order as above.

I don't believe in mixing up the numbers, because it takes so long to hunt for what you want. My coal bin is just on the left of the back door and holds two or three loads of coal. Both that and the manure pit, O, have cement floors. I throw the old shoes in back of the coal bin which I keep locked.

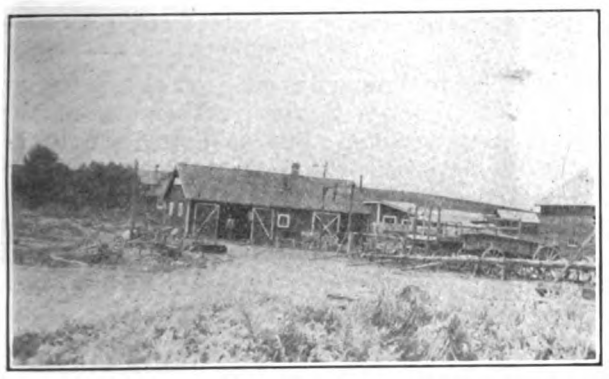
I work on the forge nearest the office and this machine is operated with a Canedy-Otto No. 4 electric blower. I also have a forge fitted with the same make of hand blower, which I can use if anything should happen to the electric blower or if the power stops for any reason. The forge is covered most over, that is, it has a top and one side, because when the doors and windows are all open the blaze would blow all over the shop if I didn't do this.

PRIZE PHOTO NO. 3.

From John T. Kamp, Montana.—I am sending you a photo of my shop, and should like to see it printed in the Blacksmith and Wheelwright. I have been reading your paper for three years, and like it because there are so many helpful things in it.

My shop is located in the best farming district of the famous Gallatin Valley, on a branch of the N. P. Railroad. The station is only 100 yards from the shop. This is a small village and we are eight miles away from the nearest good sized town.

The shop isn't large enough for the work we are doing here; it measures 22 x 40 feet,



Mr. J. T. Kamp Evidently Does Lots of Wagon Work. This Is His Shop and Yard.

and is equipped with 4½ H. P. gas engine, by which are driven triphammer, emery wheel, blower, disc sharpener, drill and bandsaw, most of the year. Part of the year I can handle the work alone, but the rest of the year I work with one man.

Since I started this shop five years ago I have been pretty busy. It's hard to get a good all around man at this time. Why, this year I paid my man five dollars a day with free board and room. Two years ago I intended to start an auto repair shop, but on being so busy with blacksmithing I did not do it.

Sometimes I think of enlarging my shop or building a new one. I should like to see a good plan for a shop for blacksmithing, wagon work and auto repairing in the Blacksmith and Wheelwright.

I noticed in one number of the Blacksmith and Wheelwright that a brother blacksmith charged 75 cents an hour for blacksmithing, while he charged $1.00 an hour for auto repairing. I think if auto repairing is worth $1.00 an hour, then blacksmithing is worth at least as much. It takes just as good a mechanic with just as much experience to turn out a good piece of blacksmith work as it does to repair an auto. I always charge $1.00 an hour. These are the prices I get:

Shoeing, common shoes,	
No. 1, 2 and 3 shoes (4 shoes)	$2.50
No. 4 and 5 (4 shoes)	3.00
No. 6 and 7 (4 shoes)	3.50
Neverslips,	
No. 1, 2 and 3 (4 shoes)	3.50
No. 4, 5 and 6 (4 shoes)	4.00
No. 7 (4 shoes)	4.50
Resetting common shoes	1.75
Resetting and recalking Neverslip shoes to No. 5	3.00
No. 5 and 6	3.50
Stallion common shoes	6.00
Plow Work,	
Sharpening lays, each	.50
Pointing lays, each	1.75
Sharpening disc blades, 16 in. each	.30
Resetting Tires, 1¾ in., one set	6.00
Resetting buggy tires	5.00
New wagon axle	7.50
New wagon pole	7.50
New wagon bolt with standard	6.50
Buggy shaft, one	3.00
New yoke, buggy or wagon (one in each wheel)	.60
New yoke, buggy or wagon (two or more in each wheel)	.50

WORKSHOP EXPERIENCE



Prices From Michigan.

From Peter Van Dijken, Michigan.—Now that I am sending my renewal subscription money, I might just as well write a few more lines that you can publish if you want to. At the present time the prices for work in this part of the country are as given below. That is, the prices we are getting today, but we don't know what it will be tomorrow. Things are changing every day and no one knows what the morrow may bring forth.

	Prices per Set.
Shoes up to and including No. 5	$2.50
Shoes Nos. 6, 7 and 8	3.00
Resetting shoes	1.40
Adjustable calk shoes	5.00
	Price Each.
Bar shoes up to and including No. 5	1.25
Bar shoes Nos. 6, 7 and 8	1.50
Rubber pads	1.50
Leather pads	.50
Adjustable calks	.06

If any blacksmith wants to play a good joke on his neighbors, here is how he can make his anvil ring like a bell. Take four large corks, the biggest ones you can find, and put one under each corner of the anvil. Then the whole neighborhood will think that the smith has a new anvil, or possibly the village has a new smith. Be sure to fasten the corks to the anvil block, an 8-penny nail for each cork will do.

Get Paid for Knowledge.

From Charles Chism, Ohio.—I am sending you herewith a subscription for a Mr. Scheetz who was in my shop last Saturday. He happened to look over the magazine and decided to subscribe for it within five minutes, because he wanted a trade paper that would keep him up with the times.

There is one good thing about Mr. Scheetz. He believes in getting prices and I wish all of us were like him. He says he believes in getting paid for what he knows, in addition to the work, for most blacksmiths charge just for the work.

If we could get all of the blacksmiths to take a trade paper, as the other mechanics do, we would be able to standardize our prices and get more money for our families. I am sending you herewith two notices, which may interest the other readers.

The first one shows that the barbers in this town get 40 cents for cutting hair, 20 cents for shaves, and 35 cents for massage. The bricklayers have raised their scale of wages from 75 to 90 cents per hour for small brick work and raised to $1.00 per hour for large paving brick. The carpenters also intend to raise their scale of wages.

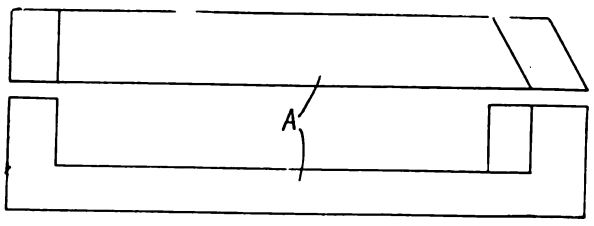
You see everyone tries to get more money but the blacksmiths. I am sure that as soon as old John Barleycorn is kicked out of Ohio we will be able to do better. We will have more money, have better tools and more money to spend on our families.

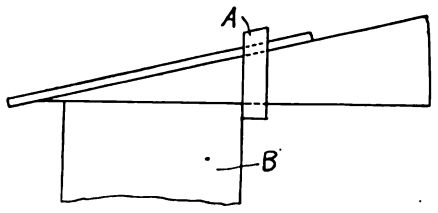
I notice that the editors of all of our trade papers are afraid to give John Barleycorn a rasp. I don't see any reason for this, because a boozer never reads the magazines anyway. He doesn't have time.

(Editor's Note:—Perhaps the main reason why editors have not bothered to hit John Barleycorn is because he is on his back anyway. The people who read The Blacksmith and Wheelwright are wise enough to know that John Barleycorn is the sort of a friend who always borrows or takes what he wants, and never gives anything in return. So long as our readers know this fact, we don't like to waste valuable space arguing against a dead one.)

A Number of Kinks.

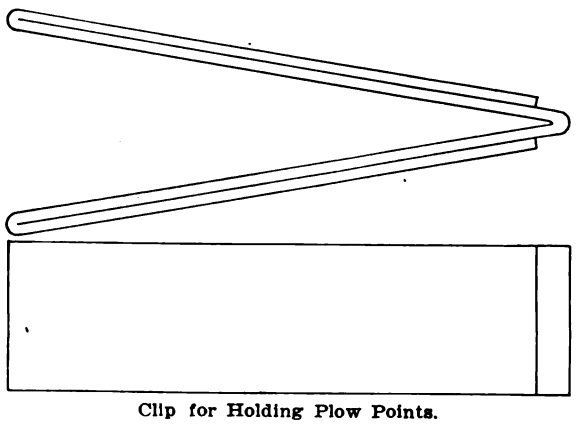
From a Village Smith in the Canadian Northwest.—Maybe the following kinks, which I have found to be of great help, will





Clip for Holding Landside.

interest some of my brothers. Figure 1 shows a clip for holding landside on share for welding. Place on share and landside and



Clip for Holding Plow Points.

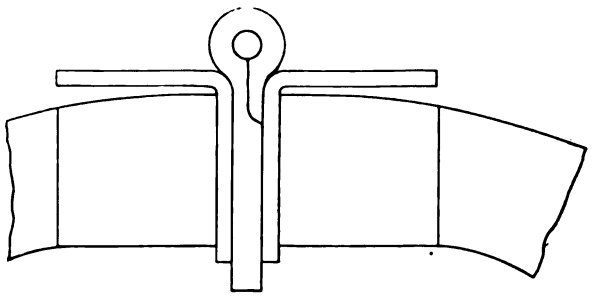
drive landside into clip A, holding clip on edge of anvil as at B in Fig. 1.

Many smiths hold points to the share with a pair of tongs for welding, but a home-made clip is more adequate. Make the clip of 1½

Digitized by Google

by ⅜ iron or steel bent double and driven on as in Fig. 2.

In cases where a single point only is used either under or on top of share, it is easier to heat share and point separately and then place them together on anvil for first weld.

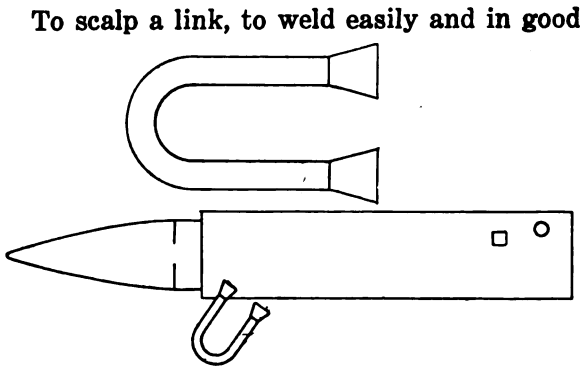


Squaring Corners and Shaping Eye Bolts.

To shape square corners and shape eye-bolts, etc., see Fig. 3. Have a pair of angle irons to fit the vise and make the corners of same well rounded.

To remove sections of mower knife, place knife in vise, points down and back of knife above vise and hold vise easy. Then a couple of sharp blows with the hammer will shear off each section.

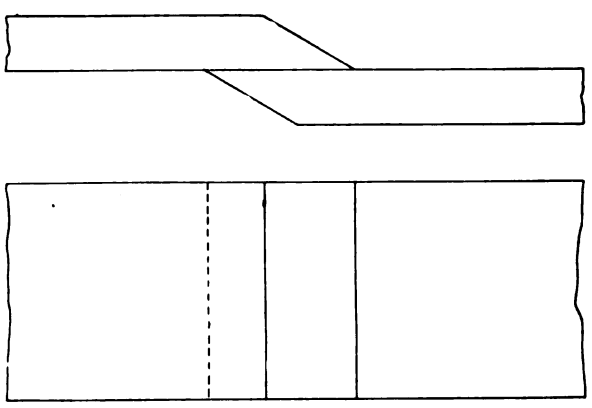
To scalp a link, to weld easily and in good



Scalping a Link.

shape, take down ends, place on anvil as shown in Fig. 4, and knock down, first one and then the other end.

In welding flat stock, it is helpful to place flat sides together as shown in Fig. 5. Especially in welding springs, place welding



Welding Flat Stock.

plate between and squeeze up in vise, and then take welding heat. They must be good and hot, however, before placing in vise or they will not hold together while taking welding heat.

LATHE WORK.

Describing and Illustrating Methods of Dressing Crankshafts.

The smith-machinist is very likely to be called upon to dress up an old crankshaft, or perhaps to make a new one. Therefore he must be "up" in that particular branch of lathe work, or, at least, should know how to mount the crankshaft in the lathe.

Perhaps the very simplest form of crank job which can come to hand will be to dress the bearings and crankpin of a single throw crank for a little gasoline engine, such as is shown in upper view in the accompanying illustration. This is about the most simple form of crankshaft that can be made, but even turning a job of this kind will require considerable rigging up and getting ready. In fact, crankshaft turning, like many other bits of lathe work, requires a number of jigs and attachments, and the setting up or getting ready frequently consumes more time than is required by the actual operation of turning.

The simple crankshaft shown consists of the two plain journals, A and B, the crankpin C, and the two throws, D D, which unite the crankpin and the journals.

As simple as this job is, there is a good deal to be considered in order to place it correctly between lathe centers and smooth off both the journals and the crankpin. With the shaft between centers, it is not even possible to true up the journals A and B for the reason that the shaft being comparatively long, and the resistance to the tool pressure having to be transmitted around through both reaches D D and C, it will be almost impossible to machine the two bearings without their springing out of alignment.

It will be necessary, therefore, even for dressing the two bearings, to block between the throws D D in order to lessen the spring at that point. This may be done in a variety of ways. Some machinists cut a piece of metal to the exact length which will permit its being driven between the throws, and to remain without falling out. Other workmen place a small jack screw between the reaches and tighten the screw of the jack just enough to prevent it from falling out.

About as good a way for the smith-machinist to do is to procure a bolt with a nut on it, which will slide easily between the reaches. Place the bolt in line with the journals A and B, then tighten the nut by unscrewing it until the bolt will stay in place between the reaches. This will transmit the pressure of the lathe centers from one reach to the other and allow the bearings to be dressed lightly without springing one way or another under pressure of the lathe centers and the thrust of the cutting tool.

A very good idea may be obtained of the ease with which a pretty heavy shaft may be thrown out of shape by lathe-spindle pressure, by means of a thick wire or a small rod which has been filed or ground away until it will just slide endwise between reaches D D and retain its position or perhaps barely slide out.

Next, place the crank between centers and find that the piece of metal is held so strongly between the reaches, even when the tail spindle is adjusted in a delicate manner that it will require some force to pull out the distance piece from between reaches D D.

The above matter is stated at some length in order that the smith-machinist may realize how very important it is to block very carefully in each crank, when the journals are to be turned. And even with the most careful blocking there is great danger of straining the crank, and when there are six or eight throws in the crank it will seem well nigh impossible to so block all the cranks that the shaft may be dressed up straight and stay straight after the blockings have been removed. Truly, it is "some stunt" to put a crankshaft into the lathe and dress up bearings and crankpins and have the shaft straight during and after the dressing!

As hard a matter as it has been found to dress crankshaft journals accurately, it will be found much more of a problem to dress the crankpins and have everything test out accurately after the work has been done. In order to dress the crankpin D, it will be necessary to place the shaft between centers in such a manner that the whole business may revolve about the crankpin as a center. To that end, centers must be drilled at E and F.

But centers at those points will not work very well; in order that the long crankshaft can revolve, the centers of the lathe must be very long indeed and the tail spindle extended so far that there would be very little stability and the crankshaft would wobble and run out of true, no matter how slowly and carefully the operations may be conducted.

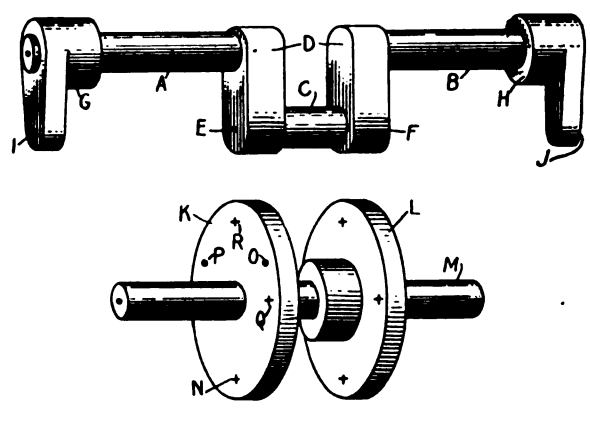
Instead of making centers at E and F, it is usual to slip another pair of reaches upon the crankshaft. These extra reaches may be fastened to the crankshaft in any approved manner, and here again, trouble will be encountered, for it is no easy job to fasten a pair of machined castings to a shaft and have both castings line up—and stay in line—with a crank somewhere along the shaft between the two extra castings.

It is not always that keys can be used, for all too often there is no keyway in the shaft upon which the reaches are to be placed. Set screws are used a good deal for the purpose, but set screws are very discouraging sometimes, and cannot be depended upon between said times. Still they are used for the purpose.

The only really good method of fastening extra reaches to a shaft for turning crankpins is to split the reaches in such a manner that they may be clamped firmly in place by great bolt-power. And unless the bolt capacity be very large, the clamping device will prove as bad or even worse than set screws. But well designed clamping will do the business and do it right.

Handling Multiple Throw Cranks.

The little crankshaft shown has only a single throw. Some shafts have many, some of them eight, and a very large number of shafts have six crank throws disposed along their length. Here is a problem indeed for the reaches. To be sure, it would be possible to turn one or two of the cranks which



Dressing Crankshafts: Upper View Shows Simple Crankshaft While Lower Depicts Use of Discs for Laying out Centers.

might be in line with each other and then move the reaches to align with some of the remaining cranks. But so doing would be giving increased chances for error and it would probably be found that some of the cranks would not be in alignment with the others or with the main or shaft journals.

When there is more than one crank in a shaft, it is better to make the reaches in circular form as shown by the lower sketch. Indeed, it is well to make them thus for turning shafts with but a single crank, then other centers may be added to the discs as required. Again, when making up a pair of reaches for future as well as present, why not put just a little more work into them and make them so they can be used for a large number of crankshafts of various sizes and throws?

Discs for Crank Turning.

By making the discs K and L as large as the lathe will swing, the discs may be used for any crankshafts which can be swung in the same lathe. For shafts of varying crank throw, it is only necessary to make a set of centers in the two discs which will correspond with the throw and angularity of the cranks in the shaft to be dressed.

Furthermore, with centers "quartering" on each disc, it is possible to dress cranks which are set at either 90 or 180 degrees with each other. And with another set of centers, spaced 120 degrees apart as shown at N, O and P, cranks set at "thirds" may be taken care of. The quartered centers appear at N, Q, R and S.

The two discs are shown upon the shaft

Digitized by Google

M, but the clamping device is not shown. This may be placed entirely upon the hub of the disc which may be split on one side and fitted with the necessary cast-on lugs for giving a fair bearing to the big clamp-bolts.

Both the discs can be made from the same pattern and they should be laid out upon the faces of each, with a series of circles, cut into the surface with a very sharp tool, and drawn concentric, one inch apart, at even inches from the center. This will enable you to lay out centers for any crank-throw very easily and accurately.

At the same time the above described circles are made, radial lines should also be drawn from bore to circumference. There may be several sets of these lines, some of them quartering, others laid down to 120 degrees, and laid alike, but to opposite hand, on both discs, so that when they are placed on a shaft the lines will come opposite each other at all times, provided the discs have been properly set and fastened to the shaft.

The bore in these discs should be made as large as the largest shaft which ever will be handled. Then sets of split bushings may be made so that a shaft of almost any diameter equal to or less in diameter than the bore of the discs may be, have the discs set up thereupon by merely providing a pair of bushings of the proper size.

With such a pair of discs you will be ready for almost any shaft which is likely to come around. If in making the discs you should find yourself "up against it" in the laying out of the radial lines at the proper angles, then you had better fasten both discs upon shaft M and take the whole business to a machine shop where they have a good dividing head. With this instrument, it is only the work of a very short time to mark both discs accurately with all the radial lines you will ever require.

There is a way of doing this marking with considerable accuracy at home in your own lathe, but it would require too much space to describe the method. You can have that problem to work out for yourself. It can be done. The writer once rigged up his lathe and graduated a circle into degrees—360 of them—for use in a home-made surveyor's instrument which he made and used. Therefore, the simple 90 and 120 degree dividing can be easily accomplished by a little study and patience.

If you like this magazine and feel that it is useful and interesting, the one best way to show your appreciation, is to purchase your accessories and supplies so far as possible from our advertisers. Also write to our advertisers for catalogs, printed matter and prices, not forgetting to always mention the fact that you saw the advertisement in the Blacksmith and Wheelwright.



CAN SOME ONE ANSWER?

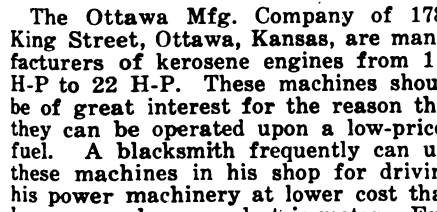
From R. A. Roberts, Florida.—Will some one of my brothers kindly tell me how to put on a heavy wagon rim that is stubborn, that is bent a little too much for the wheel, and describe the process as much as possible?

Pre-Heating Torch.

From C. C. Richter, Iowa.—Will some one of my brother readers kindly explain how to make a pre-heating torch in which I can use kerosene under air pressure for fuel?

How Do You Straighten a Foot?

From Charles Chism, Ohio.—I would like to get some ideas on straightening up a horse's front foot. The horse wears his shoes on the outside. I would like to know how his feet should be trimmed and how he should be shod.



Only One Kick in Fifteen Years.

(From the Arkansas Gazette)

Joe Benham, who has been a blacksmith here (Little Rock) for the past fifteen years, was kicked by a horse for the first time yesterday and suffered a broken leg. Benham was shoeing the animal.

(Editor's Note)—If this man had been a reader of the Blacksmith & Wheelwright he would have learned about the Barcus Horse Stock and then would have had himself to blame if he had been injured by a kicking horse even once in fifteen years. With a broken leg he is not likely to shoe horses again for a good while. Those who use the Barcus device, which has been advertised in the Blacksmith & Wheelwright for many years, can shoe any horse no matter how ugly he may be with entire safety.

Steel Stamps.

Every blacksmith shop should have a set of the alphabet in steel stamps, so that tools and other things belonging to their customers can be stamped with the initials of the customer for the purpose of identification. It often happens that things are lost, and unless they are marked in a certain way they cannot be identified. Besides every blacksmith should have his own tools marked with his initials. Geo. M. Ness, Jr., 61 Fulton St., New York City, makes a specialty of steel stamps, burning brands, and stencils. He has been supplying our readers with these things for twenty years, and will be found entirely reliable. Send to him for price-list.

Standard Horse Nails.

We want to call the attention of our readers to the excellent line of horse nails manufactured by the Standard Horse Nail Co., of New Brighton, Pa., and suggest that smith readers investigate this line, writing for catalogs, prices and samples.

Ottawa Kerosene Engines.

The Ottawa Mfg. Company of 1786 King Street, Ottawa, Kansas, are manufacturers of kerosene engines from 1½ H-P to 22 H-P. These machines should be of great interest for the reason that they can be operated upon a low-priced fuel. A blacksmith frequently can use these machines in his shop for driving his power machinery at lower cost than he can purchase an electric motor. Frequently when he owns such machinery the neighboring farmers after seeing it in operation are willing to purchase a machine from him if he acts as agent.

In this way, he can kill two birds with one stone, and earn a little money on the side without working for it.

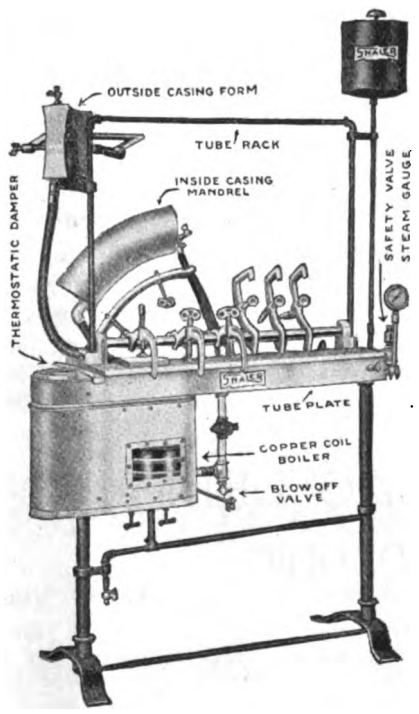
The manufacturers of the Ottawa Kerosene Engines claim that their machine starts easily, is designed for heavy work and is sold at an extremely low price. They are willing to send a catalog free and to forward the engine on a ninety day trial, the money to be refunded if the engine does not prove satisfactory in every detail. The proposition is worth investigation.

Shaler Vulcanizers.

Everyone in the automobile business admits the possibilities there are for big profits in tire repairing. Many blacksmiths are getting these profits. Others are postponing their start in tire repairing because they have received the impression somewhere that tire repairing is a mysterious, difficult art to learn or that the necessary equipment is exceedingly expensive.

Right now is the time to give tire repairing serious consideration. The high cost of tires and the possible scarcity of them is filling motorists with a desire to have repair after repair made until the last possible mile of service has been obtained.

One of the types of tire repair equipment that is especially adaptable for the small garage that wants a simple, inexpensive vulcanizing plant, as well as for the repair shop that demands reliability and large capacity, is the Shaler Type NPR No. 41, illustrated herewith. There is ample capacity for handling about 200 tubes and a dozen casings daily. Any type of repair that is practicable with any vulcanizer can be handled, from tube punctures to the largest casing blowouts.



Type N. P. R. No. 41 Shaler Vulcanizer.

By the use of the Wrapped Tread Method, adapted from the method used by most tire manufacturers in making tires, the repair of casings is reduced to the simplest terms. And all sizes and kinds of casings are mended with one set of moulds.

Great economy of repair material is secured by the elimination of cutting away and replacing a section of the tire as is often done by repairmen, and at the same time a stronger repair is made than when the tire is weakened by cutting into sound fabric. A fifty per cent. saving in time of curing is accomplished by heating the tire from inside and outside at the same time.

This vulcanizer is heated by steam generated by a gas or gasoline burner. One of the outstanding, exclusive features which have made it standard throughout the world is the automatic control of temperature by means of a thermostat. It is impossible to overcure or undercure a tire, and no attention needs to be given to the vulcanizer while it operates, as the temperature cannot vary from the correct degree.

Despite the obvious advantages of the Shaler plant its price is exceedingly low. C. A. Shaler Co., Waupun, Wis., also make many other models for repair shop use and a line of motorists emergency vulcanizers which are among the best selling accessories on the market and are handled by practically every jobber.

Capewell Horse Nails.

The attention of our readers is called to Mr. Hobart's article in this issue. Mr. Hobart called upon one of the blacksmiths and found that blacksmith complained of the horse shoe nails he was receiving. He had to sharpen every nail by hand simply because the point came from the manufacturer in a blunted condition.

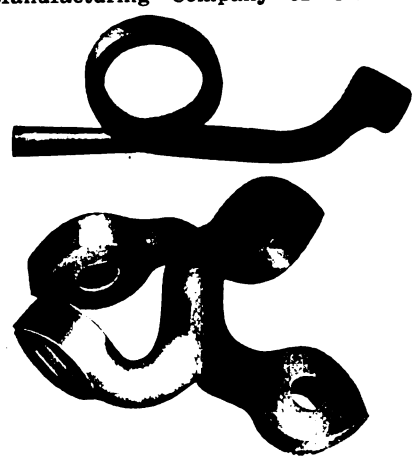
We are glad to say that this blacksmith did not use Capewell Horse Nails. If he had, he would not have needed to sharpen them. The Capewell Horse Nail Company of Hartford, Conn., are willing to have their nails compared with any other horse nail on the market because they know that their name stands for quality.

Our readers who do not know anything about the Capewell line should write them for samples and prices. We call our readers' attention to the fact that this concern is sending an attractive calendar free of charge to any of our readers who will send their name and address.

Emco Malleable Iron Castings.

One of the greatest troubles of the body maker's work is to obtain suitable body irons, for upon the irons depends his reputation. No matter how well the body may be built, his work is for nought if the body irons break easily.

We call the attention of our readers to the two illustrations given herewith, pictures which show how the malleable iron castings put out by the Eberhard Manufacturing Company of Cleveland,



Ohio, will withstand bending or twisting without breaking. In both cases illustrated the irons were bent cold.

This proves unquestionably that the material used is of the best. All of the Emco malleable iron castings are said to be of this quality and this firm manufacture body irons for practically every purpose. Their bulletin, "Assemblies of Irons," may be had free of charge, upon request, by any of our readers who are interested in quality malleable iron castings.

Stellite.

Anyone who has occasion to use cutting tools of any description for Lathe, Planer or Milling machine work should know about Stellite, a special make of alloy manufactured by the Haynes Stellite Company, of Kokomo, Indiana, who have an Eastern office at 120 Broadway, New York City. Stellite is said to bear the same relation to high speed steel that high speed steel compares to ordinary steel.

The metal has attracted considerable attention for the reason that it is uneffected by the heat up to 2,100° F. The work can be turned at a much faster speed than with ordinary high speed steel. In fact lathes equipped with Stellite tools can be run at speed not possible when any other metals are used for cutting.

Stellite is not a tempered metal. Its hardness is provided for when it is mixed and cannot be changed. It is said to work best at red heat.

The tools may be obtained in a number of shapes and styles and our readers who are interested should write the company for their latest catalog and price list.

Digitized by Google

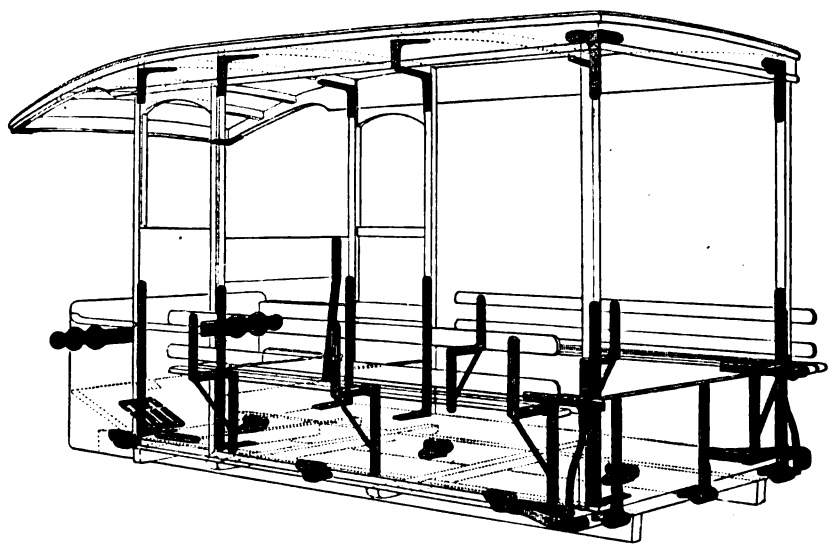
EMCO MALLEABLE IRON CASTINGS

— QUALITY AND SERVICE —

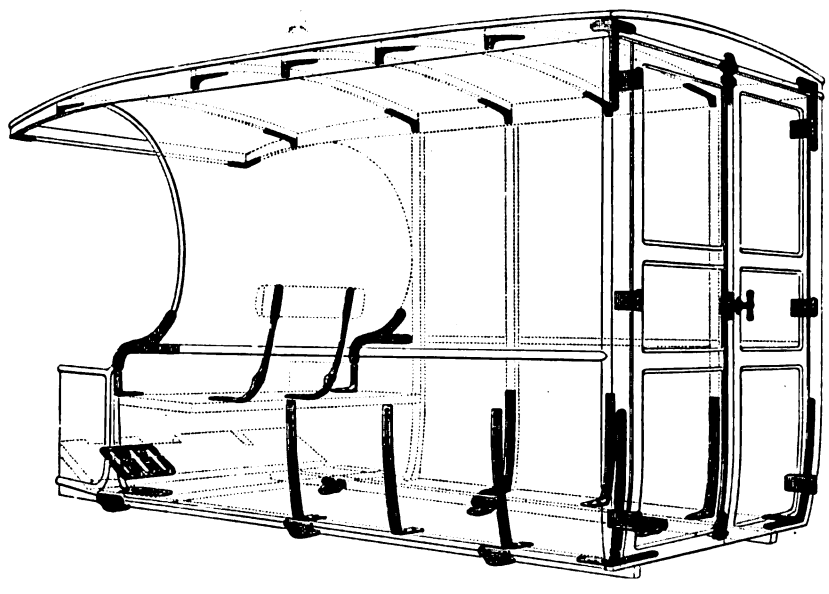
We do not make Bodies,
but only

IRONS

for them



Set No. 6



Set No. 2

Our Bulletin,

"ASSEMBLIES OF IRONS"

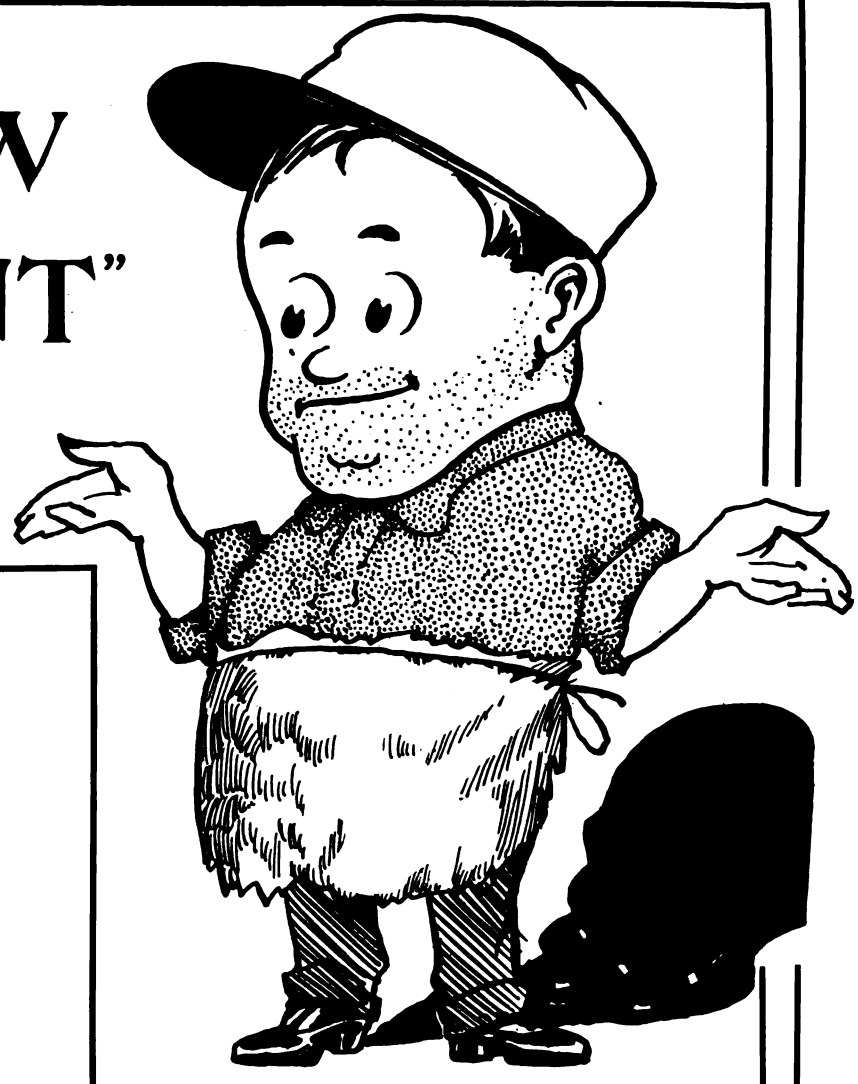
for Vehicle Bodies, will
be mailed on
request

THE EBERHARD MANUFACTURING COMPANY

CLEVELAND, OHIO

Digitized by Google

"YEP! I KNOW WHAT I WANT"





The Ⓐ Heavy Heel

Does the very name of your Horse Shoes assure to the customer real genuine serviceability? This little Blacksmith says he knows what he wants—he has, for years used

American Horse and Mule Shoes

so that must be the kind that he likes best.

It has been our experience that wherever American Horse Shoes have become established—they are there to stay and no amount of persuasion has ever been able to displace them.

The Ⓐ Heavy Heel

The heels of all horse shoes, unless upset with a good deal of extra work, have generally been too light for hard usage. We have solved this problem by rolling a heavy Heel on all American A shoes.

The weight is the same as before; exactly the same number of shoes to the keg; only, by our exclusive patented process, we put the extra metal where it is most needed.

These shoes are a distinct improvement over any other on the market.

Be sure you get what you want!—you ought to have our catalog right away!—Write us.

American Horse Shoe Company

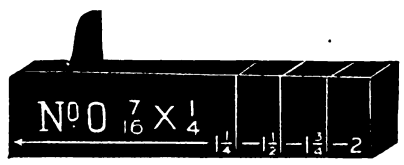
Rolling Mills, Works and Offices

PHILLIPSBURG, - NEW JERSEY

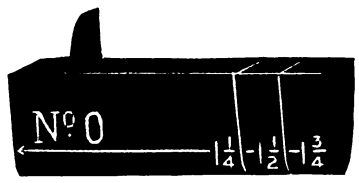
Trade Mark stamped on each shoe. Red A on each keg and box.

American Toe and Heel Calks

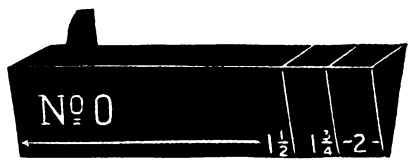
BLUNT



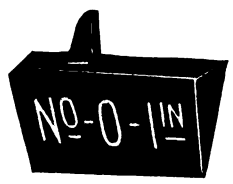
COUNTRY PATTERN
Half Sharp



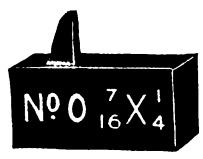
SHARP PATTERN



SHARP



BLUNT



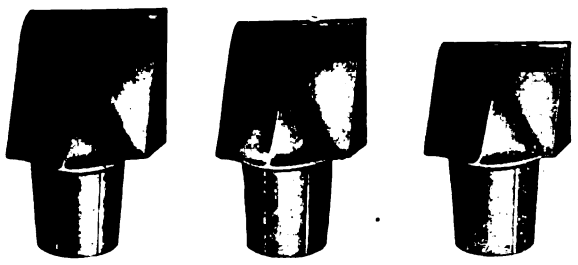
Here is an example of what resource, initiative and capacity can accomplish in the manufacture of Calks.

American Toe and Heel Calks will stand the keenest competition and reveal the fact that they are MORE than "Just a little better." We want you to prove it—send for the catalog.

Digitized by Google

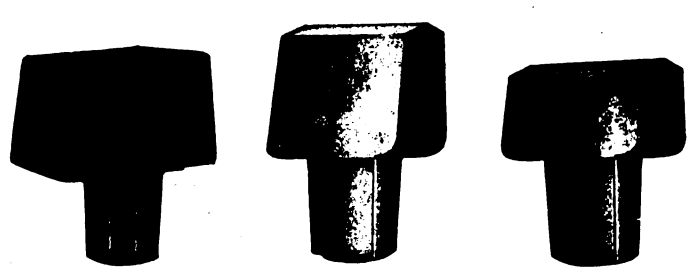
There's a DIAMOND Calk for every purpose

SHARP



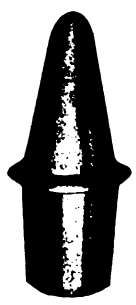
BIG BLADE | STANDARD BLADE | SHORT BLADE

DULL



BLOCK CALK | STANDARD BLADE | SHORT BLADE

ROUND SHARP



STANDARD BLADE



SHORT BLADE

and every Diamond Calk is the best calk made for its particular purpose, because it is the result of years of study and experiment to best serve its specific purpose. All

DIAMOND Calks

are as hard and tough as science and money have yet produced.

¶ They are scientifically shaped both for a definite use and for all around long wear.

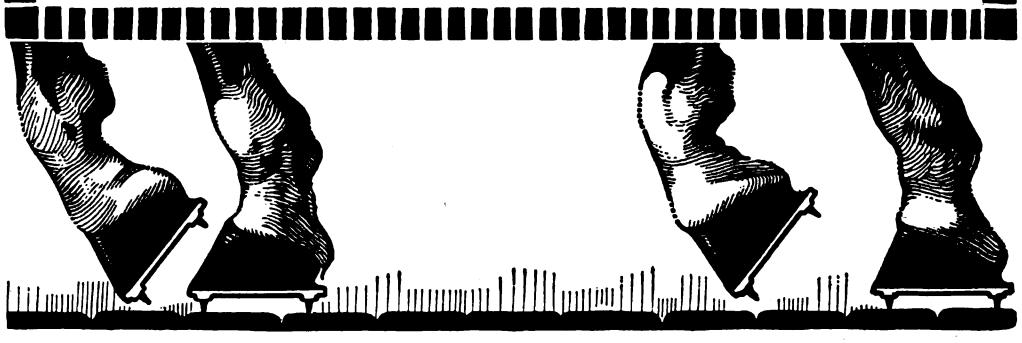
¶ The shanks are so accurately and uniformly made as not to vary 1/10,000 of an inch in diameter.

¶ They don't fall out, twist in the shoe or break off, and —they wear like a diamond.

Sold Only Through Horseshoers

Diamond Calk Horseshoe Co.

Duluth, Minn.



ROUND DULL

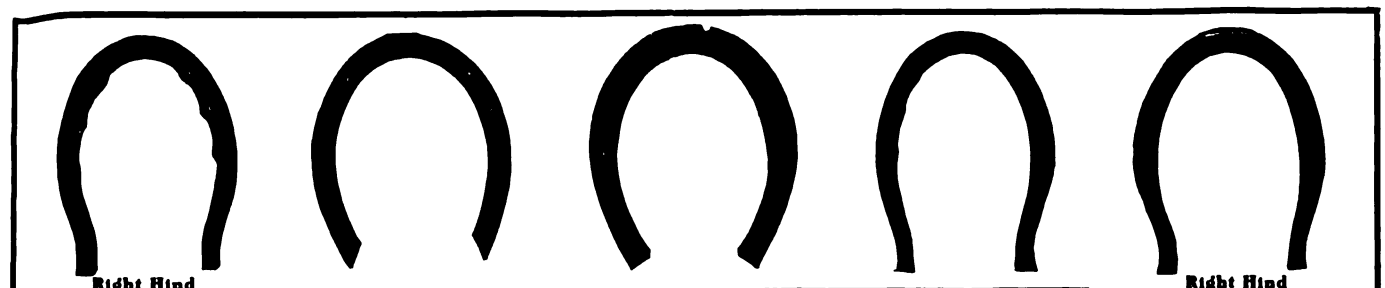


STANDARD BLADE



SHORT BLADE

Digitized by Google



"Brock Pattern" Hand Made Racing Plates

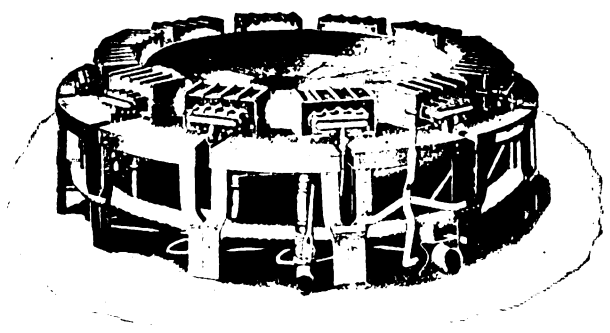
Extra Light, Light, Medium and Heavy weights; in sizes 0-4 inc.

Just What You Need for Trotters, Pacers and Runners

Write for our No. 17 Catalog (free); showing sizes, weights and measurements.

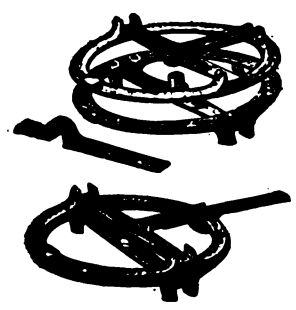
For our regular line of U. S. Horse and Mule Shoes, ask for No. 16 Catalog; showing sizes, weights and measurements of over 500 patterns and sizes.

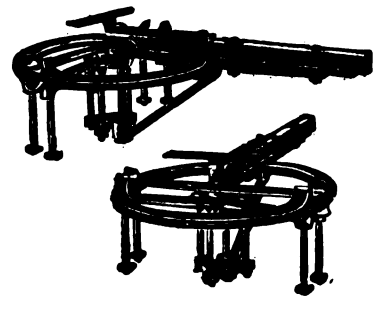
United States Horse Shoe Co., Erie, Pa.



TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas, Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.

OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.





Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE COGEL MFG. CO., TOLEDO, OHIO.



Learn Auto and Tractor Business

$100 To $400 A Month

GREATER opportunities than ever due to increased production of Autos, Trucks, and Tractors. Big demand for Repairmen, Garage Foremen, Drivers and Tractor Operators. Thousands of our graduates making big money.

Learn in 6 to 8 Weeks

Immense additional equipment from our former Military Division. Same practical method as used to train soldier mechanics for U. S. Army in 60-day courses.

Free Now. Write today, giving age and occupation for **7-Day Trial Offer** and 68-page Opportunity Book.

GOOD JOBS OPEN BOOK FREE

Rahe Auto & Tractor School

3164 Oak St., Kansas City, Mo.

FOR SALE

Axles—half fan, half coach, 1⅛x7 and 1⅛-x1 1/16 x 6½. Long beds, not welded; price, $3.00 per set. Also Bolts, Screws, Clips, and Light Spring Wagon Bodies, Buggy Spring Bars, etc., below market prices.

AMERICAN CARRIAGE CO.

KALAMAZOO, MICHIGAN

DOUBLE YOUR INCOME!

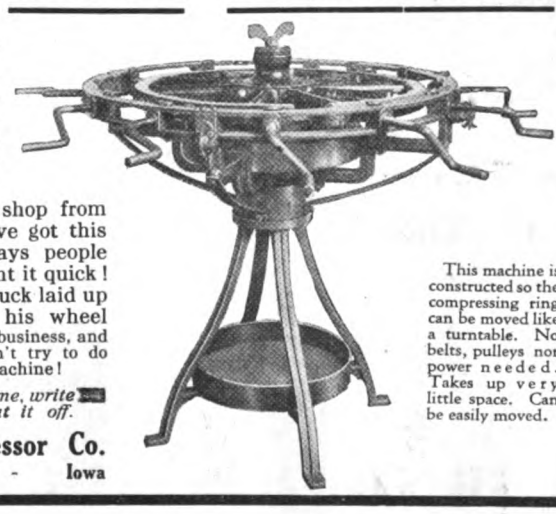
UNIVERSAL WHEEL COMPRESSOR

This is a Truly Wonderful Machine!

NOW you can get your wheels compressed to the point of perfection and joints closed so nicely before putting on the tire or rim—why it is almost like magic!

Customers will flock to your shop from all over. The news that you've got this machine travels fast. Nowadays people want good work and they want it quick!—no man wants his Auto or Truck laid up for days or weeks—he wants his wheel fixed in a jiffy so he can go about his business, and he's willing to pay the price. Don't try to do everything with your hands—get a machine!

If you want to double your income, write to us this very day—don't put it off.



This machine is constructed so the compressing ring can be moved like a turntable. No belts, pulleys nor power needed. Takes up very little space. Can be easily moved.

Universal Wheel Compressor Co.

Cedar Rapids - - - Iowa

WELDING PLANTS, $25.00 to $300.00

Designed for all purposes. Small cash payment; balance, three to six months. Every mechanic and shop should have one.

BERTSCHY-BERMO CO. OMAHA, U. S. A.

Power Punch and Shear.

The old cold chisel and hammer method of cutting heavy iron has passed out of existence simply because too much time is wasted in cutting heavy iron. Every backsmith in the country who can manage to keep busy a large part of his time, can afford to purchase a power shear. If, however, he can add to his equipment and purchase both a punch and a shear at a price of either one, he saves considerable money thereby.

Such a combination punch and shear can be obtained from the Plymouth Foundry & Machine Company, Plymouth, Wisconsin. This machine is exceptionally heavy and may be driven from any available source of power. It may be obtained in a number of sizes and will cut either flat or round iron within its range, depending upon size of machine purchased. Our readers should write for prices and descriptive literature to the manufacturers whose name is given above.

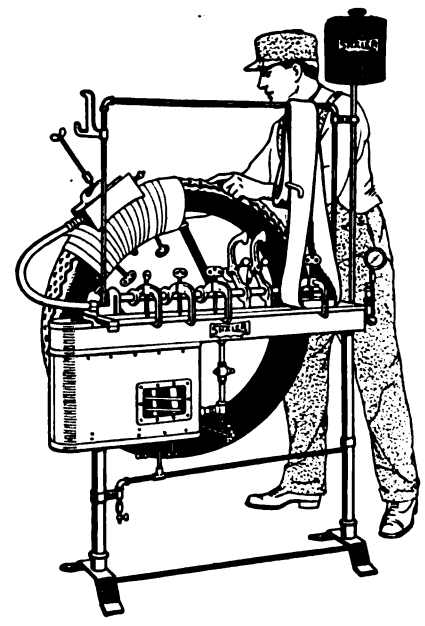
Kerrihard Power Hammer.

Strikers and helpers are hard to obtain at the present time, and if one is fortunate enough to be able to hire them he is forced to pay a fairly high figure in order to keep the man satisfied. Machines are replacing men in many cases and this statement applies to blacksmith cases particularly.

The blacksmith can save a lot of money by installing a Kerrihard Power Hammer manufactured by The Kerrihard Co., Kerrihard Station, Red Oak, Iowa. This machine is a helper which never sleeps and never tires. The first cost is practically the only one, and even this cost is low. Within a very short time the power hammer will pay for itself. Its work is of the best and it never shirks. Our friends should write for full particulars, catalogs and price lists.

Buffalo Forge Products.

Blacksmiths and garage men throughout the country have found that efficient tools are the foundation upon which the reputation of the workman depends. One makes no mistake in installing the machines manufactured by the Buffalo Forge Company of Buffalo, N. Y. This concern manufacture a complete line of electrically driven machinery, forges, electric blowers, drills of the floor and post type, and shears of all sizes.



An Easy Way to Make Money

Don't be content to plod along on a small salary. Be *independent*. Go in business for yourself. Open a Tire Repair Shop, and be your own boss. Hundreds of men are making $200 to $500 a month clear profit. Many make $60 a week. One man made $45 the first day. No experience is needed. We teach you how. Very little capital required and expenses are small. But little risk as there is plenty of work and motorists are willing to pay liberal prices for good tire repairing. There is a good profit on the sale of automobile accessories also.

SHALER

Tire Repair Outfit

is a simple, easily operated steam vulcanizer that does as much and as perfect work as the large $250 to $500 vulcanizing outfits. It is the only vulcanizier that has ***Automatic Heat Control.*** It must vulcanize just right. Can't overcure or undercure the rubber. So simple that a boy can operate it. Requires no watching or regulating. Only takes a small space in corner of barn, garage or repair shop. You can learn to do expert tire repairing in half an hour. It's easy and the work is pleasant. Complete outfit—Shaler Steam Shop Vulcanizer with full instructions for tire repairing costs only $70—subject to trade discounts. Tools and materials are not expensive. Do you know any other business that pays such large profits on such a small investment?

FREE BOOK

"How to Open a Tire Repair Shop"

—gives full information, and describes the Shaler Wrapped Thread Method of tire repairing that is used by all tire manufacturers. Write quick before some hustler gets ahead of you. It's easy to make money repairing tires, and there is a big opportunity now, right in your town. Don't fail to write for free book.

C. A. Shaler Company

1811 Fourth Street Waupun, Wisconsin

Digitized by Google

Index to Advertisers

Aetna Nut Co., horseshoe calks....Front cover
Akron-Selle Co., gears....4th cover
American Calk Co., calks....Front cover
American Horse Shoe Co., horseshoes.... 25
American Carriage Co., supplies.... 27
Anti-Borax Compound Co., welding compounds....3rd cover
Armstrong Mfg. Co., bolt dies.... 29
Armstrong-Blum Mfg. Co., punches and shears....Front cover

Barcus Mfg. Co., horse stocks.... 1
Barnett, G. & H., Co., files and rasps, Front cover
Bauer Engine Co., engines.... 8
Bear Mfg. Co., starters....Front cover
Bertschy-Bermo Co., welding plants.... 27
Bicknell Mfg. & Supply Co., punches and shears, spark plugs.... 29
Bradley, C. C., & Son, shaft coupler.... 6
Brooks, The, Machine Co., welding outfits.... 5
Buffalo Forge Co., blacksmiths' tools.... 7
Burden Iron Works, horseshoes....3rd cover
Butterfield & Co., taps, dies and screw plates.... 8

Campbell Iron Co., supplies....Front cover
Canedy-Otto Mfg. Co., blacksmiths' tools.. 5
Capewell Horse Nail Co., horse nails, Front cover
Champion Blower & Forge Co., blowers.... 3
Champion Shock Absorber Sales Co., Inc., shock absorbers.... 8
Champion Tool Co., blacksmiths' tools, 2nd cover
Chase, L. C., motor topping....
Columbus Forge & Iron Co., anvils.... 31
Cortland Welding Compound Co., welding compounds....4th cover
Crane Puller Co., pullers.... 7
Cray Bros., blacksmiths' tools.... 31
Crescent Machine Co., woodworking machinery....3rd cover

Diamond Calk Horseshoe Co., horseshoes 26
Doxey, N. D., welding compounds, Front cover
Durner, A. E., disc sharpeners.... 1

Eberhard Mfg. Co., iron castings.... 24
Edwards, C. D., Mfg. Co., shears.... 29
Electric Blower Co., blowers.... 31
Electric Wheel Co., wheels....Front cover
Empire Mfg. Co., wheels.... 29

Felton, Sibley & Co., paints.... 1
Firestone Tire & Rubber Co., tires.... 4
Fisher & Norris, anvils and vises.... 8
Franklin Steel Works, toe calks.... 8

Giant Grip Horseshoe Co., horseshoes.... 29
Gillette Clipping Machine Co., clipping machines.... 4
Gogel Mfg. Co., tire heaters.... 27
Greb Co., grip pullers.... 4
Greenfield Tap & Die Corporation, screw plates and blacksmiths' machinery.... 1
Gwilliam Co., ball bearings....4th cover

Hamilton Mfg. Co., roller bearing inserts....Front cover
Hart Mfg. Co., stocks and dies....4th cover
Harvey Spring & Forging Co., auto springs.... 32
Hay-Budden Mfg. Co., anvils....4th cover
Heller Bros., horse rasps, tools, etc.... 8
House Cold Tire Setter Co., tire setters, hollow and spoke augers....4th cover

Jenner, H. W. T., patents.... 30

Kerrihard Co., hammers....3rd cover

Little Giant Co., hammers.... 32
Linde Air Products Co., oxygen.... 8
L. S. P. Calking Machine Co., calking machines.... 32

Macgowan & Finigan Cordage Co., hammers....4th cover

Ness, Geo M., Jr., steel stamps....Front cover
Niehoff & Co., Paul G., defectometers.... 8
Nicholson File Co., files and rasps.... 6

Ottawa Mfg. Co., engines.... 29
Oneida National Chuck Co., chucks.... 29

Parker, C. L., attorney....4th cover
Parks Ball Bearing Machine Co., woodworking machinery....4th cover
Peck, Stow & Wilcox Co., pincers.... 32
Phoenix Horseshoe Co., horseshoes and toe calks.... 2
Porter, H. K., bolt clipper....4th cover
Prentiss Vise Co., vises....4th cover
Plymouth Foundry and Machine Co., punches and shears....4th cover

Rahe Auto and Tractor School, school.... 27
Root-Heath Mfg. Co., lawn mower grinders.... 6
Rosewater Electric Co., blowers....3rd cover
Rowe Calk & Chain Co., horseshoe calks, Front cover

Sampson & Murdock, directories.... 29
Savidge, A. C., lathes.... 29
Shaler, C. A., Co., vulcanizers.... 27
Sheldon Axle & Spring Co., axles....2nd cover
Sherwood, W. L., woodworking machinery.... 4
Simonsen Iron Works, shears.... 32
Standard Horse Nail Co., horseshoe nails, 4th cover
Star Mfg. Co., agricultural implements.... 4
Sterling Tire Corp., hoof pads.... 6
Stokes Bros. Mfg. Co., rasps....Front cover
Superior Oxy-Acetylene Machine Co., welding outfits....4th cover

Thompson Tuyere Iron Co., tuyere iron, 4th cover

United States Horseshoe Co., horseshoes 27
Universal Wheel Compressor Co., wheel compressors.... 28

Warner, R. P., Electric Co., blowers 3rd cover
West Tire Setter Co., tire setters, hammers.... 31
Wheel B, Top & Hardware Co., supplies 31
Whisler Mfg. Co., nut splitters, jointer heads....Front cover
Witte Engine Works, engines....29
Wolfe, Matt L., tire coolers....Front cover
Young, W. F., veterinary remedies, Front cover

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co.... 4

Anvils
Columbus Forge & Iron Co.... 31
Fisher & Norris.... 8

Attorneys
Hay-Budden Mfg. Co....4th cover
Parker, C. L....4th cover

Automobile Springs
Harvey Spring & Forging Co.... 32

Axles
Sheldon Axle & Spring Co....2nd cover

Ball Bearings
Gwilliam Co....4th cover

Blacksmiths' Machinery
Greenfield Tap & Die Corporation.... 1

Blacksmiths' Tools
Buffalo Forge Co.... 7
Butterfield & Co.... 8
Canedy-Otto Mfg. Co.... 4
Champion Blower & Forge Co.... 3
Champion Tool Co....2nd cover
Cray Bros.... 31
Heller Bros Co.... 8
Nicholson File Co.... 6
Peck, Stow & Wilcox Co.... 32

Blowers
Buffalo Forge Co.... 7
Champion Blower & Forge Co.... 3
Champion Tool Co....2nd cover
Electric Blower Co.... 31
Rosewater Electric Co....3rd cover
Warner, R. P., Electric Co....3rd cover

Bolt Dies
Armstrong Mfg. Co.... 29

Bolt and Rivet Clippers
Porter, H. K....4th cover

Calking Machines
L. S. P. Calking Machine Co.... 32

Calks, Horseshoe
Aetna Nut Co....4th cover
American Calk Co....Front cover
Diamond Calk Horseshoe Co.... 26

Calks, Toe
Franklin Steel Works.... 8

Chisels
Champion Tool Co....2nd cover
Peck, Stow & Wilcox Co.... 32

Clipping Machines
Gillette Clipping Machine Co.... 4

Chucks
Buffalo Forge Co.... 7
Oneida National Chuck Co.... 29

Defectometers
Niehoff & Co., Paul G.... 8

Directories
Sampson & Murdock Co.... 29

Disc Sharpeners
Durner, A. E.... 1
Little Giant Co.... 32

Engines
Bauer Engine Co.... 8
Ottawa Mfg. Co.... 29
Witte Engine Works.... 29

Farriers' Tools
Barnett, G. & H., Co....Front cover
Champion Tool Co....2nd cover
Heller Bros. Co.... 8
Peck, Stow & Wilcox Co.... 32

Files and Rasps
Barnett, G. & H., Co....Front cover
Nicholson File Co.... 6
Stokes Bros. Mfg. Co....Front cover

Forges
Buffalo Forge Co.... 7
Champion Blower & Forge Co.... 3

Gasoline Engines
Witte Engine Works.... 29

Gears
Akron-Selle Co....4th cover

Grip Pullers
Greb Co....4th cover

Hammers
Champion Tool Co....2nd cover
Kerrihard Co....3rd cover
Macgowan & Finigan Cordage Co., 4th cover
Little Giant Co.... 32
Peck, Stow & Wilcox Co.... 32
West Tire Setter Co.... 31

Hollow Augers
House Cold Tire Setter Co....4th cover

Hoof Nippers
Champion Tool Co....2nd cover

Hoof Pads
Sterling Tire Corp.... 6

Hoof Parers
Champion Tool Co....2nd cover

Hoof Shears
Champion Tool Co....2nd cover

Horseshoes
American Horseshoe Co.... 25
Burden Iron Works....3rd cover
Diamond Calk Horseshoe Co.... 26
Giant Grip Horseshoe Co.... 29
Phoenix Horseshoe Co.... 2
United States Horseshoe Co.... 27

Horseshoe Calks
Diamond Calk Horseshoe Co.... 26
Rowe Calk & Chain Co....Front cover

Horseshoe Nails
Capewell Horse Nail Co....Front cover
Standard Horse Nail Co....4th cover

Horse Stocks
Barcus Mfg. Co.... 1

Iron Castings
Eberhard Mfg. Co.... 24

Kerosene Engines
Witte Engine Works.... 29

Lathes
Savidge, A. C.... 29

Lawn Mower Grinders
Root-Heath Mfg. Co.... 6

Motor Topping
Chase, L. C....

Nut Splitters
Whisler Mfg. Co....Front cover

Oxygen
Linde Air Products Co.... 8

Paints and Varnishes
Felton, Sibley & Co.... 1

Patents
Jenner, H. W. T.... 30
Parker, C. L....4th cover

Pincers
Peck, Stow & Wilcox Co.... 32

Pullers
Crane Puller Co.... 7

Punches
Champion Blower & Forge Co.... 3

Punches and Shears
Bicknell Mfg. & Supply Co.... 29
Peck, Stow & Wilcox Co.... 32
Plymouth Foundry & Machine Co, 4th cover

Roller Bearing Inserts
Hamilton Mfg. Co....Front cover

Schools
Rake Auto & Tractor School.... 27

Screw Plates
Butterfield & Co.... 8
Buffalo Forge Co.... 7
Champion Blower & Forge Co.... 3
Greenfield Tap & Die Corporation.... 1

Shaft Coupling
Bradley, C. C., & Son.... 6

Shears
Edwards, C. D., Mfg. Co.... 29
Simonsen Iron Works.... 32

Shock Absorbers
Champion Shock Absorber Sales Co., Inc.... 8

Spoke Augers
House Cold Tire Setter Co....4th cover

Starters
Bear Mfg. Co....Front cover

Steel Stamps
Ness, George M., Jr....Front cover

Stocks and Dies
Butterfield & Co.... 8
Champion Blower & Forge Co.... 3
Hart Mfg. Co....4th cover

Supplies
American Carriage Co.... 27
Campbell Iron Co....Front cover
Wheel B, Top & Hardware Co.... 31

Swages
Champion Blower & Forge Co.... 3

Tires
Firestone Tire & Rubber Co.... 4

Tire Bending Machines
Buffalo Forge Co.... 7
Champion Blower & Forge Co.... 3

Tire Coolers
Wolfe, Matt L....Front cover

Tire Heaters
Gogel Mfg. Co.... 27

Tire Setters
Buffalo Forge Co.... 7
House Cold Tire Setter Co....4th cover
West Tire Setter Co.... 31

Tire Shrinkers
Buffalo Forge Co.... 7
Champion Blower & Forge Co.... 3

Tongs
Champion Tool Co....2nd cover

Tool Grinders
Phoenix Horseshoe Co.... 2

Trucks
Akron-Selle Co....4th cover

Tuyere Irons
Buffalo Forge Co.... 7
Champion Blower & Forge Co.... 3
Thompson Tuyere Iron Co....4th cover

Veterinary Remedies
Young, W. F....Front cover

Vises
Butterfield & Co.... 8
Fisher & Norris.... 8
Prentiss Vise Co....4th cover

Vulcanizers
Shaler, C. A., Co.... 27

Wagons
Akron-Selle Co....4th cover

Welding Compounds
Anti-Borax Compound Co....3rd cover
Cortland Welding Compound Co....4th cover
Doxey, N. D....Front cover

Welding Outfits
Brooks, The, Machine Co.... 5
Superior Oxy-Acetylene Machine Co., 4th cover

Welding Plants
Bertschy-Bermo Co.... 27

Welding Supplies
Linde Air Products Co.... 8

Wheel Compressors
Universal Wheel Compressor Co.... 28

Wheel Dishers
House Cold Tire Setter Co....4th cover

Wheels
Electric Wheel Co....Front cover
Empire Mfg. Co.... 29

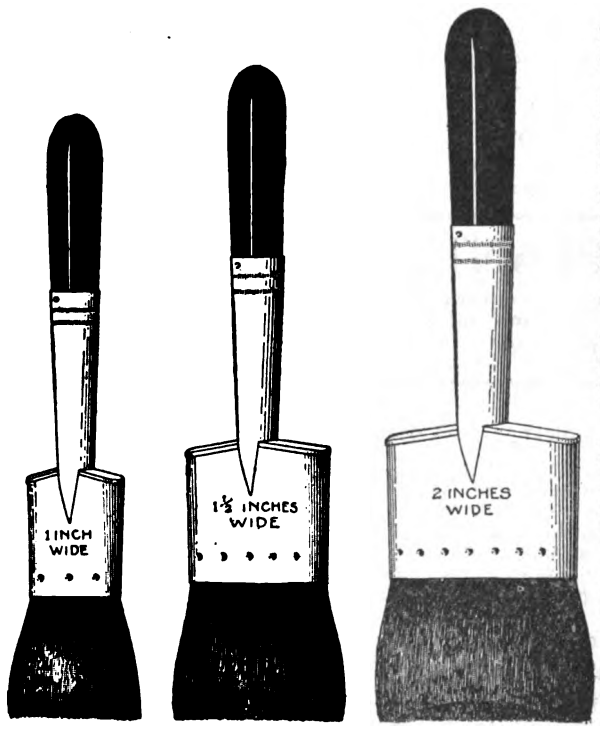
Woodworking Machinery
Buffalo Forge Co.... 7
Crescent Machine Co....3rd cover
Parks Ball Bearing Machine Co....4th cover
Sherwood, W. L.... 4

Wrenches
Champion Tool Co....2nd cover

Wrenches (Knife Handle and Pipe)
Peck, Stow & Wilcox Co.... 32

IMPORTANT POINTS ABOUT PAINT AND VARNISH BRUSHES

A Set of Three Brushes and the Blacksmith and Wheelwright for One Year for $2.00.



Showing Brushes One-Half Actual Size.

Did it ever occur to you that there was much difference between a good paint or varnish brush and a poor one? Probably not. To most people a brush is just a brush. Yet an analysis shows that there is an almost measureless difference between a good brush and poor one.

For instance, a properly made Flowing Fitch brush is hermetically sealed, so as to keep the paint, or whatever may be used, from getting into the brush at the top and loosening the hairs. All such properly made brushes are solidly set in glue cement inside a leak-proof ferrule, and a whole row of neatly clinched nails are driven in at the end of the ferrule to give added security, and a guarantee that the hairs will not pull out.

A Fitch brush is *smooth, soft,* and *flowing,* and does not "mush" up or get flabby like a cheap brush, but holds its springiness. The trouble with cheap brushes is that the ferrule is nothing more than a single band of tin, open at the top, with a couple of nails jabbed through. When you use such a brush the cheap hair will pull out and scatter all over your work, because it is not held securely enough to stand the drag of the brush in painting or varnishing.

A brush may be washed with gasoline or kerosene oil, but to clean it thoroughly turpentine should be used. No brush used for painting should be used for varnishing.

We have recently made arrangements with one of the best manufacturers of these properly made brushes in New York to offer a set of Three in connection with a subscription to the BLACKSMITH AND WHEELWRIGHT for a year for an even $2.00. These brushes sell at retail for $1.40. It will be seen, therefore, that there is a substantial advantage in sending to us for the BLACKSMITH AND WHEELWRIGHT for a year, and for a set of these brushes.

Present subscribers can have their subscriptions extended for a year, and secure a set of brushes, on the same terms. These brushes are guaranteed in every respect, and though they cost more than cheap brushes would cost, they are far cheaper in the end, because of their lasting qualities and the good work that can be done with them. No man can afford to waste expensive paint and varnish on any vehicle by using a cheap and poorly constructed brush, such as is usually to be found wherever brushes are sold. The ordinary dealer in brushes himself as a rule has very little knowledge of the quality of the brushes he sells.

Remit by check or money order, and your name will be entered as a subscriber to the BLACKSMITH AND WHEELWRIGHT for a year, and a set of these brushes, which are just the right size and shape (see illustration, which is exactly one-half the actual size of the brushes), will be sent to you, postage prepaid.

Address all orders to the

M. T. RICHARDSON COMPANY, Publishers

71-73 MURRAY STREET, NEW YORK

Digitized by Google

THE ARMSTRONG MFG. COMPANY

BRIDGEPORT CONN., U.S.A. **NEW YORK OFFICE 248 CANAL STREET**

like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



"Makers of the Genuine ARMSTRONG Stocks and Dies."

ROBERGE'S GREAT BOOK

"THE FOOT OF THE HORSE"

By DAVID ROBERGE

The author of this book for many years enjoyed the entire confidence of Robert Bonner, who, in his day, owned many of the fastest trotters the world has ever seen. Bonner and Roberge worked together in shoeing the former's horses. Many believe that David Roberge was the ablest horseshoer this country has ever seen. His book is filled with plates and illustrations showing proper methods of shoeing horses for every kind of lameness. We have sold large numbers of these books and they have always given entire satisfaction. The work represents the life experience of its author. Sent to any address, postage prepaid, on receipt of price, **$5.00.** Address

M. T. RICHARDSON CO., Publishers, 71-73 Murray Street, New York.

Edwards Shears

For twenty-four years the **Two Leading Low Priced Shears** in the U. S., representing the **Greatest Value** for the **Least Money.**

No. 5, weighs 200 lbs., cuts 4x½ inch soft steel.
No. 10, weighs 430 lbs., cuts 4x¾ inch soft steel.

At their price you should have had one long ago. **Order one** from the first iron man that calls on you. **They All Sell Them.**

Write for descriptive circular and prices.

C. D. EDWARDS MFG. CO.
Albert Lea, Minn.



What is it worth to you to have a correct list of over 300,000 Business Firms in New England?
You may have just such a list for only $7.50
Write the Sampson & Murdock Co.
246 Summer St., Boston, Mass.
and ask for the New England Business Directory

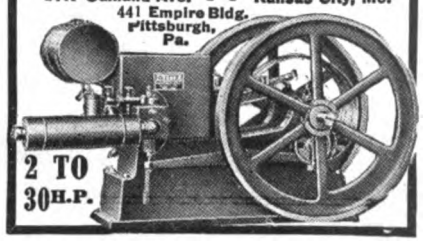
Get a WITTE BIG CUT IN ENGINE PRICES



No Cut In Quality

I have made a big smashing reduction in engine prices—for quick shipment—all styles—all sizes—2 to 30 H. P.—Kerosene or Gasoline—Stationary, Portable or Saw-rig—Buy on your own terms. I guarantee safe delivery, make **immediate shipment**—guarantee every part of your engine against defects as long as you use it—no "strings"—no time limit. Write me at once for prices on this special factory direct offer. Book Free.—Ed. H. Witte, Pres.

WITTE ENGINE WORKS
2441 Oakland Ave. - - Kansas City, Mo.
441 Empire Bldg. Pittsburgh, Pa.





The Bicknell SPARK PLUGS

Made in ½ in., ⅞ in. and Ford Special

Retail For

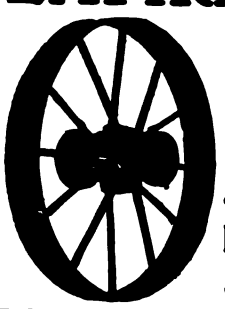
75c

Splendid Profit to the Dealer

Write for Circulars and Prices

BICKNELL MFG. & SUPPLY CO.
Janesville, Wisconsin

EMPIRE STEEL WHEELS



Plain or Grooved Tire To Fit Any Wagon.

FARM TRUCKS
All Standard Types

Write today for Proposition to Blacksmiths

EMPIRE MFG. CO.
P. O. B. 209
QUINCY, ILL.

NOW Cheaper Power

OTTAWA Kerosene Gasoline **ENGINES**

90-Day Trial
10-Year Guarantee

You get more power from a gallon of 12 cent Kerosene than from a gallon of 25 or 35 cent gasoline in any gasoline engine. No cranking, no batteries. Easy to start. Easy to operate. All Sizes and Styles, 1½ H-P. to 22 H-P.

Free Book Before you arrange to try any engine, read my latest and finest 3-color book. Tells all what you want to know about engines. Written so you can understand it. Write for low prices now.



OTTAWA MFG. CO.
1786 King St. Ottawa, Kans.

"NATIONAL" BLACKSMITHS' DRILL CHUCK

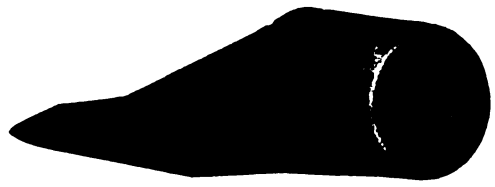


Made especially for Blacksmithing and Carriage Work. Positive, durable, strongest, self-cleaning, always works, quickest to change Drills, casts no shadow, will save its cost over other Chucks in saving of time. BUY THE BEST. Money refunded if not as represented. Ask your jobber for it, or send direct for prices and circular.
ONEIDA NATIONAL CHUCK CO., Oneida, N. Y.

95% *of the usual VALVE grinding is time and labor wasted,—a slow, costly and inaccurate method of truing motor valves.*

By our method ANYONE can have an accurate, concentric, perfect fitting valve job and in a fraction of the time.
You can please more customers, make more money, handle more work. Write for full information to
A. C. SAVIDGE, 615 N. Capitol Ave., Indianapolis, U. S. A.

Subscribe to THE BLACKSMITH AND WHEELWRIGHT. $1.00 per year.



The Mark of Quality

The Giant Grip Mark protects you and your business—because you can guarantee satisfaction and know that the manufacturer stands back of you.

Quality is forged into all

Giant Grip Shoes and Calks

When you receive Giant Grip Shoes and Calks, they have passed the critically sensitive fingers of the micrometer and set gauge—that is your protection.

Giant Grip Shoes and Calks have the strength of steel and the gripping qualities of a giant.

WRITE FOR LITERATURE, EQUIP WITH GIANT GRIP

GIANT GRIP HORSESHOE CO.

Established 1863

OSHKOSH - - - - - WISCONSIN

Also makers of Giant Grip Traction Chains for Motor Trucks

Digitized by Google

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

will be inserted under this head at 3 cents a word, including the address, for each insertion, payable in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York.

PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT

Patents

PATENTS FOR INVENTIONS.

H. W. T. JENNER, patent attorney and mechanical expert, 622 F Street, Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trade-marks registered.

For Sale

FOR SALE

Blacksmith and wagon shop. Stock, tools, machinery, house and two lots, or will sell half interest. Address SCHMIDT BROS., Waldorf, Minnesota.

FOR SALE

About 100 feet of two-inch internal wire carriage tire made by the Victor Tire & Rubber Co., will be sold cheap to close out. This is new stock. BECK-HAWKEYE TRUCK WKS., Cedar Rapids, Iowa.

FOR SALE

Country blacksmith's shop and store. Ten room house, acre of ground; unusual opportunity. Owner wishes to retire. F. W. LEWIS, Olyphant, Pa., R. F. D.

FOR SALE OR TO RENT

Fine old established blacksmith's and wheelwright shop; two-story building; 30 by 70 feet; location excellent; well equipped for business; large country trade. Owner has recently died. Address for price and further particulars, A. B. SWAB, St. Johnsville, N. Y.

FOR SALE.

Blacksmith business; lot 200x220, brick shop 35x80, three forges, one frame building 25x50, concrete floor. Extra fine location, plenty of work, good prices. Four churches, fine school, good water, fine farming country. Good man can get rich here. Reason for selling, old age, want to retire. Fine stand for a garage, plenty of that kind of work here if a man wants that kind of work. Too old to do it myself. Address R. B. LINK, Marvell, Arkansas, Box 155.

FOR SALE OR TRADE.

For engine lathe, combination wood worker with 12-inch pointer and one spindle shaper. Address C. E. LOVELAND, Andover, Ohio.

FOR SALE.

Wagon and blacksmith shop and implement business in a good live town; well equipped and doing a good business; only shop in town. For particulars address THEO. PATZNER, Hannibal, Wis.

FOR SALE.

A two-story blacksmith and wood working shop; two forges; plenty of work the year round for five to six men; corn mill; with this shop one four-room dwelling house; will sell shop and dwelling, or will sell stock and tools and rent the shop and house. For further information write to R. L. POSTON, Midville, Ga.

FOR SALE.

A rich Iowa community offers a live mechanic a general blacksmith business unequalled anywhere; work for three or four men the year round. Get particulars at once from T. SOLVBERG, Paullina, Ia.

FOR SALE.

Sweet Rubber Tiring Machine, complete with Brazing Torch, etc., $20.00; 6 H. P. Sandow Gasoline or Kerosene Engine; overhauled and place in first-class order; painted to look and is good as new; price $65.00. Address OTTO HASFURTER, Kent, Ind., Jefferson County.

For Sale

FOR SALE

Blacksmith shop, stock, tools, house and lot. Reason for selling, poor health. Address, H. BECHTLOFF, Terra Bella, Cal.

FOR SALE

14 x 6 Shepard lathe, hollow spindle, power cross feed, compound rest, all attachments and chuck fitted, $275.00. Milling machines, $150.00, $200.00 and $250.00. BICKNELL MFG. & SUPPLY CO., Janesville, Wis.

FOR SALE

Ford Felt Packings, per set 45c. Durabestos Brake Lining. Radiator Hose, 3 ft. lengths. Ford Hose Connections, per 100, $8 50. BICKNELL MFG. & SUPPLY CO., Janesville, Wis.

FOR SALE

The only shop in a good town with large territory. Electric power, good equipment, plenty work and top prices. For prices and particulars write or come and see L. J. MILLER, Germania, Iowa.

FOR SALE

Will sell or rent my shop and tools and stock, or will pay good wages to a good all around man. Will either give him the shop on percentage or will pay wages. Must be honest. Address E. J. PERRON, Ontonagon, Mich.

Wanted

WANTED

Would like to hear from one who has a blacksmith's stand for sale with from 10 to 20 acres or more of land. Address L. LUBER, Box 23, Prairie View, Illinois.

WANTED.

Good all round blacksmith; top wages for right man. Address T. SOLVBERG, Paullina, Ia.

Personal

PERSONAL.

Accidentally discovered nature's antidote, pleasant Florida root, easily, inexpensively overcomes any tobacco habit or indigestion; gladly send full particulars free. G. S. STOKES, Mohawk, Florida.

Miscellaneous

PRINTING FOR BLACKSMITHS.

Increase your business by handing out our printed business cards with "The Blacksmith's Ten Commandments" printed on back; 100 for $1.25. NEWS PRINTING CO., Stockton, Ill.

Tires

TIRES--DOUBLE TREAD

Guaranteed for good service. Big Strong—Extra Heavy. 30x3 Tire $5.50; 30x3½ $7.00; 33x4 $10.00; 34x4 $10.25; 36x4½ $13.00; 37x5 $14.00. Big saving on other sizes and Tubes also. Trade in your old Tires. 10% deposit required on C. O. D. orders. Send for list now! State size and bead of tire. Orders filled same day received.

M. LIBEN & CO., 205-RK, W. 48th St, N. Y. City

DOUBLE TREAD TIRES

We carry a full line of new and used tires and tubes. H. GINSBERG & SONS, 236 W. 48th Street, New York City.

Ideal Lawn Mower Grinder.

All weather signs seem to point toward a particularly long summer season. Within a few weeks the grass will begin to spring up and the blacksmith in addition to his regular spring work can take in quite a lot of profits in the way of sharpening lawn mower blades.

Heretofore, the smith did not care for the work simply because to sharpen a full set of blades required from one to two hours, for the work was done by hand. With the "Ideal" Lawn Mower Grinder, however, he can accomplish the work so the manufacturers say in fifteen minutes.

This machine is designed to sharpen the blades of the lawn mower without taking the lawn mower to pieces. The "Ideal" Lawn Mower Grinder is sold by the Root-Heath Manufacturing Co., 137-149 Bell Street, Plymouth, Ohio, and can be had to operate by power or by hand. The bearings are of the ball type. In addition to the regular lawn mower grinding the machine may be used for sharpening skates during the winter season and so be kept at work all year round.

Business Directory.

The business man who is up to date, is always careful to keep his name before his customers and always looking for new people to whom he may sell his products.

The Sampson & Murdock Company of Boston, Mass., are selling, at an extremely low price, a business directory having over 300,000 names of business firms in New Engand from which the reader can compile extremely large mailing lists and so get his goods before the interested buyers.

American Horse Shoe.

The attention of our readers is called to the line of horse shoes and toe calks manufactured by the American Horse Shoe Company of Phillipsburg, N. J. This company have been engaged in the manufacture of horse and mule shoes since 1894, and they claim to manufacture a shoe in which quality is considered a feature. Their line is extremely large and their catalog interesting. Readers should write the concern asking for their latest catalog.

Bearing Catalog.

In repairing farming machinery as well as automobiles, the workman must possess a knowledge of all kinds of ball and roller bearings. He is frequently called upon to replace such units and should he know where to obtain them at the lowest prices his profits are increased.

Our readers should write the Gwilliam Company, 253 West 58th Street, New York City, for their latest catalog of ball and roller bearings. The line of bearings manufactured by this company is exceptionally large and complete. They manufacture annular and thrust bearings of a number of types as well as roller bearings, plain, taper and thrust.

The bearings may be obtained for high grade work or one may purchase a cheaper pressed steel bearing which can be used in many cases and they cost much less than the higher grade.

Racing Plates.

The blacksmith who is called upon to attend the feet of trotters, pacers or runners should know about the line of hand made racing plates manufactured by the United States Horse Shoe Company, Erie, Pa.

This company manufactures the "Brock Pattern" plates in four weights in sizes from zero to number four inclusive. These plates are designed along scientific lines and are the result of years of study and practice in shoeing horses. This company also manufactures a particularly large line of horse and mule shoes. Our readers should ask for catalog No. 16 in writing for information.

Bull Dog Calks.

The Phoenix Horse Shoe Company of Chicago, Illinois, offer a particularly attractive proposition in the shape of "Bull Dog Calks" which are easy to drive into the shoe and are said to remain where they are put. The calks are made of the best material and by a company which is known throughout the country and which has a reputation for honesty and satisfactory products.

Motor Topping.

Many of our readers in relating their experience for the past few years have mentioned the fact that they have been able to earn quite a good deal of money on automobile work, particularly in replacing old and worn tops.

Blacksmithing itself is a fairly hard job whereas the refitting of an automobile or carriage top is fairly easy. At the same time the smith can earn as much or if not more money on the latter job.

Every reader should investigate the fabric manufactured by the L. C. Chase & Company of Boston, Mass., and write for samples and full particulars regarding their Drednaut Motor Topping.

Depew Disc Roller and Cutter.

Practically every farmer is a good customer for discs for harrows, and these discs require frequently cutting or sharpening. The blacksmith should be able to pick up a fairly big business in this line during the spring months as well as the Fall season where land is being opened. He should provide himself with a disc roller and cutter.

Such a machine can be obtained from the Depew Sales Agency, Trenton, Nebraska, at a very low cost. This machine is mounted upon a heavy base and designed to be connected to a power drive. The disc holder is adjustable to any size or shape of disc. It is said to be practically noiseless, very durable and simple. To operate it, requires but a minimum amount of power. Our friends should write for prices and full information. We understand that if desired, a machine may be had on trial.

Bicknell Spark Plugs.

Every week finds more blacksmiths in the accessory business. A blacksmith finds that he can make easy profits and a quick turn-over of money if he is located on a well-travelled road by selling spark plugs, tires, tubes and other accessories.

Spark plugs offer an especially big profit to the dealer. They sell very readily because the average motorist does not carry an extra supply in his machine. When he needs a plug he needs it badly, for his machine will not run satisfactorily without it.

Interested readers should write the Bicknell Mfg. & Supply Co., Janesville, Wisconsin, for full details concerning the spark plugs which they manufacture. Their plugs are said to be especially well made from the best of materials. They are made in practically all of the standard sizes and find a ready sale.

THE SCREW-CUTTING LATHE

How to select, set up, adjust and operate

By JAMES F. HOBART, M. E.

THIS book is a concise and exhaustive treatise on everything pertaining to the SCREW-CUTTING LATHE, including costs, erection, operation and adaptability. It is written by one who thoroughly understands his subject in all its details, and is so copiously illustrated that everything in it will be readily understood.

It will be found invaluable to those desiring to know just how a Screw-Cutting Lathe should be run.

There are ***92 illustrations,*** and the book is substantially bound in cloth. ***Price, $2.00.*** A copy will be sent postage prepaid to any address on receipt of price.

M. T. RICHARDSON CO.

PUBLISHERS

71-73 Murray St., New York

Digitized by Google

THE OVER-CAUTIOUS MAN SLYLY TAKES A SANDWICH TO THE BANQUET

THE ROCHESTER WEST TIRE SETTER

You don't even have to be

CAUTIOUS

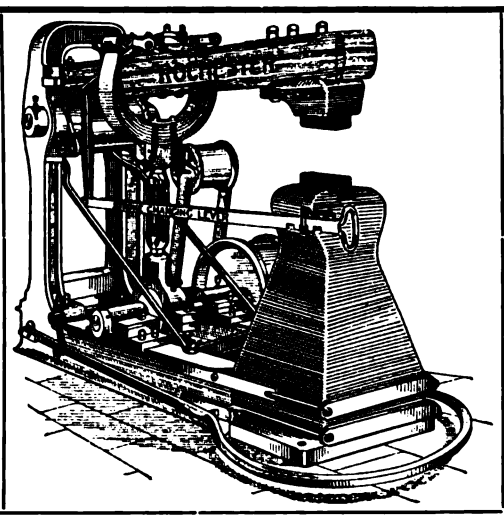
in ordering a

ROCHESTER

Helve Hammer

It is a well-built, substantial tool for welding and general forging. MADE IN SIX SIZES, 25 lb. to 100 lb. Heads and two styles of frame.

Send for our HELVE HAMMER BOOKLET, and give us information regarding character of your work.



No time like the present to say "HOW DO YOU DO

THE ROCHESTER HELVE HAMMER

SEND A CARD TO THIS ADDRESS FOR OUR CATALOGUE AND PRICES

WEST TIRE SETTER CO.
ROCHESTER, NEW YORK.



Free 448 PAGES OF BARGAINS

POST PAID

WE WANT TO SEND YOU THIS 448 PAGE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

Tells how you can work up a profitable auto supply and repair business.

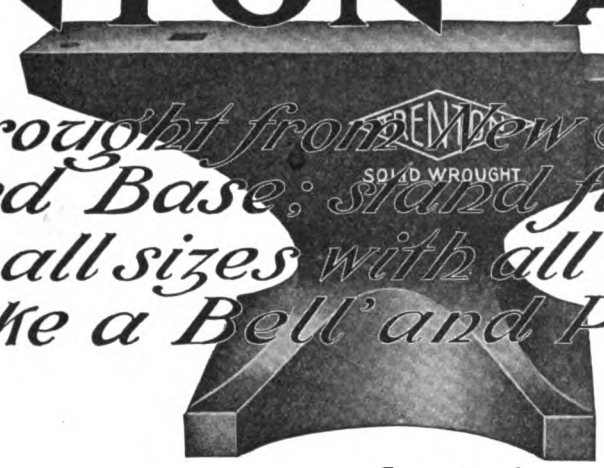
Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories
1117 W. 11th Street, Cleveland, Ohio, U. S. A.

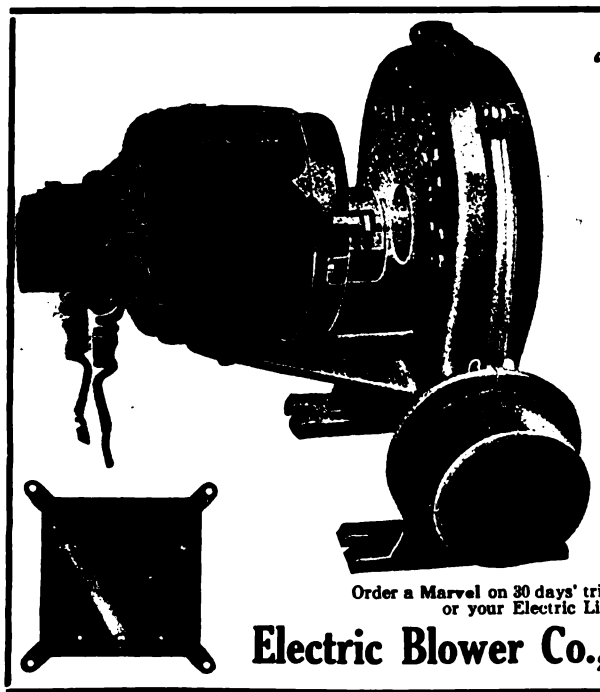
TRENTON ANVILS



Solid Wrought from New Steel; not cast.
Recessed Base; stand firmly on the block
Made in all sizes with all desirable Clips.
'Ring like a Bell' and Perfect in Shape.

BOKER CUTLERY & HARDWARE CO., Inc., Sole Sales Agents,
101-103 Duane Street, New York City

THE COLUMBUS FORGE & IRON CO. COLUMBUS, O.



"One Fire" Marvel

A. C. or D. C.
or
UNIVERSAL MOTORS

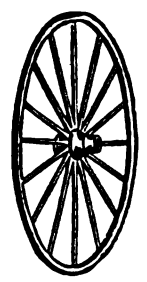
Extra Large Ring Oil Bearings

Case Hardened Armature Shaft

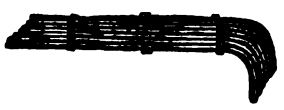
$38.00 Net

Order a Marvel on 30 days' trial through your Dealer, or your Electric Light Company

Electric Blower Co., 352 Atlantic Avenue BOSTON, MASS.



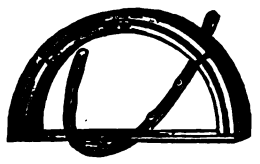
SARVEN WHEELS
$11.90 Per Set and Up



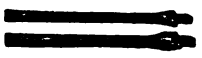
FINISHED BUGGY SHAFTS
$10.00 Per Bundle of 6 Pairs



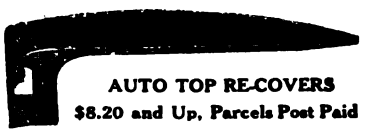
OAK WAGON SPOKES
$3.65 Per Set and Up.



PLAIN HICKORY RIMS
$2.15 Per Set and Up



REPAIR GRADE SARVEN SPOKES
$2.50 Per 100



AUTO TOP RE-COVERS
$8.20 and Up, Parcels Post Paid

Auto Tires
Non Skid
30 x 3½ $14 75
Other Sizes in proportion

Wheel Top & Hardware Co.

Dep't. W2 (Get our Catalogue) **Cincinnati, O.**

940 Pages instead of 824 — NINTH EDITION — 3362 Illustrations instead of 2000

$4.46 prepaid **DYKE'S AUTO ENCYCLOPEDIA** $4.46 prepaid

Entirely re-written, hundreds of illustrations and many new subjects added. Practically a new book. A non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 50 Instructions—Simplified and Practical.

3362 Illustrations—the kind you understand at a glance.

2 Supplements, part printed in two colors, treating on the construction, operation, repairing and adjusting of the FORD and PACKARD—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.

778 illustrations and 279 pages on Electric Ignition, Electric Starters and Generators, etc.

81 pages and 79 illustrations on the Delco system alone.

60 pages and 254 illustrations on Adjustments, Tests, etc., of leading Electric Systems.

164 pages and 1189 illustrations on Repairing.

Oxy-Acetylene welding. Axle, Differential and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.

27 pages and 180 illustrations on Tires and Tire Repairing.

44 pages and 119 illustrations on Carburetion.

89 pages and 291 illustrations on Engines and Parts.

16 pages on Digest of Troubles.

6000 lines to the Index. This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. Index begins on colored paper, easy to refer to.

Dictionary is also included, which gives the meaning of motoring terms.

Inserts: There are five—printed in colors. New features you never before saw or heard of in one of the inserts.

Additions to the Ninth Edition:

TRUCKS, TRACTORS, MOTORCYCLES, AIRPLANES and LIBERTY ENGINE

HOW TO BECOME AN EXPERT AUTOMOBILE MECHANICIAN

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion subject so thoroughly, you can adjust any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

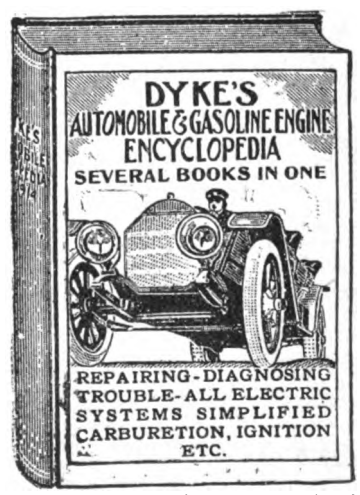
You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical Automobile book in America. Price $4.46, prepaid.

Address all orders to

THE BLACKSMITH & WHEELWRIGHT
73 MURRAY STREET NEW YORK

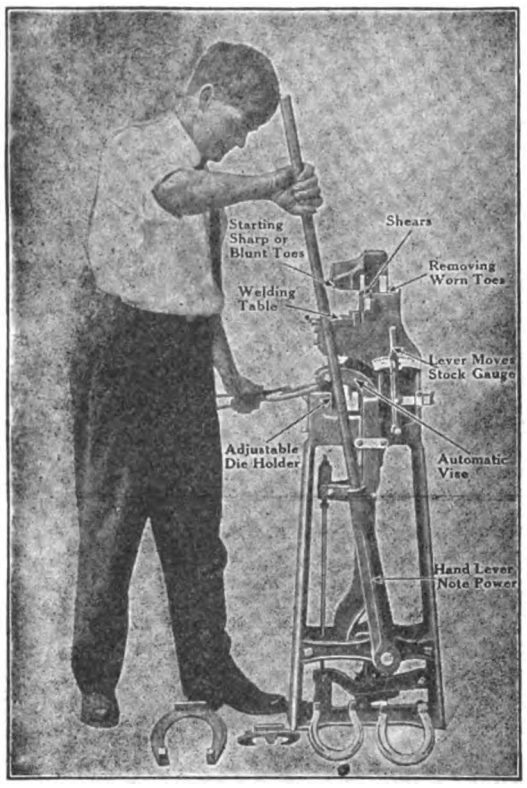


It's worth ten times its cost if only placed on the shelf and used as a reference.

Digitized by Google

1919 MODEL
THE L. S. P. CALKING MACHINE

The Greatest Time and Labor Saving Machine On Earth



1919 MODEL—Fully covered with Patents

OUR 1919 Model is the same as our 1918. We agree with the users and so would you, that it cannot be improved.

Do not mistake this for a machine which makes toe calks or a foot vise. This machine is for turning heel calks, both Blunt and Sharp, sticking and welding toe calks, clipping and trimming ends of shoes. IT CALKS SHOES, doing the work just the same as you do by hand with the hammer, only it is done much better and easier, and in a fraction of the time.

In turning heels, you can turn up just as much stock as you wish, upset or stoveup to make as heavy as you like and square up the calks without use of hammer. There is no losing of toes when you weld on the L. S. P.

It is a strong, handsome, well made machine and will last, as you might say, a life time, fully warranted for one year. It is in use in the best shops in the United States, users claiming more for it than we do.

Write at once for full information and prices.

L. S. P. CALKING MACHINE CO.

P. O. Box 225 WYALUSING, PA., U. S. A.

NATIONAL MACHINE CO., Brighton, Ontario, Canada

How Harvey Helps Dealers

When you become a seller of the famous Harvey Springs, you gain the earnest support of a great nation-wide selling organization.

No matter in what part of the country you are located, there is a Harvey jobber near at hand with a good stock of Harvey Springs, who is ready to supply you on a moment's notice with a genuine Harvey Spring for *any make or model* of car.

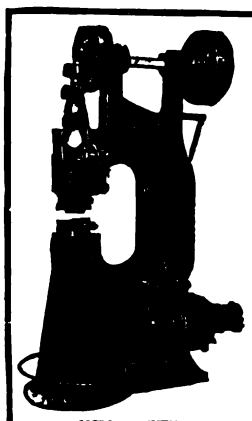
For your assistance, too, Harvey has compiled a helpful Auto Spring Book, which gives weights, sizes, measurements, prices, and other valuable information regarding auto springs for all makes and models of cars. You may have this book FREE, by simply writing to

Harvey Spring & Forging Co.
1083 17th Street
Racine, Wis.

Harvey RACINE

Easy Riding Guaranteed

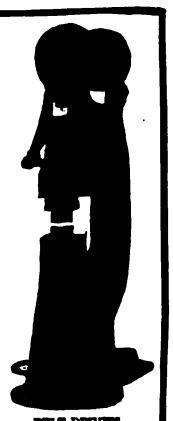
BOLTLESS AUTOMOBILE SPRINGS


MOTOR DRIVEN

Little Giant Power Hammers

25, 50, 100, 250 and 500 lb. Models.

BELT OR MOTOR DRIVEN.


BELT DRIVEN

The Boys in Khaki and Sailor Blue Will Be the Farmers of the Future.

Their war equipment has been the most modern, and when they return home the old out-of-date methods will no longer satisfy them.

They will insist on their farm equipment being kept in first class repair and they will take their work to the blacksmith who has up-to-date shop equipment.

No blacksmith shop is modern unless it has a Little Giant Power Hammer. Either of our models will pay for itself in a few months on our easy payment terms, and continue to repay for itself for many years after.

The first Little Giant Power Hammer made 26 years ago and every one since sold,—some 8,000 in all,—are still in use. There is no wear-out to them.

Average annual repair sales on all Little Giant Power Hammers in use, large and small, from oldest to latest, is 48¢ each or less than 2/5 of 1% of original cost to user.

Any Belt Driven Little Giant Power Hammer can be quickly changed to a Motor Driven Outfit. Ask your power plant superintendent for current, voltage, phase and cycles of motor required. Send this information to us and we will quote prices.

Little Giant Power Hammers are guaranteed FOREVER against defective material and workmanship, and are shipped on 30 days' trial.

Write Your Jobber, or Direct To Us

Little Giant Company, 103 Rock Street,
Established 1876. MANKATO, MINN., U. S. A.

PEXTO
BLACKSMITHS' TOOLS
Built to Bite

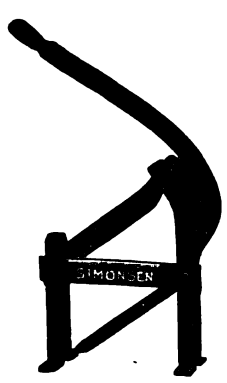
Here's a real Nipper—PEXTO No. 22, with wide, powerful jaws and clean-cutting edges. With heavy shoulders and a husky rivet. A Nipper forged from finest steel by America's century-old tool maker.

You'll find Pexto Quality in all the other Pexto Blacksmiths' and Farriers' Tools. Ask your dealer.

The Peck, Stow & Wilcox Co.
Mfrs. Mechanics' Hand Tools, Tinsmiths' and Sheet Metal Workers' Tools and Machines, Builders' and General Hardware.
Southington, Conn. Cleveland, Ohio
Address correspondence to 209 W. Center St., Southington, Conn.

100% American For 100 Years
(Founded 1819)

THE SIMONSEN HOT TRIMMING SHEAR SAVES ALL THE WORK AND NEARLY ALL THE TIME.



Hot Trimming Shear.

Think of cutting out plow points, or trimming cultivator shovels, etc., without a sledge or helper, and doing a neater job too!

The SIMONSEN HOT TRIMMER is designed especially for hot cutting and in actual saving will pay for itself several times over the first season.

Is made entirely of wrought material and in two sizes. No. 1 cuts hot plow steel 5/16x6. No. 2 cuts hot plow steel 5/16x8. Hold the work with one hand in plain sight and operate shear with the other hand.

Sold by leading jobbers. Write us for free circular and testimonials, mentioning jobber's name when writing.

SIMONSEN IRON WORKS, SIOUX RAPIDS, IOWA

Digitized by Google

SPRING TRADE SPECIAL

THE BLACKSMITH & WHEELWRIGHT

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U. S. Patent Office.

Entered as Second-class Matter March 4, 1880, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Published Monthly.

Vol. LXXIX. No. 4 NEW YORK, APRIL, 1919 TERMS: { One Dollar a Year. Foreign, $1.50. (6s. 3d.)

When You Think of a Horse Nail

let it be "The Capewell." From the view point of the buyer and from that of the man who actually wields the hammer Capewell nails are the *best.*

Most economical and easiest and safest to drive.



Year in and year out Capewell nails meet the requirements of horseshoers in all parts of the United States, Mexico, Canada, South America and in many foreign lands.

Not the cheapest nail regardless of quality but the world's best at a fair price.

The Capewell Horse Nail Co.
Hartford, Conn., U. S. A.

Leading Horse Nail Makers of the World



CHASE
DREDNAUT
Motor Topping

"Defies Time and the Elements"

Write for Particulars — L. C. CHASE & CO., BOSTON — Write for Samples
NEW YORK DETROIT SAN FRANCISCO CHICAGO

SEND US YOUR NAME
and Address and you'll get information worth while regarding this splendid Shear and Punch.



THE MARVEL
A Double Lever Machine.
One man does all the machine is capable of and he faces his work all the time.

ARMSTRONG-BLUM MFG. CO.
340 N. FRANCISCO AVE., CHICAGO, ILL.



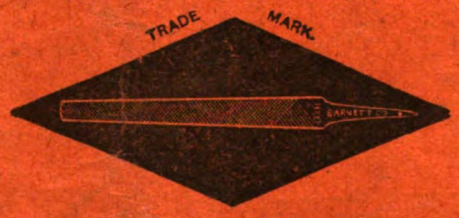
HORSESHOES
In Stock
Ask for Stock List



ROWE CALKS
Screw and Drive
ROWE CALK & CHAIN CO.
Plantsville, Conn.

THE TEETH IN
BLACK DIAMOND RASPS
ARE MINGLED
So as to Cut Clean and Free and Leave no Furrows in the Work

Twelve Medals of Award by Jurors



At International Expositions

G. & H. BARNETT COMPANY
Black Diamond File Works, PHILADELPHIA, PA.
Owned and Operated by NICHOLSON FILE CO.
Copy of Catalog sent Free to any interested file users upon application.

EMPIRE STEEL WHEELS



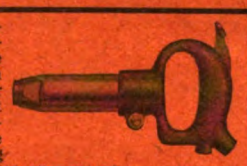
Plain or Grooved Tire
To Fit Any Wagon.

FARM TRUCKS
All Standard Types

Write today for Proposition to Blacksmiths

EMPIRE MFG. CO.
P. O. B. 209
QUINCY, ILL.

The HELWIG Pneumatic Hammer develops remarkable speed and power with notable economy in air consumption. A great Labor-saver on Garage work. We have also other interesting Labor-savers. Circular on request.



HELWIG MFG. CO., ST. PAUL, MINN.



SUREGRIP CALKS
American Calk Co.
DETROIT, - - MICH.

AETNA STEEL TOE CALKS
Made by THE AETNA NUT CO., Southington, Conn.
BLACK HORSE BRAND

BEST SHAPE
BEST SPUR
TO DRIVE
BEST STEEL



TOE AND HEEL CALKS

SOLD BY ALL DEALERS

Stokes Bros.' Improved Horse Rasps

Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A

STEEL STAMPS
BURNING BRANDS
RUBBER STAMPS
STENCILS
GEO. M. NESS, JR.
61 FULTON ST. NEW YORK
Send for price list.

SUBSCRIBE FOR
The Blacksmith and Wheelwright

Digitized by Google

The Better Your Equipment The Bigger Your Profits

Buy CANEDY-OTTO
AND INCREASE YOUR INCOME

Once Tried, Always Used : There's a Reason—Quality

OVER 200 DIFFERENT STYLES

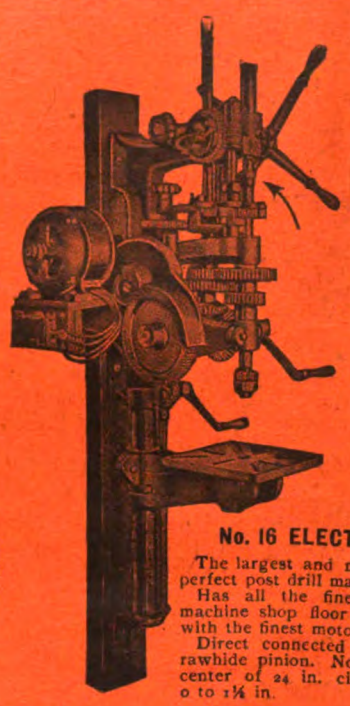
SEND FOR CATALOGUE No. 12



No. 19 DRILL

A low-priced combined hand and power self-feed drill.

Drills to center of 16½ in. circle.



No. 16 ELECTRIC DRILL

The largest and most mechanically perfect post drill manufactured.

Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.

Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1¼ in.



No. 100 ROYAL FORGE

The most popular forge ever made.
Fan, 12 in. Hearth, 31½x45½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x50 in. Blower, 12 in.



Blower, 12"
Wt., 135 lbs
Height, 47"

ROYAL BLOWER

(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.

Fire pot is 8xy in. inside.



No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.

All machines are tested before leaving the factory, and guaranteed in every respect.

Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS



No. 1 1/2 SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



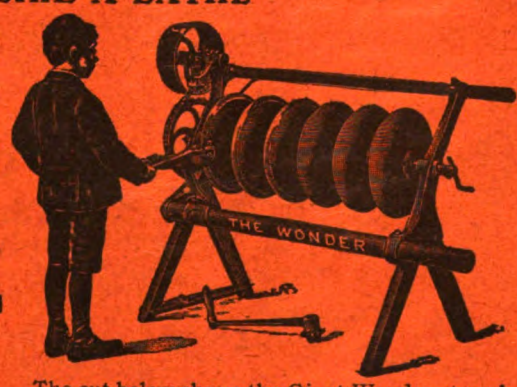
No. 8 ELECTRIC BLOWER

The best outfit money can buy.

THE WONDER DISC SHARPENERS

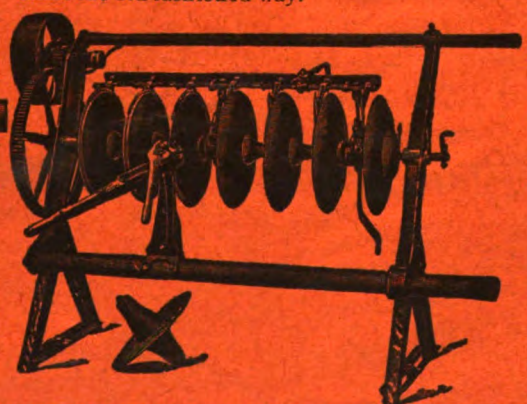
BUILT LIKE A LATHE

This cut shows the Little Wonder at work on a whole section of discs. This machine is especially adapted for sharpening disc harrows. While the Little Wonder is being successfully used to sharpen plow discs of 22 inches or less, we would recommend the Giant Wonder where disc plows are used extensively.





The cut below shows the Giant Wonder at work on a seven-disc section without removing discs, thereby saving one-half the time and labor, as in many cases you can sharpen a whole section of discs while your competitor is taking his off the shaft the old fashioned way.



The above cut shows the Giant Wonder at work on disc plows. Will sharpen any size from 12 to 32 inches in diameter.

FOR SALE BY LEADING JOBBERS IN UNITED STATES, CANADA, MEXICO, SPAIN, AUSTRALIA, ARGENTINE REPUBLIC, SOUTH AFRICA AND FIJI ISLANDS.

A. E. DURNER, Manufacturer EVANSVILLE, WIS., and BRANDON, MAN., CAN.

ADDRESS ALL INQUIRIES TO

A. E. DURNER; Head Office, Evansville, Wis.

Both size machines are equipped regular, long enough to take in 8 disc section. Special length furnished for 10 and 12 disc section at small cost.

I hold the original patent on this style sharpener. I could build them cheaper, but I won't. I would build them better, but I can't. Write for testimonials from your neighbor. Did you ever buy a cheap machine that gave satisfaction?

THINK ABOUT IT, THEN BUY A WONDER.

INDIAN CHIEF
Black-smiths' VISES Horse-shoers'



BOKER CUTLERY & HARDWARE CO., Inc.
Sole Sales Agents
101-103 Duane Street, New York City

Solid Box – Solid steel drop forged jaws faced with crucible tool steel. Improved screw of one piece of forged steel. Built right throughout.

THE COLUMBUS FORGE & IRON CO., COLUMBUS, OHIO.

Digitized by Google

"F-S" PAINTS



"F-S" Products Stand the Most Rigid Inspection.

Your good work will stand even higher at inspection when you use "F-S" Superfine Coach Colors on your carriage, coach and automobile bodies. The best of material is used as in all "F-S" products—ground in gold-size Japan.

FELTON, SIBLEY & CO., Inc.

Manufacturers of Colors, Paints, Varnishes since 1863

136-140 North Fourth Street, Philadelphia

(147)

Harvey RACINE SPRINGS

Boltless—consequently greater strength where strength is most needed.

Accurately Heat-Treated—perfectly tempered by the superior Patented Harvey Process.

Accurately "Fitted"—There is a specially designed Harvey for every make and model of automobile.

Thoroughly Tested — Every Harvey Spring must measure up to E. J. Harvey's rigid requirements.

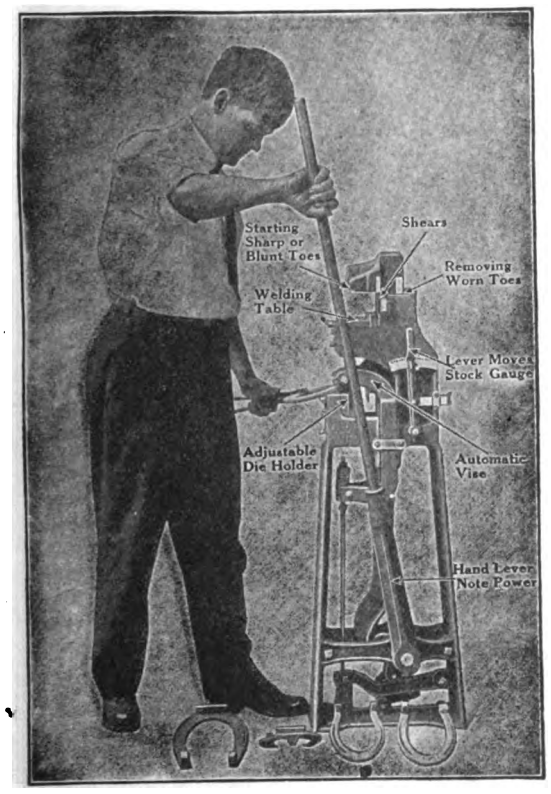
—Therefore Easy Riding and Guaranteed

Dealers—*Write for the free Harvey Spring Book containing specifications for more than 900 kinds of springs and other valuable information. Address:*

Harvey Spring & Forging Co.
1084 Seventeenth Street, Racine, Wisconsin

1919 MODEL
THE L. S. P. CALKING MACHINE

The Greatest Time and Labor Saving Machine On Earth



1919 MODEL—Fully covered with Patents

OUR 1919 Model is the same as our 1918. We agree with the users and so would you, that it cannot be improved.

Do not mistake this for a machine which makes toe calks or a foot vise. This machine is for turning heel calks, both Blunt and Sharp, sticking and welding toe calks, clipping and trimming ends of shoes. IT CALKS SHOES, doing the work just the same as you do by hand with the hammer, only it is done much better and easier, and in a fraction of the time.

In turning heels, you can turn up just as much stock as you wish, upset or stoveup to make as heavy as you like and square up the calks without use of hammer. There is no losing of toes when you weld on the L. S. P.

It is a strong, handsome, well made machine and will last, as you might say, a life time, fully warranted for one year. It is in use in the best shops in the United States, users claiming more for it than we do.

Write at once for full information and prices.

L. S. P. CALKING MACHINE CO.
P. O. Box 225 WYALUSING, PA., U. S. A.
NATIONAL MACHINE CO., Brighton, Ontario, Canada

"E-Z" WELDING COMPOUND

is the best **BECAUSE**

FOR ALL GRADES OF STEEL — E-Z — WELDING COMPOUND
PAT. MAY 27, 1902

It works Equally good on all Kinds of steel.

It welds at **lower heat** than any other.

It **sticks** to metal at a **very low** heat.

It leaves **no scale.**

USE IT ONCE AND YOU WILL ALWAYS WANT IT

Crescent Welding Compound

MAKES SMOOTHER WELDS THAN ANY OTHER

It is fine for plow work or where parts are fastened together before welding, or for making spiit welds, finishing heats, or for welding under dies, etc., etc.

CRESCENT WELDING COMPOUND TRADE MARK

It insures smooth finish and perfect welds on Toe Calks.

"Money back" from any jobber if "E-Z" or Crescent does not give perfect results.

We will send samples free of charge.

MADE ONLY BY

Anti-Borax Compound Co.
FT. WAYNE, IND.

Digitized by Google



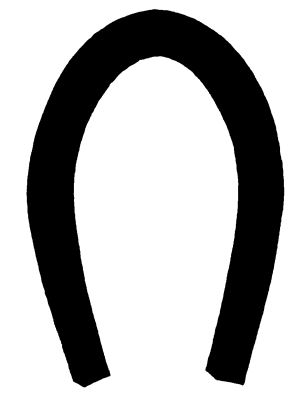
DID YOU RECEIVE OUR CATALOGUE ?

THE importance of having our catalogue handy cannot be over-estimated. It's a valuable little reference book. You can't afford to take a back seat for anybody---you want your customers to look up to you as an authority. The very moment that your name appears on our books, you have that authority through the national prestige that belongs to

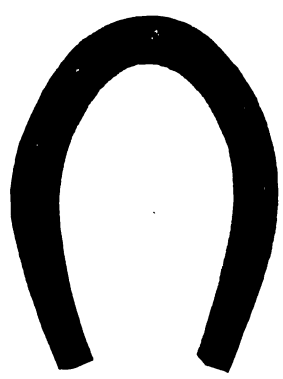
AMERICAN HORSE AND MULE SHOES

In the development and design of our models, special attention has been given to the distribution of the metal to insure perfect balance. The creases are clean cut and uniform and each pattern is perfectly adapted to meet the conditions for which it was especially designed.

We believe that better shoes than A brand cannot be made.



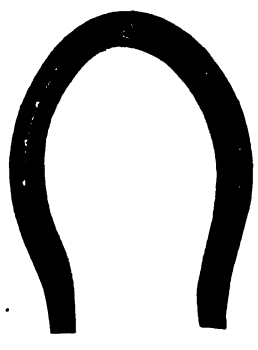
Extra Light Front



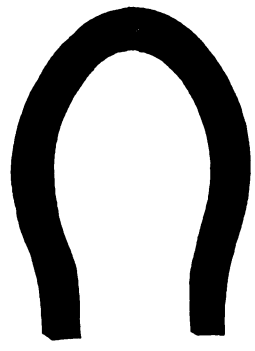
Light Front



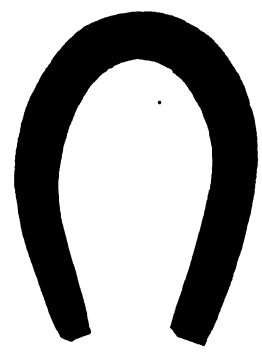
Medium Front



Extra Light Hind



Light Hind



Medium Hind

Be Sure to Send for the Catalogue

American Horse Shoe Company

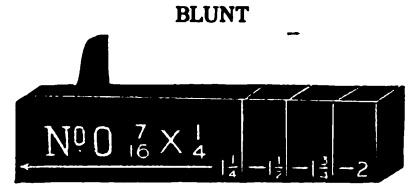
Rolling Mills, Works and Offices

PHILLIPSBURG, - NEW JERSEY

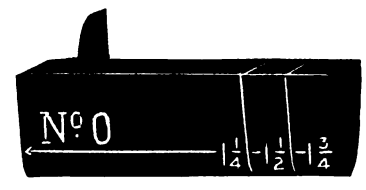
Trade Mark stamped on each shoe. Red A on each keg and box.

American Toe and Heel Calks

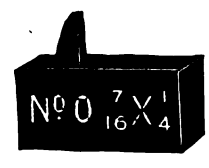
BLUNT



COUNTRY PATTERN
Half Sharp



BLUNT



Here is an example of what resource, initiative and capacity can accomplish in the manufacture of Calks.

American Toe and Heel Calks will stand the keenest competition and reveal the fact that they are MORE than "Just a little better." We want you to prove it—send for the catalogue.

Digitized by Google

THE FAMOUS CHAMPION BLACKSMITH TOOLS

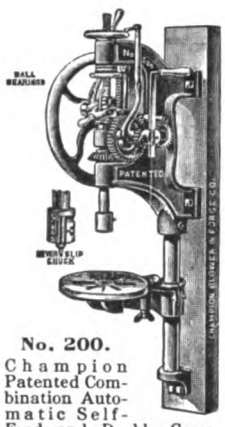
CHAMPION BLACKSMITH TOOLS HELPED TO WIN THE WAR



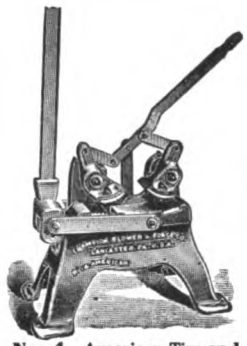


No. 400. Crank turns either way.

FAMOUS 400



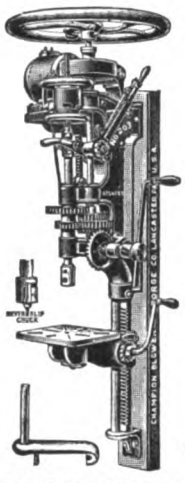
No. 200. Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



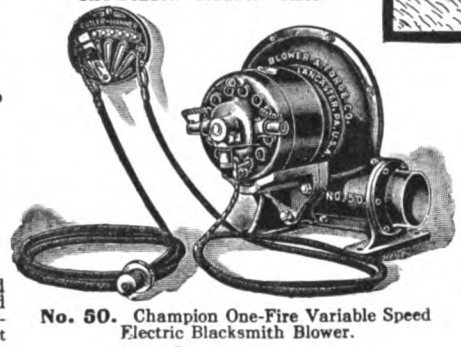
No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



The Champion "Columbian" Tire Bender. Made in 3 sizes.



No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.



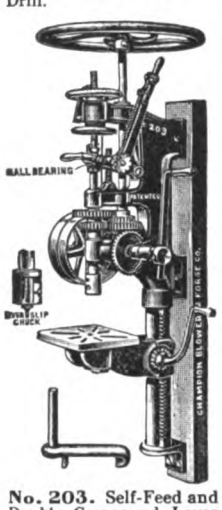
No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower.



No. 408. Steel Blacksmith's Forge.



No. 433. Cast Iron Blacksmith's Forge



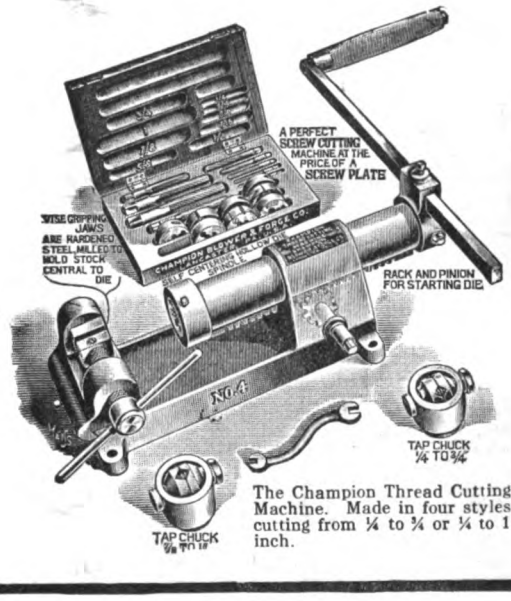
No. 203. Self-Feed and Double Compound Lever Feed Drill.



Hercules Patented Power Hammer. Weight of ram, 65 pounds.

Don't Fail to Get Our 1918 Catalog

Before purchasing a Hand Blower Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



The Champion Thread Cutting Machine. Made in four styles cutting from ¼ to ¾ or ¼ to 1 inch.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

Digitized by Google

UNIFORMITY

SHELDON AXLES AND SPRINGS

HAVE LONG BEEN

INTERNATIONALLY FAMOUS

For Their Superiority In

DESIGN, MATERIALS and WORKMANSHIP

REASON:

Sheldon Took Guesswork Out of Axle and Spring Manufacturing

which means

UNIFORMITY OF PRODUCT

Sheldon Axle & Spring Co., Wilkes-Barre, Pa.

PHOENIX HORSE SHOES

Constant Demand is the Best Proof of Their Superiority.

Practical to the Highest Degree. **Made of Unexcelled Material.**

BULL DOG CALKS

Hold Firmly to the Shoe. Never Jump Out When Set. Easy to Drive in Shoe.
Perfect in Every Detail.

FOR SALE BY ALL DEALERS. WRITE FOR SAMPLES.

WE ARE THE LARGEST HORSE SHOE MANUFACTURERS IN THE WORLD.



PHOENIX
Horse Shoe Company
CHICAGO, ILLINOIS
ROLLING MILLS and FACTORIES JOLIET, ILLINOIS / POUGHKEEPSIE, N. Y.



Digitized by Google

FIND OUT!

for yourself—to stop and watch the hands go round on the face of the clock of progress is losing time—it will put you in the class with "the man who stood still"—you cannot afford to lie at anchor in the stream of trade and you can reckon that you're not going ahead one inch unless you make it your business to find out just where you stand on welding and cutting apparatus.

Brooks Welding and Cutting Apparatus

Stands on the Solidity of Truth as the Most Important Part of the Tool Equipment in All Metal Working Shops for Both Repairing and Manufacturing

In no other product is a more thorough-going sincerity of purpose seen—the kind that makes for impetus in your business. Most welding and cutting improvements originated in Brooks Equipment—also the special machinery necessary to secure absolute uniformity—the every-time-correct expression of what good welding and cutting equipment ought to be.

The Brooks flash-back safety valve eliminates all chances of bursting the dry pipe. This is the greatest safety device ever put on an Acetylene Generator. It opens and releases the force the same as the exhaust valve on a gas engine.

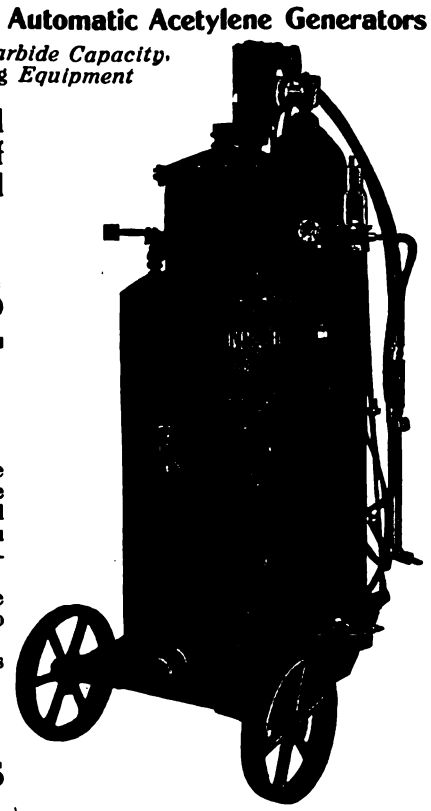
The Brooks Machine Co. manufactures welding and cutting torches, automatic acetylene pressure generators, both portable and stationary. This means complete equipment to take care of any and all kinds of welding and cutting. If you can tell us the nature and quality of your work, we can advise you fully as to the size and kind of equipment to meet your requirements best.

All products manufactured by the Brooks Machine Co. are guaranteed for one year against defective workmanship and to be made of first-class material and to do all we claim for them.

We are pretty sure this is the right way to make customers and we are dead sure it is the right way to hold them.

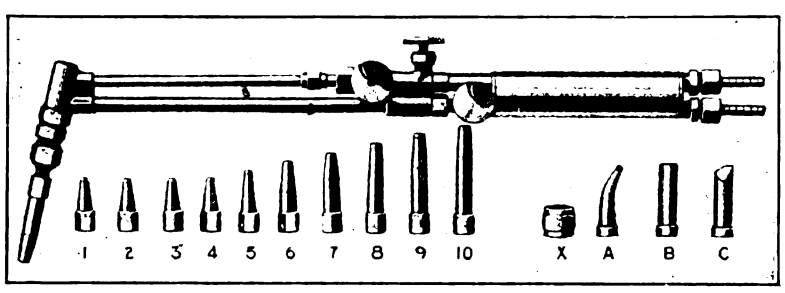
Brooks Portable Automatic Acetylene Generators

25 and 50 lb. Carbide Capacity, with Welding Equipment



WRITE TO US TODAY

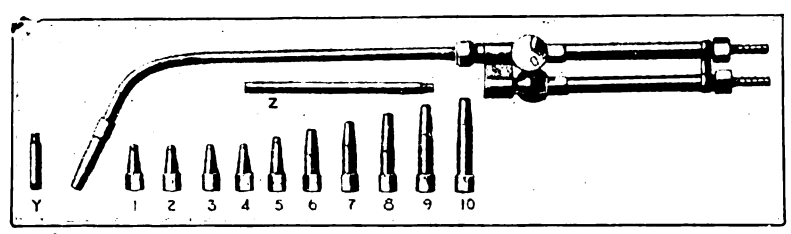
The Brooks Machine Co., 219-229 W. Lewis St , Wichita, Kansas



Brooks Universal Welding and Cutting Torch

10 Welding and 3 Cutting Tips.

This Torch is made in lengths of 20 inches over all. With it, either welding or cutting can be done by simply changing tips. This Torch is adapted to all classes of welding and cutting of metals within range of the Oxy-Acetylene welding or cutting process.



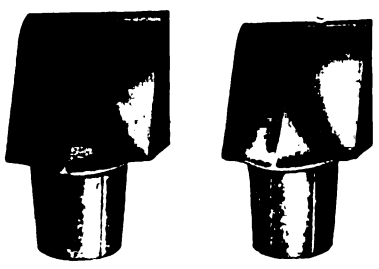
Brooks Commercial Welding Torch

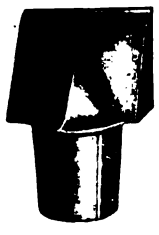
8 Welding Tips and 1 Extra Extension. Larger Tips Furnished on Request.

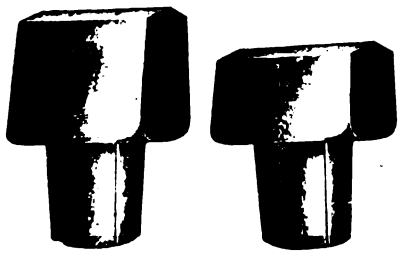
The above cut shows Torch made up to 21 inches over all. It can be lengthened or shortened, according to the requirements of the work, by changing blow pipes. One extra blow pipe is furnished regularly which makes the torch 28 inches long. On request, pipes of any length may be furnished.

By taking off the tip elbow head and screwing the welding tip on direct to the short extension, it can be converted into a straight torch, which is often convenient.

The Brooks Commercial Torch will handle all welding work within the limit of the process. This Torch is especially well adapted for pipe line, boiler and machine shop welding.







Safe—Economical Footing

Safe—Because there's just the right calk for every purpose. They don't twist in the shoe, break off or fall out.
Always a sure grip on the ground.

Economical—They're as hard and tough as science can make them. They fit absolutely tight. Wear longest and don't drop out on the street.
No waste.

DIAMOND Calks

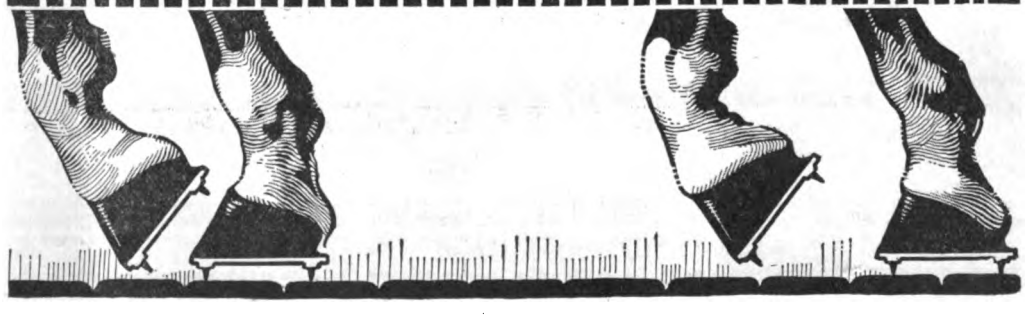
are the best calks in design, fit and wear and for every "footing" need.

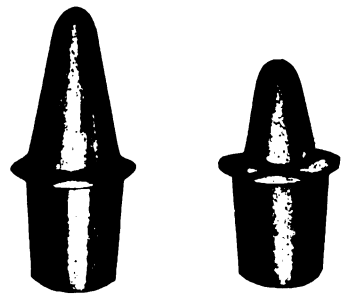
Sold Only Through Horseshoers

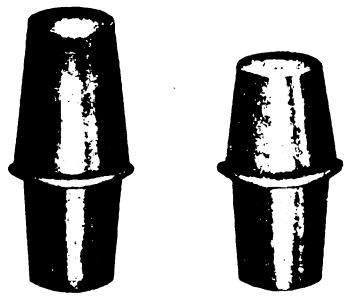
Diamond Calk Horse Shoe Company

DULUTH ∴ MINN.

Western Canadian Distributors: WILKINSON-KOMPASS, LTD., WINNIPEG, MAN.









Digitized by Google

EMCO MALLEABLE IRON CASTINGS

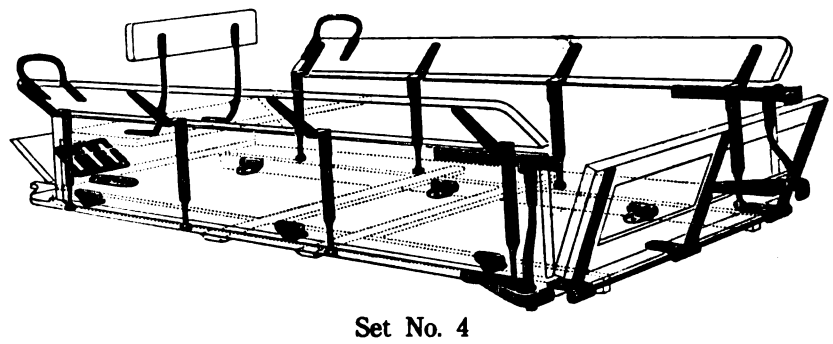
— QUALITY AND SERVICE —

We do not make Bodies,

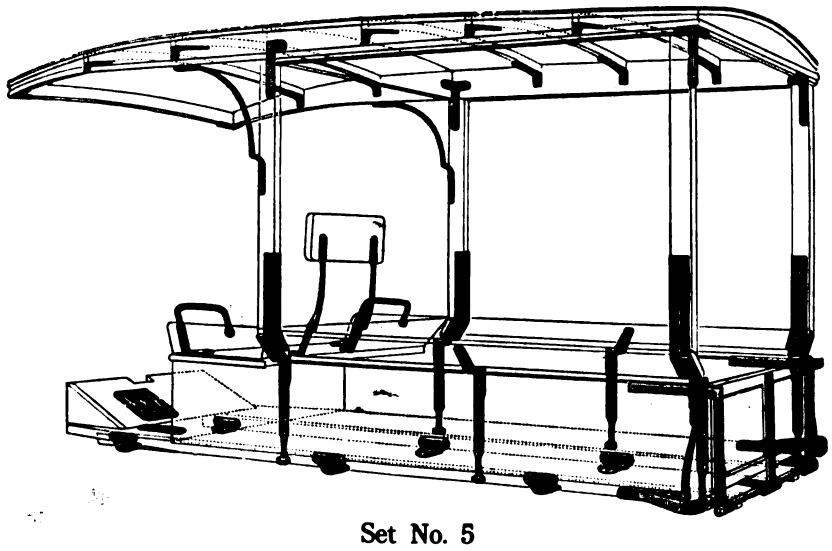
but only

IRONS

for them



Set No. 4



Set No. 5

Our Bulletin,

"ASSEMBLIES OF IRONS"

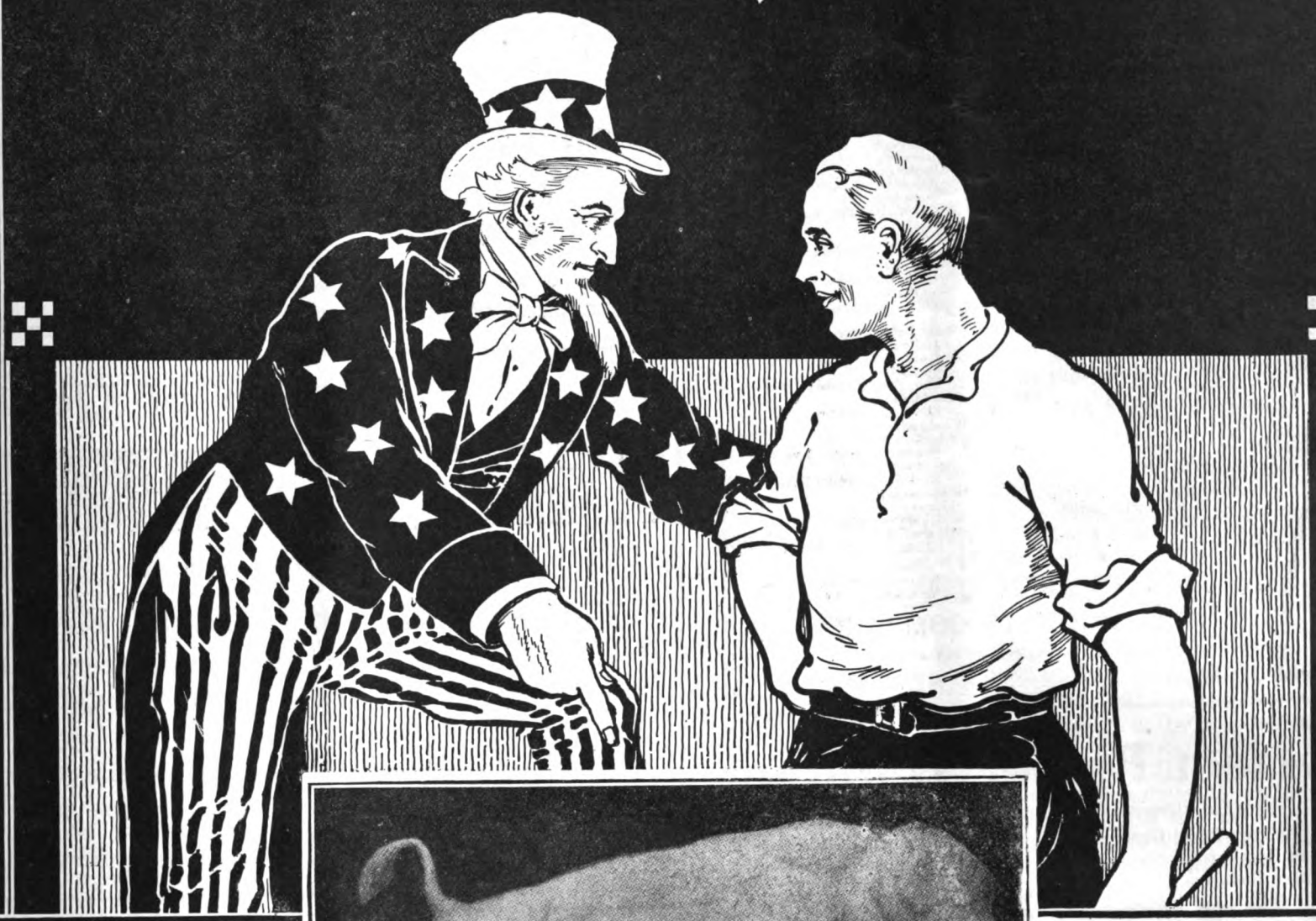
for Vehicle Bodies, will be mailed on request

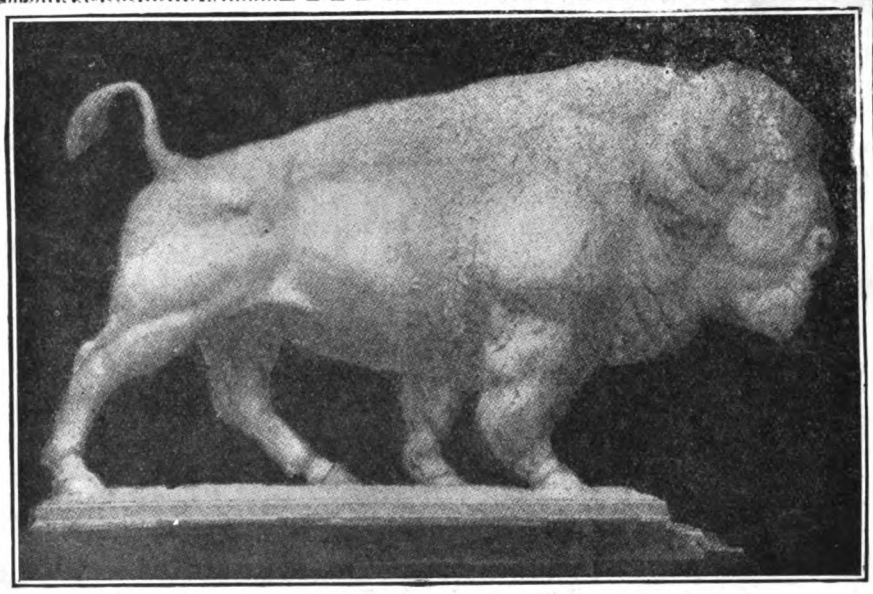
THE EBERHARD MANUFACTURING COMPANY

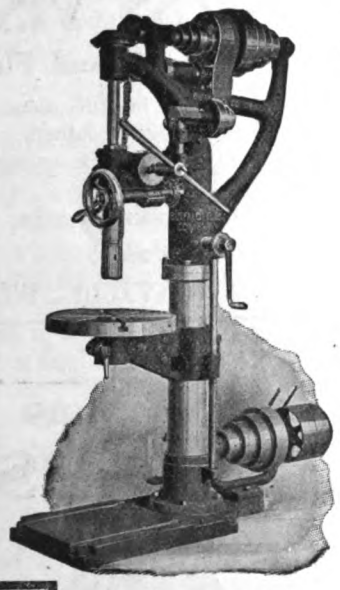
CLEVELAND, OHIO

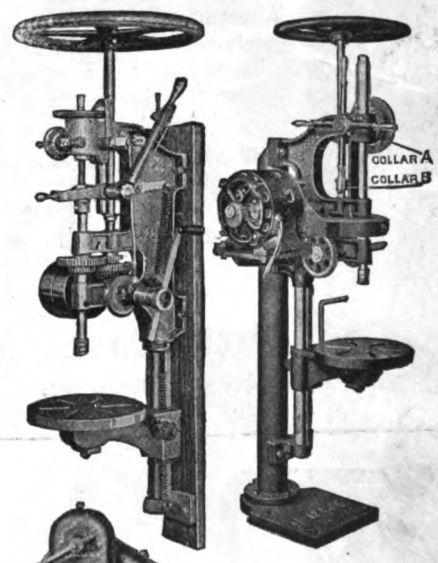
Digitized by Google

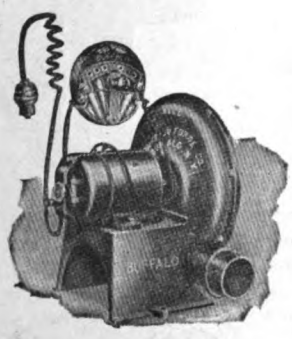
THAT'S THE SIGN OF THE BEST BLACKSMITH SHOP EQUIPMENT MADE













Modern Shop Efficiency

Blacksmiths and Garagemen are determined to have the best that may be had in Blacksmith Shop Equipment.

The work of the modern shop demands modern efficient tools—tools that will stand up under severe service.

Forges; electric blowers; drills—floor and post type; shears—for cutting angles, bars and sheets—and of every size from the little bench type hand power shear to the heaviest power shear made—these are the tools you should know about.

Write Dept. 6 for Catalog

Buffalo Forge Company - Buffalo, N. Y.

"Buffalo"

Digitized by Google

LINDE OXYGEN

From Coast to Coast 65 Producing Plants and Distributing Stations provide an unlimited supply of Linde Oxygen for users everywhere.

LINDE SERVICE means no investment except for oxygen actually received—no expensive overhead or upkeep charges.

Linde Oxygen may be obtained from any of the following Linde Plants and Distributing Stations where a large suppply of charged 100 to 200 cu. ft. cylinders is kept on hand constantly to insure immediate shipments.

Mail or telephone your order to THE LINDE AIR PRODUCTS CO., at the nearest point. **Shipments will be made on day order is received.**

PRODUCING PLANTS AND WAREHOUSES

Alabama
*Birmingham
10th Ave. & 28th St.
California
*Emeryville, Oakland
*Los Angeles
1405 Mission Road
Colorado
*Denver
S. B'way & Exposition Ave.
Connecticut
Hartford
1095 Main Street
District of Columbia
Washington
9th & Maryland Ave., S. W.
Georgia
*Alanta
Plyant St. & Southern R. R.
Savannah
OgeecheeCanal, So. of BaySt.
Illinois
*Chicago
3633 Wall Street
East St. Louis
6th & Walnut Ave.
Peoria
721-731 So. Washington St.
Indiana
*East Chicago
S.E.Cor. Kennedy & 145th St.
Fort Wayne
414 E. Columbia Street
*Indianapolis
2819 Roosevelt Ave.
Iowa
Davenport
118 Harrison Street
Des Moines
117 W. 5th Street
Kansas
Wichita
Rock Island Ave. & 2nd St.
Kentucky
Louisville
126 East Main St.
Louisiana
New Orleans
841 Fulton Street
Maryland
*Baltimore
25th & Montebello Ave.

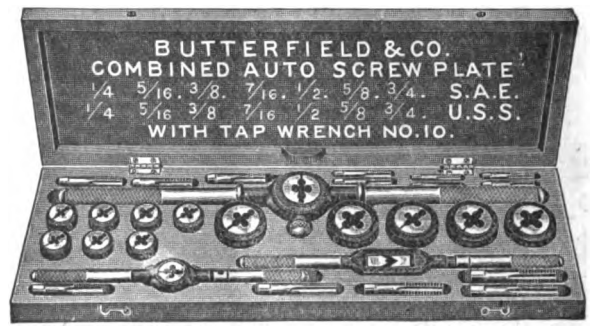
Massachusetts
Cambridge
25 Waverly Street
Springfield
Napier Street
*Worcester
961 Southbridge St.
Michigan
*Detroit
St. Aubin Ave. & Newton St.
Grand Rapids
Pearl Street by the Bridge
Minnesota
Duluth
Seventh Ave., West
*Minneapolis
1809 Hennepin Ave.
Missouri
*North Kansas City
14th & Charlotte St.
*St. Louis
4218 Forest Park Blvd.
Nebraska
Omaha
1007 Jones Street
New Jersey
*Elizabeth
Linden Ave.
Newark
354 Plane Street
New York
Albany
Montgomery & Colonie Sts.
*Brooklyn
475 Driggs Ave.
*Buffalo
Broadway and Ideal Sts.
*Utica
Walnut & Schuyler Sts.
Ohio
*Cleveland
802 East 72nd Street
*Cincinnati
Stanton & Mellish Aves.
Columbus
310 Dublin Ave.
Dayton
521 E. First Street
Lima
338 East High Street
(Star) * Designates Plants.

Ohio
Toledo
441 South Erie Street
*Youngstown
601-621 Jones Street
Oklahoma
Oklahoma City
27 E. Grand Ave.
Tulsa
1 North Boulder St
Oregon
Portland
15th & Hoyt Streets
Pennsylvania
Allentown
211 Gordon Street
Erie
1502 Sassafras Street
*Norristown
*No. Philadelphia
13th & Cambria Streets
Pittsburgh
16th & Pike Streets
*Trafford
Tennessee
Chattanooga
212-238 King Street
Memphis
203 Washington St.
Texas
*Dallas
Harwood and Coombs St.
Houston
Cedar and Baker Sts.
San Antonio
512 Dolorosa St.
Utah
Salt Lake City
112 West Second St., South
Virginia
*Norfolk
22nd St. and Colonial Ave.
Richmond
1709 E. Carey Street
Washington
*Seattle
Henrietta St. & 8th Ave., So.
Spokane
121-123 S. Madison St.
Wisconsin
Manitowoc
810 Quay Street
*Milwaukee
36th St. & National Ave.

Other Plants and Distributing Stations are planned for other industrial centers throughout the country and will be established as fast as and wherever the local demand for oxygen warrants.

THE LINDE AIR PRODUCTS COMPANY
Largest Producers of Pure Oxygen in America
Forty-Second St. Building NEW YORK

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

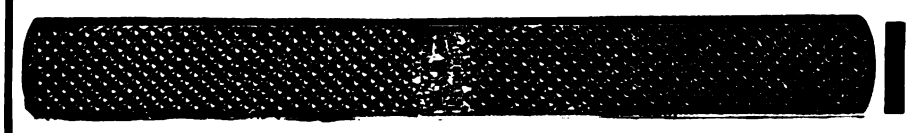
No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.
New York Store: 126 Chambers Street

The Horse Rasp of Quality



Ask your Dealer for the

IMPROVED HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, **"Slim," "Light," "Slim Light"** and **"Fine Cut."** Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial. New catalogue mailed free on application.

HELLER BROTHERS CO. *Established in 1836* **Newark, N. J.**

The Perfect Power Hammer



Note the difference in construction over other makes:

Extra Long Guides, insuring a direct movement of the ram without any side motion, which causes guides and springs to break on other Hammers.

The only Hammer made with a disk attachment with special anvil for sharpening harrow and plow disks.

A recently invented **Friction Clutch** fitted with **Ball Bearings,** absolutely controls the operation of the Hammer by foot pressure from the lightest tap to the heaviest blow. This ease of operation makes the Hammer particularly well adapted for plow work, as you can get as light a stroke as you desire.

Will ship to any responsible party on approval. If not as represented, no sale.

Made in two sizes:

3 inch square, 40 lb. ram—shipping weight, 1,150 lbs.
4 " " 80 " " " " 1,800 "

Write any jobber for prices, or

Macgowan & Finigan Cordage Co.,
204 North Third St., ST. LOUIS, MO

BICKNELL'S DRILL PRESS VISE

Holds Rounds, Squares and Flats



Drill Vise

Saves its cost every year in drills alone.
Base, bed and jaws fully machined.
Swivels to any position on Drill Table, or can be used as a Bench Vise.

For sale by the jobbing trade.
Write for circular.

BICKNELL MFG. & SUPPLY CO., JANESVILLE, WIS.



CRESCENT Wood Working Machines

will always satisfy those particular users who want the highest quality at reasonable price.

Send today for catalog of band saws, saw tables, shapers, jointers, variety wood workers, planers, planers and matchers, swing saws, cut off table, disk grinder, borers, hollow chisel mortiser, Universal wood workers.

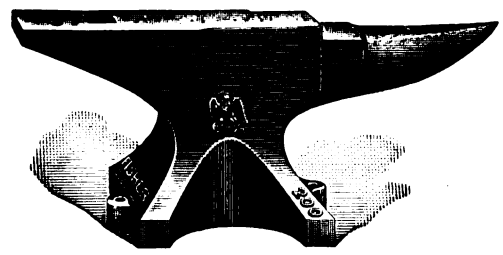
THE CRESCENT MACHINE CO.
203 Main Street
LEETONIA, OHIO, U.S.A.

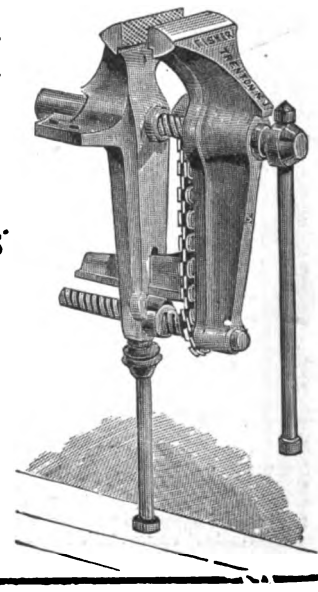
1843 **EAGLE ANVILS** 1919
AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE

BLACKSMITH AND WHEELWRIGHT

Vol. LXXIX. No. 4. NEW YORK. APRIL, 1919. TERMS ONE DOLLAR A YEAR

The Care and Repair of Tires

The Construction of Tires, Various Types, the Curing of Rubber, Methods of Storing and Proper Inflation

Copyright, M. E. FABER

THE late George Fitch described the pneumatic tire as the "turkey buzzard in the ointment of the automobile owner." Most motorists will agree with him that tires cause the larger portion of the troubles that help to make the operation of a car retain the element of interest and uncertainty that has been a part of it since the days when exhibitors at the automobile shows demonstrated their creations by driving them around an indoor track, that was built for the purpose, adjacent to their booths.

Tires have their faults, it is true. But probably not less than ninety per cent of the failures of tubes and casings to give the service that is expected of them are due to mistreatment that follows a lack of understanding of the proper use of tires or just to good old-fashioned neglect.

It is really marvelous, when one stops to consider it, how a combination of vegetable products, the sap of a tree and the gossamer-like fibre from the seed-pod of a little bush, can endure with even a moderate amount of resistance the thundering impact of a two-ton car that is driven at railroad speed over roads that would destroy a tire of steel in a comparatively few hundred miles.

Preliminary to treating of the factors that cause the untimely deterioration of tires and the methods of coping with them, it is interesting to know something about the construction of a tire and the materials that enter into it. The average driver sees only a tube and a casing that he pays for and puts on the rim with a silent prayer that "this one will give some service."

Tire Construction.

Generally speaking, a tire consists of an outer casing of fabric covered with rubber, providing the tensile strength to hold the internal pressure and the resistance against road wear; and an inner tube of softer rubber serving as an air-tight lining to prevent the air from escaping. When such a tire is placed on a wheel and inflated, the effect is that the wheel is actually suspended on compressed air, the most elastic substance that is commercially available.

Slight shocks, which in the case of a solid tire would be transmitted in a direct line to the axle and thence to the body of the car, via the springs, are absorbed by a slight distortion of the air chamber.

The size and construction of tires have been so standardized that a study of any make gives an excellent idea of all makes. It is true that each maker has secret formulas for the compounding of rubber to obtain toughness, resiliency, etc., but the finished tires show little difference in the main.

Casings fall naturally into two divisions, those in which layers of canvas are used to give the strength, and those which are constructed of layers of parallel cords. Tire-makers say that the advantage of the former, and in fact its only excuse for existence today, is its low initial cost. The cord construction, while more expensive per tire, seems to offset this by the increased mileage which it gives and the smoother riding qualities it possesses by virtue of the fact that it does not need to be inflated as tightly as the fabric tire in order to prevent breaking down of the internal construction.

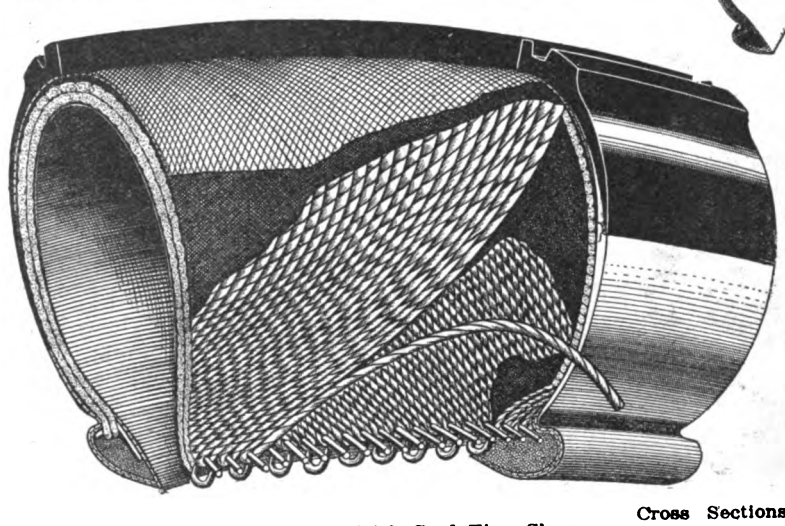
Both kinds of casings are made in three styles; they differ principally in the shape and construction of the beads, in other words, in the method of attachment to the wheels. The clincher tire has soft beads that permit it to be stretched over the rim of a wheel just the same as one would stretch a rubber band over a spool. This style is now used only in the smaller sizes of tires such as on Ford cars where the expense of any but the simplest rims would be prohibitive.

The Quick Detachable Clincher (known as the Q-D) has beads shaped the same as the regular clincher, but instead of being elastic, these beads have steel wires built into them. In placing this tire on the rim one side of the rim is removed and when replaced is locked by means of a spring or other device. The Straight Side tire also has a non-stretchable bead, but of different form, and is used on special rims somewhat similar to those used with the Q-D type.

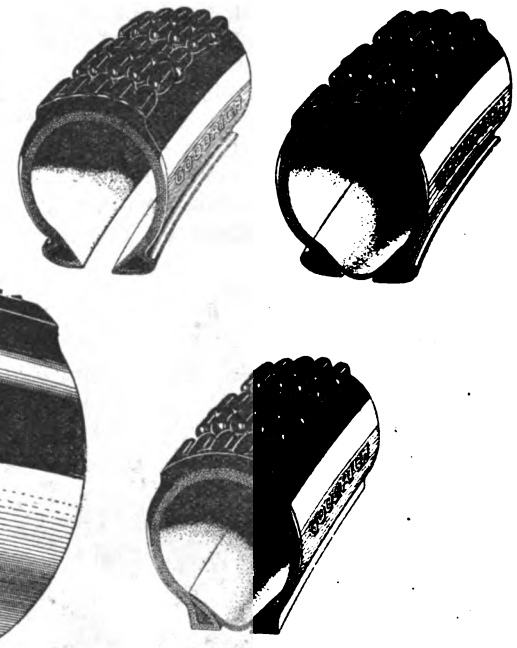
Tread patterns are almost innumerable, apparently being limited in design only by the imaginations of the manufacturers. They offer a means of adding to the thickness of the tread without making the tire unduly rigid, and under some conditions are advantageous in preventing skidding.

Two Materials Used.

It will be noted that the casing is made of two materials, fabric (which includes both the cord construction and woven canvas) and rubber. The fabric is usually a high grade of Sea Island cotton, which on account of its long fibre supplies strength and resiliency. The rubber merely holds the layers of fabric together so that they stretch and bend as a unit, and protects the fabric from actual contact with the road and from the deteriorating action of water, oil and other enemies.



Partial Cut-Away Section of Goodrich Cord Tire, Showing the Two-Ply Construction of Their Silvertown Tire.



Cross Sections of Goodrich Tires. Regular Clincher: Q. D. Clincher, and Straight Side Tires.

The rubber has practically nothing to do with the shock-absorbing ability of the tire. That is all left to the air inside of the tire, and the chief function of the casing is to keep the air inside. It appears that if it were possible to make a tire as thin as this sheet of paper, yet with strength enough to resist puncture, we would have the ideal, so far as easy riding is concerned. It seems that the aim of the tire designer is to use as large a volume of air and as little canvas as possible consistent with adequate strength.

In making a casing, an iron core or mandrel, ring-shaped and having a cross section the same as the inside of a tire, is coverel with several layers of fabric which have been thoroughly impregnated with rubber. From four to six layers are used, depending on the size of the tire. These are each carefully rolled and pressed together and as the fabric is applied it is continually stretched so as to eliminate stretching in use. On the fabric is placed a ⅛ inch layer of soft cushion rubber and over this comes a loosely woven strip of fabric—the breaker strip. Then comes the tread, compounded of tough rubber to stand the wear of the road. Of course the beads have been applied during the process of laying on the fabric.

Vulcanizing or Curing.

The next process is the vulcanizing or "curing" of the tire. (Some manufacturers partially cure the fabric body of the tire and the tread separately and then vulcanize them together later.) This is simply a matter of applying heat at a certain temperature while the tire is kept under pressure in moulds which determine its shape when finished, much as a waffle is moulded. Just as in culinary processes the temperature and the length of time heat is applied are vital to the success of the result.

In building tires by the wrapped tread method which is almost universally used for smooth tread tires, the pressure on the tire is obtained by wrapping it while on its iron mandrel with strips of muslin. Afterward iron moulds conforming to the finished product are clamped tightly over the wrappings. The whole affair, moulds, tire and mandrel, is then placed in a large cylindrical tank much like a boiler and large enough to hold many tires at one time.

Heat is applied for about an hour by admitting steam into the sealed tank at a pressure which corresponds to a temperature of approximately 300 degrees F. The steam itself has nothing more to do with the vulcanizing process than to distribute the heat uniformly over the tires being cured. Hot dry air, or any other method of supplying

Digitized by Google

heat would serve the purpose equally well if means could be provided for a uniform distribution of heat.

The fact that steam, on account of its convenience for this purpose, is commonly used for curing rubber has misled many people into the belief that the steam itself had some mysterious chemical influence, or supplied moisture that prevented overcuring, but this idea is entirely wrong. At the temperature used in vulcanizing, steam contains less moisture than average illuminating gas. It is practically dry. Maintenance of the proper temperature is the important point.

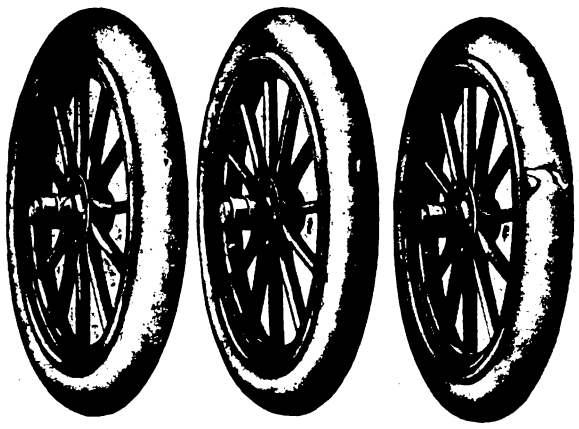
The Inner Tube.

We have seen that the rubber used in casings is of a tough variety designed to stand the wear of the road. On the other hand the inner tube, which is protected from outside damage, and must remain absolutely air-tight, is made of quite a different kind of rubber. A very elastic compound is used, so strong that a good tube may be inflated until it is more than a foot in diameter without bursting. Demonstrations have even been made in which the weight of a loaded car has been suspended in the air by means of an inner tube, and most of us have seen cars towed by using a tube instead of a rope.

Inner tubes are made on mandrels, too, but in this case the mandrel is a piece of steel tubing of proper diameter, straight, and of a length equal to the circumference of the completed tube. This mandrel is put into a sort of lathe and as it revolves the raw rubber in narrow strips is wound upon it. Several layers of very thin rubber are applied to insure freedom from leaks that might occur if only one layer were used, and then strips of cloth are wound on top of the rubber to give the pressure that is required.

Curing is accomplished by inserting a hundred or more of these mandrels into a steam-heated chamber for a suitable length of time. When the cure is completed the cloth is unwrapped and the rubber is stripped from the mandrel by turning it inside out, which accounts for the tube being smooth on the outside and rough inside. Then the ends of the tube are vulcanized together either by heat or by chemical means, a valve stem is attached and the tube is ready for use.

The matter of color in tubes and casings was discussed quite widely a few years ago. The natural color of pure rubber is a sort of amber. Some of the colors that appear in finished tires are the result of using chemicals that affect the properties of the rubber and others are merely a disguise to trademark a certain brand of tire. The only real proof of a tire is the service it gives, and if the tire is made by a reliable manufacturer and given reasonable care by the user, the



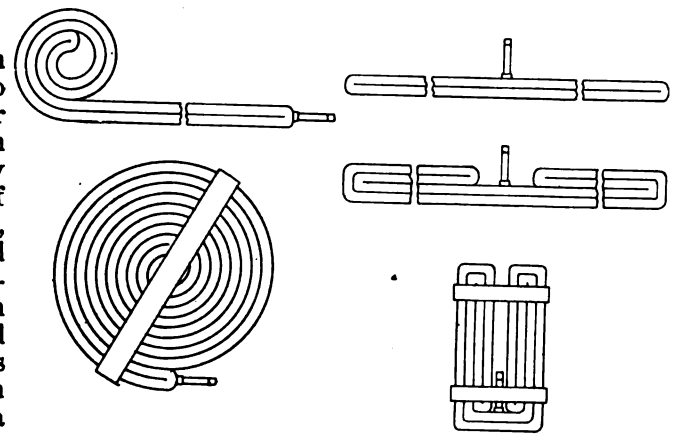
Three Stages of Tire Disintegration: A Small Cut Appears in the Tread; At the End of 500 Miles a Sand Blister Forms, and in 500 Miles More the Tire Blows Out.

service will, aside from unavoidable accidents, be all that can reasonably be expected.

Possibly the fact that tire makers have placed guarantees of from 3,500 to 5,000 miles on their product has led the average car owner into the mistaken belief that the guaranteed mileage is about all he has a right to expect and that any service he receives in excess of this guaranteed mileage is due either to exceptional tire quality or exceptional good luck.

While that may be an optimistic way of looking at the situation, it should be remembered that no matter what mileage may have been secured from a tire that has been allowed to go without attention or care until its life has ended, there is no doubt that the observance of a few simple precautions, easily within the ability of anyone, would have added hugely to that mileage. It has been well established that a reasonable amount of attention will invariably be repaid in the mileage that can be obtained from any good tire.

As an illustration, the writer recently had occasion to correspond with a number of



Two Methods of Folding and Storing Tubes.

motorists to whom a certain tire manufacturer had awarded prizes for securing exceptional mileage. All of these people had driven twenty thousand miles or more on the tires that were under observation. Some almost reached the twenty-five thousand mark. Without exception, while they admitted that the quality of the tires had had something to do with the result, they agreed that the care the tires had received was a highly important factor.

Another case that has been authenticated is of a tire that has given more than thirty-eight thousand miles and when last heard of was still in active service. In this case, too, the care that had been given was considered largely responsible.

The life of a tire should be over ten thousand miles under ordinary usage and conditions; but it is safe to say that two-thirds of the tires used are thrown in the junk heap before they have gone more than half that distance.

In this section, therefore, we shall take up in detail some of the methods that motorists have found effective in obtaining the higher figure.

Proper Inflation.

The importance of proper inflation certainly entitles it to consideration as the first of the factors entering into the securing of the mileage that is built into a tire. Most people do not realize the damage that underinflation will surely cause. The novice is sometimes afraid of inflating his tires too tightly, something that cannot be done with a hand pump and is seldom done with a power pump.

Nothing will wear out a casing so quickly as running it with too low an air pressure. The fabric is bent and twisted so much that the threads cut each other, the rubber is disintegrated, and the tire wears out like an old leather hinge. The layers of fabric become separated—a good bump bends the casing so much that the inside layers break—the tube works itself into the crank—and then comes one of those inexplicable blowouts, often in a new tire, that makes the tire adjuster want to change places with the recording angel.

Roughly speaking, a tire is properly inflated when it will stand up full and round under the weight of the loaded car. A kick at the tire tells you nothing. A tire gauge is the only sure way of knowing anything about the pressure.

Tire makers indicate on their tires the correct pressure to be maintained, and their instructions should be rigidly followed. The general rule is twenty pounds of pressure for each inch of cross section. That is for a 3½ inch tire the pressure should be from 65 to 70 pounds if the tire is carrying the normal load for which it is designed.

If exceptionally heavy loads are to be carried the pressure should be increased correspondingly. Especially during the first ten days a tire is in use it should be attended to daily, for the casing stretches more or less and the pressure is thus reduced. After this period, unless the tire shows symptoms of a leaky valve or other leak, an inspection once a week will be sufficient.

There is a popular impression that the pressure in a tire should be reduced during hot weather. This is absolutely wrong. Really more care should be taken to keep the tire up to full pressure in the summer than when the weather is cool. A loosely inflated tire is subjected to so much extra bending as it passes over the road that it actually heats more than if it were pumped up to the standard pressure.

It is the heat that injures the tire by causing the rubber to lose its adhesiveness so that the fabric separates. In addition there is the danger of rimcutting, bent rims and other damage. The expansion of the air in the tire due to the heat of the atmosphere will only increase the pressure a few per cent so that there is no danger of a blowout from that cause.

One should never drive on a flat tire, even for a few rods, because there is the certainty of damaging both casing and tube, and the likelihood of skidding or loss of control. The safest way to do if caught without a spare casing is to remove casing and drive on the rim. Don't remove the rim or you are liable to have the whole wheel fall to pieces.

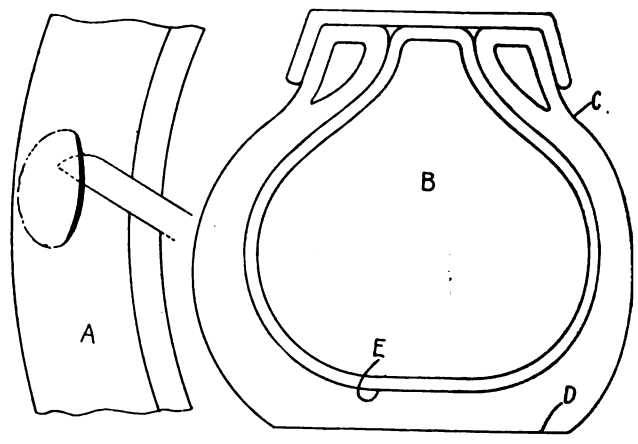
Remember then, as the first and most important rule for tire conservation, to keep your tires pumped full all the time.

Care During Storage.

Most motorists know that continued exposure to direct sunlight will harden and crack the varnish on their cars, but they do not always realize that the rubber in the tires is the same sort of a vegetable product and that light has the same effect on a tire. Park your car in the shade when possible, and when it is in the garage keep the garage dark.

When a car is used only at infrequent intervals, it is a good idea to jack up the wheels and partially deflate the tires. This is done, not so much to take the imaginary strain from the weight of the car off the tires, as to prevent the weight of the car from settling down on a tire that may have a slow leak, and pinching the tube and casing. If a tire is fully inflated the pressure per square inch on the inside of it is very little different whether the car stands on the tire or is supported on jacks.

Keep in mind that conditions which will rust iron will rot a tire that has its fabric exposed either by cuts through the tread or by exposure of the inside of the tire when



A, Opening a Sand Blister To Let Out the Dirt; B, Result of Underinflation; C, Tire Bends Excessively at This Point Causing Rim Cuts; D, Large Ground Contact Means More Punctures; E, A Bump on the Road Will Bend and Break Fabric at This Point.

stored off the wheel. Moisture has no effect on the rubber, but it is ruination to the cotton fabric.

In winter it is best to remove the tires from the wheels and after being sure that they are perfectly free from oil, water, etc., wrap them with cloth and paper to keep out the light, and store them in a place where it is cool and dry. If the car is set on jacks the tires may be partially deflated and wrapped as they are on the wheels.

Digitized by Google

If the tires are taken off the wheels leave the tubes in the casings and put in enough air to keep them round. Do not hang the tires on a nail or hook as that will cause them to take an unnatural strain that may deform them badly. It is much better for the tires if you will simply pile them on the floor.

Why Wheels Must Run Parallel.

Unless the wheels are parallel the tires are shoved along the road instead of rolling in a straight line and the result is about the same as if they were pushed over a big piece of sandpaper. The treads are worn rapidly, so that if a tire shows signs of undue wear in the center of the tread examine your wheels and straighten them out or have it done immediately.

A loose steering gear that lets the front wheels wobble has much the same effect. Above all things the front wheels should not "gather" or "toe out." It is better to have them "toe" in so that the front edges of the rims are half an inch nearer together than the rear. This offsets the effect of the slant that is caused by the slight deviation of the steering knuckles from the perpendicular and makes steering easier without harming the tires.

Substances That Destroy Rubber.

Light and heat, as explained before, have the effect of overcuring the rubber and hardening it. Water, when admitted to the fabric, rots it and causes it to loosen from the fabric. To a large extent it is impossible to protect a tire from these, but there is another enemy that causes more trouble than all of the others. That is oil.

Oils of various kinds are ready solvents of rubber and will rot a tire quicker than any other substance. Consequently the garage floor should always be kept clean and dry and if in oiling the car or as a result of leaky bearings oil is spilled on the tires it should be cleaned off immediately. Use soap and water, not gasoline.

What Rusty Rims Will Do.

Iron rust eats into canvas very quickly and for this reason the rims should be examined and cleaned a few times each season. Assuming that the rim is clean, as it should be when the tire is attached, it may be kept so indefinitely if proper attention is given to keep the rims straight and if the locking nut on the valve stem is drawn tight so that no water can work in through the hole in the rim.

If on inspection the rim is found to be rusty, even though merely in small spots, the rust should be sandpapered off and the rim given a coat of thin shellac. Ordinarily stove polish, which contains graphite, is also excellent for preventing rust and making it easy to remove a tire in case of an emergency.

Any dent or bend in a rim should be corrected as soon as discovered, for if the bend is inward a great strain is brought on the bend and side of the casing. If the bend happens to be outward there is a fine chance for water, oil and dirt to work in between tire and rim.

The driver who likes to show how quick a start he can make, or who puts unnecessary strain on his tires by starting with the high gear engaged is usually the fellow who wonders why his tires don't give him the service that some of his more conservative neighbors receive. He forgets that the entire energy required to set a mass of a ton or two in motion is all concentrated into one huge kick applied at one small point on the rear tires. Start on low. That's what your gears are for. Take curves and corners at a moderate pace for safety as well as for economy.

On wet or frozen roads skidding is practically unavoidable unless chains are used. The chains must be adjusted loosely enough so that they can travel around the tire, otherwise they will gouge the treads and tear them loose. Take off the chains as soon as the necessity for their use has passed. On a soft road the chains sink into the ground and do not hurt the tires but when you get on a hard road it is another story.

Winter driving is usually wet weather driving, and consequently the treads should be watched even more carefully than in dry weather for the appearance of cuts that may let water get to the fabric. Even the small holes due to punctures ought to be fixed right away. It will be economy to pay the repairman for doing the work if you do not have one of those small, inexpensive vulcanizers that are so easy to use for this purpose without even taking the tire off the wheel or letting the air out.

At all times endeavor to keep out of ruts. It is better for your tires and for the rest of the car, too, to drive on the rough part of the road than to have the sides of the ruts grinding away at the sides of the tires and throwing the car from side to side.

Street car tracks are even worse than ruts. Keep away from them. The tire is distorted and bent as it runs along the rail groove, and on curves and crossings especially there is almost always a knife-like fin sticking up to cut the tread all the way around. This cutting is exceedingly likely to occur in wet weather.

Don't apply the brakes suddenly enough to lock the wheels and drag the tires. Your car will come to a stop sooner if you tighten the brake to the point where the wheels just barely revolve, and your tires will not suffer. Remember that it is the friction of the tires on the road as well as the grip of your brake-bands that stops the car, so don't try to stop all at once. Plan to coast to your stopping point and use the brakes as little as possible. Be sure that your brakes are working equally, or one tire is going to do more than its share of the work and will suffer accordingly.

Application of Tires.

First be sure that the rim is clean. Examine the inside of the casing to see that there are no particles of dirt, or possibly the nail that caused the puncture, remaining to damage the tube. Put into the casing enough soapstone or graphite to cover the inside well and prevent the tube from adhering to it even after long service. Be careful not to use too much soapstone as the excess is likely to collect in one spot, harden and hurt the tube.

Before placing the casing on the rim inflate the tube until it is round and run your hand around inside to be sure that it isn't twisted or wrinkled. If your tire is equipped with a flap be careful to have the flap free from wrinkles or kinks. Never insert a tube in a casing that is damp, and never put in a tube that is still damp from testing for a puncture.

*Editor's Note.—Mr. M. E. Faber is the Advertising Manager of the C. A. Shaler Co. and is considered a high authority on tire construction, repair and vulcanizing. Mr. Faber has written for many book publishing houses and delivers lectures at the University of Wisconsin. We are printing this series of articles for our blacksmith readers because of late we have had many calls for vulcanizing information. Many smiths repair tires as a side line and find the work pays well.

The Rock Drill Blacksmith

Part VIII—Methods Adopted in Welding Rock Drill Steel and Fluxes Commonly Used

Copyright, J. F. SPRINGER

People nowadays are often in doubt as to what is meant when the word "welding" is used. Does it mean the process of uniting by means of gas flames—the new method which has in recent years come into vogue? Or does it mean the procedure used by blacksmiths from time immemorial? At any rate, what the writer means by the sub-title Welding Rock Drill Steel is this old-time process applied to the steel used in rock drills. As this kind of welding is a very ancient thing, perhaps a word of explanation may be due as to why the author does not take it for granted that this style of welding is very well known to all blacksmiths.

Let me tell a little story substantially as I recollect it. A distinguished lawyer was engaged in a case before that august tribunal, the United States Supreme Court, and was addressing the court. In the course of his address, he laid great emphasis on certain points of law which were very elementary and such as all lawyers might be expected to know. And yet, there he was, explaining some of the A B C's of law to this great court.

As you may know, things go on in the Supreme Court in a very courteous manner; so the lawyer was allowed to proceed for some time with his explanations of the kindergarten part of law. But after a time one of the venerable judges interrupted the lawyer to say:

"Mr. Smith, don't you think that perhaps this court may have already heard these principles of law, and that you could well assume that all of the judges here are very well acquainted with them?"

The lawyer promptly answered, "No, sir, I do not."

"Why, why, my dear sir, how is that? You can certainly assume that we all are thoroughly acquainted with the lessons that belong in the infant class at a law school."

"Well, your honor, I assumed all that when I was addressing the court below this. If it hadn't been for that, I wouldn't be here now with an appeal, but would certainly have won my case in the lower court."

Now, I don't know whether this story is 100 per cent true. At the same time, it illustrates a very useful point. Never be too sure that the other fellow, to whom you are explaining something, understands the basic facts. You may wake up suddenly and find that he is weak at some point. I do not believe a good master blacksmith, who is rightly disposed, will very seriously object if I go over the details of ordinary welding. He may find something new.

Welding Steel.

Steel is good, weldable metal. That is, it is possible to make steel unite to steel at a point a good deal below the melting temperature. This is a very valuable quality indeed. The welding temperature may be had at an ordinary forge. Whether one could easily

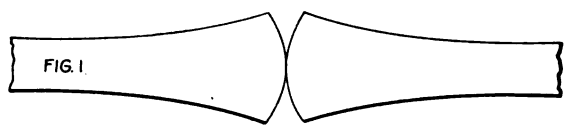


Fig. 1—The Butt Weld.

get the melting temperature may be doubted. The union is made, in ordinary welding, by heating the two surfaces to the welding heat and then forcing them together. Wrought iron requires a higher heat than steel. Probably, the different varieties of steel can be welded at various temperatures, dependent upon how much carbon they contain or some other varying feature.

Probably an average temperature for steel will be about 1,950 degrees, F. This is a light yellow. It is not to be confused with white. The smith should exert himself to know what is the lowest heat at which a given steel can be welded. Then he should use this lowest heat. I venture to say that a good many rock drill blacksmiths could weld at lower temperatures than those they are now using.

Advantages of Low Welding Heat

The drill steel used at a mine or quarry will probably, for the most part, be of a single kind. It will therefore be worth while for the blacksmith to get any advantages that are possible. For example, if he finds out the very best heat for welding the particular steel used by his mine or quarry, he will then be able, without further experi-

Digitized by Google

menting, to do a very great deal of work at advantage.

For it is really advantageous to use a low temperature. It is well known to many that as steel is heated up above a medium cherry red, the grains grow, and that the bigger they get to be the greater will be the damage to the quality of the metal. The very lowest welding heat possible will mean that right at the weld itself the metal has had very large grains and that to either side of the weld the grain size has also been pretty large. In fact, the grain size will be enlarged as far away from the weld as medium cherry red is located.

In welding together two pieces of drill, the grain enlargement may involve a very considerable distance on each piece. From medium cherry red to light yellow may cover quite a bit of steel. All this steel, on both pieces, is damaged steel, for the reason that big grains means loss of tensile strength and probably other qualities.

The advantage of using as low a welding heat as possible means two things: (1) a shortening of the amount of metal involved, and (2) a getting rid of the worst damaged part. As to the advantage of shortening the metal involved, it will be well to note that less metal will be colored with heat, if the end is heated, say, to a full yellow, than would be the case if the heating of the end went up to light yellow. As to the second point, it



Fig. 2—Scarfed Ends for Lap Weld.

will be evident that, if the heating does not need to go to a full yellow, but stops short, then all the full yellow portion which would contain the biggest grains is disposed of.

Now a good deal of rock drill steel used in the various mines, quarries, etc., may very well be weldable at a lower temperature than that in use. If so, then a double advantage would be gotten by using this lower heat.

Experimentation Easy.

To experiment and see whether the particular steel used by his people may not be welded at a lower heat should not be a difficult matter for the blacksmith to cover. Let him heat two pieces to a lower heat than usual and test the matter out. He may find that, with better scarfing, cleaner surfaces, and better hammering, a distinctly lower temperature may be used. Further, while the smith is seeking improvement in respect to temperature, he may also find that he need not heat quite as much of the metal to the temperature of welding. Really, the only locations where union actually occurs is on the surfaces.

Of course, it may be necessary to heat more than a thin film to the welding temperature in order to cover the loss of heat which occurs in transferring from the fire to the anvil and in getting ready. The welding heat must be existent when the two surfaces are being forced together by the hammer. It is granted, then, that the metal must have more than a thin film heated to the welding point. But it may very well be that the smith will find, upon paying attention to the matter, that he can lessen the amount of metal involved in the high heat.

Preparation of the Ends.

There are quite a number of styles of welding applicable to the rock drill rod. But some will suit the situation better than others. There will be two principal kinds of work, dependent upon whether the rod is absolutely solid or whether it is pierced by a hole that has to be maintained. First, let us consider solid rod.

The Butt Weld.

The authorities on welding do not seem to be of one mind as to the comparative strength of the butt weld. J. F. Sallows, p. 33, "The Blacksmith's Guide," says: "The butt weld is the strongest weld for heavy, round stock, and is the easiest weld to make." J. L. Bacon, author of "Forging," makes, on p. 19, the statement: "A butt weld is not as safe or as strong as a lap weld." Ernst Schwarzkopf, author of "Plain and Ornamental Forging" and instructor in forging in Stuyvesant Technical High School, New York City, remarks, p. 88: "A butt weld does not insure a strong and safe weld, consequently it should not be used if avoidable."

T. F. Googerty in "Practical Forging and Art Smithing," p. 31f., says: "Iron may be welded by butting the ends together. In doing this the bars must be long enough so that they can be handled without tongs. For instance, two bars of one-inch round stock, one five feet long and the other shorter, are to be welded. This size is about as light as can be welded by this method. . . . This method makes a good weld, providing the heats are clean."

There is a good deal of contradictory statement in the foregoing. Mr. Googerty does not speak decisively, says only that it is possible to get a "good weld." Messrs. Bacon and Schwarzkopf speak decisively, however, against the strength and safety of the butt weld; while Mr. Sallows, just as decisively, commends it, "for heavy, round stock," as the "strongest."

The truth is probably this. The butt weld is a strong and excellent weld when made with intelligence and skill, but is not the best where skillful care and attention can not be counted upon. Mr. Sallows may very well be talking about welds he himself was able to make, while the others may not have had their own personal work in view.

If the butt weld is to be used, the ends of the pieces are to be rounded as in Fig. 1. Upon being heated to the proper point, the one piece is driven, with hammer or sledge, lengthwise against the other.

The effect is to upset both ends and produce a bulge all round. This is so managed as to eliminate the seam. Clean surfaces and skilful handling of the hammers may be counted upon to get a good union and the disappearance of the seam. The work is then heated and the bulge reduced and disposed of by the use of the hammer.

The Lap Weld.

One has in the lap weld an undoubtedly strong form. This may be understood from the fact that this type of joint has the sanction of the United States naval authorities, being used in making hand-welded chain cables of large size.

For example, at the Boston Navy Yard

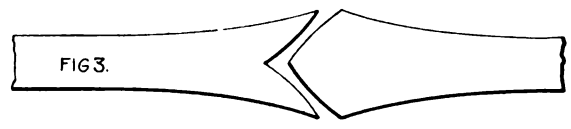


Fig. 3—Ends Prepared for a Split Weld.

3½-inch iron (not steel) bar was welded into links in making protective cables to stretch across the locks of the Panama Canal.

To make a lap weld of approved style, the two ends are properly scarfed. That is, they are hammered down to form wedge-like forms. One is lapped over the other as in Fig. 2, and the weld made. It is important that the two surfaces of the scarfed ends, which are welded together, shall not be flat nor concave.

They should be rounded, somewhat like the under side of the bowl of a tablespoon. When one is laid upon the other, there is only a small contact. This is what is wanted—or, at least, part of what is wanted. When the hammer blow is struck, it should come upon the outside in such way that the hammer strikes just above the place of contact. The effect is to start union here. The smith then works from this point out.

What it is desired to accomplish is to force slag, etc., out of the weld. This is very important, and is facilitated by putting convex surface to convex surface and then making the weld. It is considered good practice to upset the ends before scarfing. The object in view is to provide an extra amount of metal at the welding point to cover losses.

Thus the hammering to effect the weld may reduce the cross-section. Then there may be some loss from scaling. If the work is not too large, a hammer with a ball-pene may be advantageously used to do the scarfing. The pene end is employed to do the rough forming of the scarf and the flat face to do the finishing. The length of the scarfed part of the bar will naturally vary with the customs of different blacksmiths.

If the scarf end is made of a length equal to 1½ diameters of the stock being used, good results may be expected. Thus if the solid bar being used is 1½ inches in diameter, the scarfed end may properly be 2½ inches long.

The Split Weld.

The split weld form is suitable for solid stock of round and hexagonal cross section. One, or even both, ends may be upset. The one end is then split to produce a kind of Y form as shown in Fig. 3. The other is given a double bevel like a cold chisel. Both pieces are heated to the welding temperature and then the one is driven against the other. Then the arms of the Y are beat down onto the bevel faces of the other piece.

It would seem advisable here, as well as in the case where plain scarfs are made, to round the faces which come into actual contact, in order to force out dirt, scale and the like.

This type of weld is understood to be especially suitable in cases where tool steel (high carbon steel) and low carbon steel are to be joined; or where high carbon steel is to be united to iron.

Fluxes.

The object of a flux is to clean off the surface. It performs no service, in making the union, other than assisting in making sure that it is steel that is next to steel or iron that is next to iron. A piece of scale in between the two surfaces would not be pure metal. Borax is the thing to use for rock drill steel. Sand is sometimes used as a flux, but it is scarcely to be commended. The flux has to melt to do its work properly. This means practically that the metal on which it is put must be heated up beyond this melting point whether such a high heat is really needed for the actual welding or not.

Borax melts at a lower heat than the usual sand. When sand is used, especially with steel, it may very well happen that the steel will have to be heated up beyond any welding necessity merely to get the sand to flow. This means bigger grains and consequently greater damage to the steel. Use borax and reject the sand for drill work.

When borax is bought from a dealer, it is likely to contain more or less water incorporated in its mass. When borax is used in this condition as a flux, it will boil and foam on the metal and perhaps drop away from it. The blacksmith may put his borax in proper shape for use by driving off the aforesaid water. This may be done by heating it up to a red heat and then permitting it to cool. It will then be in a condition resembling glass. It may now be powdered and used as a proper flux.

It is doubtful whether there is any substantial advantage in mixing anything else with the borax. If, however, the smith desires a mixture, he may weigh out four parts of borax and one part of sal ammoniac, both in powder form, and thoroughly mix the two. A good way to mix is to sift through a sieve at the same time and repeat this operation eight or ten times.

An approved way to use a flux is to spread it on the surfaces just before they get to the welding heat. The metal is then returned to the fire and the flux allowed to do its work. Apparently, what it does is to unite with the scale and run off the surface, leaving perhaps a coating which serves to prevent the formation of more scale.

I may, I think, advantageously quote from the experienced blacksmith, J. F. Sallows, at this point: "In placing pieces in the fire after scarfing and dipping in the flux, always turn them so the scarf will come uppermost, thus keeping the scarf away from the blast and preventing the flux from dropping off into the fire; but just before the pieces are ready to be removed from the fire, turn the scarf down, and when taking out to weld, tap lightly, to shake off the dirt, but not hard enough to remove the flux."

But perhaps the point at which most smiths fail in connection with ordinary weld-

Digitized by Google

ing is with the fire itself. Whatever necessity there may be for a clean fire or a non-oxidizing fire, when forging and hardening are being done, is still more distinctly true when welding is in question. The metal is heated to a much higher point for welding and is in consequence undoubtedly in more danger from sulphur, oxygen and the like.

Fuel containing either no sulphur or a very insignificant amount is the thing. Such fuel may be wood charcoal, anthracite coal and perhaps coke. If possible to heat without exposure to the bare flame, then that is better yet. Or, if a flame must come into contact more or less, then the best thing is to shape the forge or the furnace so that there is a considerable distance between the bed of coals, the oil burner, or whatever supplies the heat. The reason is this: It is desirable to give the gases time and opportunity to burn and thus suffer destruction of the power to do harm.

(To be continued)

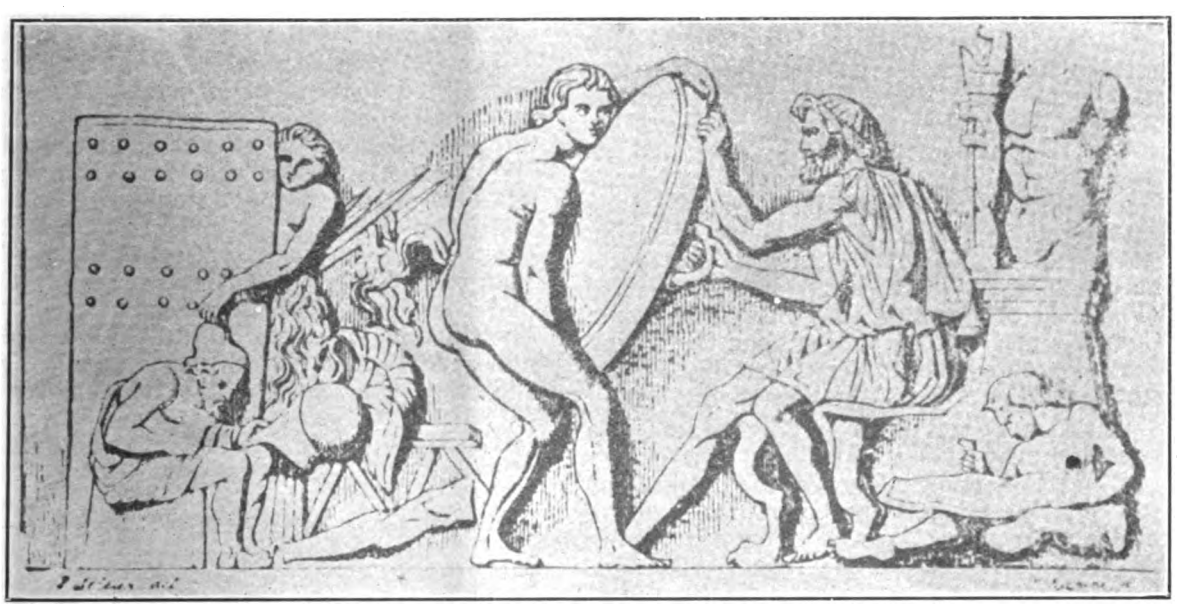
An Illustrated History of Smithing

Part IV—Historical Drawings Showing Smith Work As Practiced By Early Greeks and Romans

BY H. H. MANCHESTER

Several highly interesting pictures of Greek and Roman smithies have recently come to light in addition to those which we published about a year ago, and serve to clarify our idea of conditions in that period.

The first noticeably important improvement in the apparatus used by the blacksmith in ancient Greek days was the high or stack furnace. This is illustrated in one of our pictures. The furnace is in the form of a hollow cylinder probably constructed of pottery. The fire may be seen at the bottom of the stack.



A Greek Plaque Representing Vulcan Making the Armor of Achilles. Note the Furnace and the Assistants at Work on the Helmet.

Behind it, it is very important to notice the goat skin bellows, which may be identified by their irregular form. One of the smiths may be seen extracting a hot lump from the furnace by means of a pair of tongs. These tongs, as will be observed, are jointed near one end, thus differing from the Egyptian pincers, which were of the spring variety.

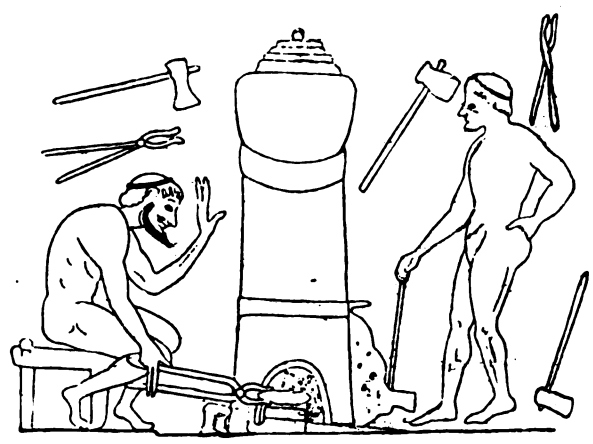
At the top of the furnace is what apparently represents a bowl or kettle. This was probably used to melt the softer metals, as for instance copper and tin in the making of bronze. One curious feature about this kettle is the very top. The step-like form of this suggests several different covers, each larger than that above, which could be put on or taken off to help regulate the draft. It is also worth noting that the hammers and axes had long handles in contrast with the earlier Egyptian in which the handle was the smith's own arm.

Besides the goat skin bellows, shown in this picture, the bellows constructed of two pieces of wood, much as the hand bellows today, are said to have been invented by Ctesebius, who lived about 500 B. C.

The story of the fashioning of the armor of Achilles by Hephaistos, or Vulcan, must have been a popular theme for Greek and Roman artists as there are several representations of it still extant. In the one which we are reproducing the furnace seems to be rectangular in shape with several rows of holes at the top and part way up to afford a draft. Peering from behind it may be seen a workman whose job it was to blow the bellows. He seems to be grabbing off the cap of another workman who is engaged, with a hammer and punch, in finishing the plumed helmet of the warrior. The famous shield is shown in the middle of the picture, while at the right an assistant is working on one of the greaves.

A little frieze, which is in itself a good example of the metal work of the Graeco-Roman period, and at the same time illustrates the methods of operation, depicts several cupids that work as smiths. The form of the anvil is interesting, and it is curious to see that two of the smiths are striking in quick succession, much as might have been done in modern times. How true their blows must have been is evinced by the fact that another cupid is holding the fish, which is being hammered out, by his hand alone.

At the right another cupid is finishing the embossed figure on the shield. It is important to remember that during the whole Graeco-Roman period, the smith was not yet specifically a blacksmith. This was partly due to the fact that bronze was still used more than iron or steel, and that the smith of the time usually wrought in both metals.



An Ancient Greek Furnace. Note the Goat Skin Bellows Behind It, the Cupola Form, the Pointed Tongs and the Long Handled Hammers. The Kettle at the Top is Probably for Easily Melted Metals.

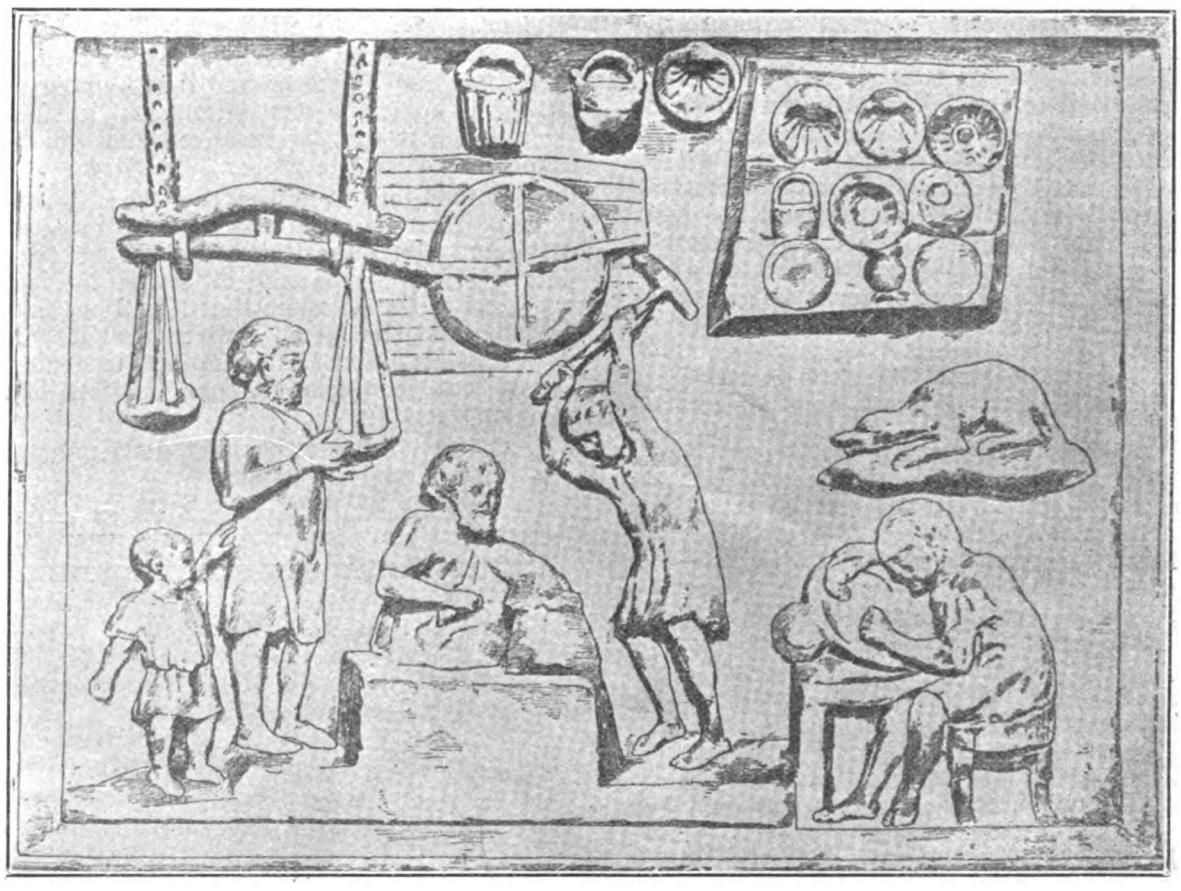
The shop of a smith, where work is being done on some metal which is capable of being wrought cold, is pictured in a small plaque of the Roman period. The anvil and the piece which is being hammered are somewhat obliterated, but the sledge hammer of the workman is plainly depicted.

At the right a workman seems to be finishing a bowl or vessel. Other vessels and a pair of scales, which were presumably made in the shop, were hung upon a wall in the background.

The Greek and Roman smiths had plenty of products upon which to busy themselves, some of which were either new or else far more highly developed than previously.

While bronze statues had been made by the Egyptians, the Greek and Roman smiths brought them to a perfection never before known. Bronze furniture such as chairs and couches had also been made by the Egyptians, but was much more common in Roman times.

Bronze shields, greaves and other defensive armor were made by the Assyrians, but were still further developed by the Greeks and Romans. Among them locks and keys reached a development never even approached before, and may be considered practically a new field at that time. The keys were comparatively ornamental and considerable larger than at present, although the



Roman Smiths Working Bronze or Other Metals Which Could Be Hammered Cold.

Digitized by Google

locks were themselves much simpler and easier to pick. In general both locks and keys were of the variety common a generation or two ago.

Another new field for bronze and iron work was the ornamental fence, of which there are several pictures which date back to Roman times.

Still another novel field came from the baths which were first greatly developed in the Roman period, and required various paraphernalia in the way of kettles and pipes.

Iron and steel were used particularly in the



The Tombstone of a Smith Who Was Formerly a Slave. Gallo-Roman Period.

blades of cutlery. One new invention was the crossed shears which were a decided improvement over the old spring shears still employed not so long ago for the shearing of sheep. Most sharp-edged tools were also sometimes made of iron or steel, although the use of bronze had not by any means disappeared.

It is well to remember that the smith of the period was in general either a slave or freed slave. This is illustrated in a monument in memory of a Gallo-Roman smith who apparently is given a band around his right ankle to signify that he has been a slave. At all events, his garb as well as that of all of the other smiths in the pictures we have been reproducing belongs to that class.

PHILIP S. DYER DIES.

We are sure that, with us, the trade will mourn the death of one of its oldest friends, Mr. Philip S. Dyer, the president of the American Horse Shoe Co.

Mr. Dyer was the son of Col. G. W. Dyer and came from a well known New England family. He was born January 14, 1857, at Calais, Maine, and received his education at the public schools.

As a young man, Mr. Dyer became interested in the lumber business, but later, in 1879, associated himself with Thomas A. Edison in the laboratory at Menlo Park, N. J. As representative for T. A. Edison, Mr. Dyer shortly after went to Europe.

In 1892 Mr. Dyer returned to the United States and founded the American Horse Shoe Co., with which he has been identified ever since. He was well known in the industry, being associated with many prominent firms in directorial capacities.

Mr. Dyer was a figure in public life and is mourned in many circles.

Tips From the Old Man

The Old Time Blacksmith Gives the Young Man a Few Valuable Tips About His Work.

BY JAMES F. HOBART

"Let's go at this spring business right," said the "Old Man" one day as the blacksmith was taking down a spring with two broken leaves in it. "What kind of steel are you going to make that new leaf of?"

"I don't know," replied the smith, "whatever kind there chances to be in the stock rack, I suppose. Does it make any difference?"

"I should say yes," the Old Man replied. "Springs, nowadays, are made of special steel which contain, within the make-up of the bar, all the tempering necessary. Procure a bar of this steel from your dealer and all that is necessary will be to cut off the proper length, forge the ends by plating and pointing them, punch in the necessary holes, drill the bolt holes if any are necessary—which I rather would be absent than in my springs—and then you only have to form the leaf to the proper curvature and then put it in place under the automobile."

"How," said the smith, "can the leaf be formed to the proper curve? Seems to me that would be a 'ticklish' piece of business. What is the best way of doing that job?"

"It's very easy," the Old Man replied, as he lifted the shop cat out of his easy barrel-chair and sat down for a smoke—"it is very easy to make a form for any shape of spring leaf. Take a piece of half-inch by one and a half-inch steel, black iron, 'slay-shoe' steel (Fig. I at A) or any kind that is at hand. Cut off a piece a trifle longer than the spring leaf (B) and bend it very carefully to the curvature required by the new spring leaf.

"Next, heat the new and finished leaf to a good red heat—not a white heat or a 'cherry red' but to a good mellow red. Then clamp the hot leaf against the cold form, using a half dozen pairs of tongs or clamps (C) to press the leaf against the form. Place one pair of tongs or clamps near the center of the spring, say five inches from the center, squeeze the leaf against the form and slip a ring over the tongs—log or clamp to hold them firmly in place. Then put on another pair of tongs or clamp the same distance the other side of the center of the leaf, ring these tongs also, then put on two pairs more tongs or clamps on either side of the pair already in place.

"That makes six pairs of tongs or clamps on the leaf and the form and that number of clamps is sufficient to hold the leaf until it cools, when it may be removed and will be found formed to the proper curvature.

"But just keep in mind," the Old Man continued, "that the placing of the leaf upon the form and clamping it there must be done in a pretty lively manner, otherwise the leaf will have cooled so much that it will not take the shape of the form. Two men should do the tongs-clamping and clamp act, then they can be put on quickly, before the thin leaf cools appreciably.

"No! Don't try to do any hardening or

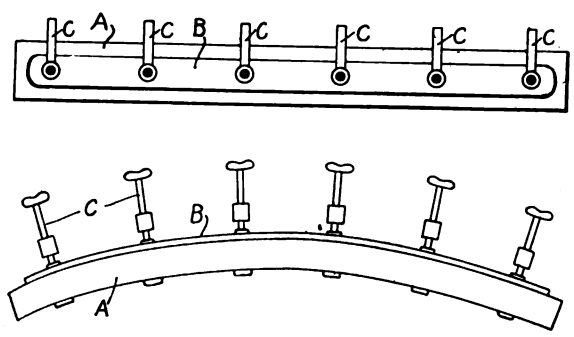


Fig. 1—Shaping a New Spring Leaf.

tempering. Provided you have the right kind of steel, made for automobile springs, just forge, finish and form as above described and the 'temper' will take care of itself. Yes, good springs can be made of carbon or 'cast' steel, but such springs require tempering and a fire much larger than the smithshop can show, is necessary for heating springs for tempering. Therefore, get special spring steel, go ahead as I have told you and the springs you make will be good!"

Having thus delivered himself the Old Man scooped three kittens out of his easy barrel-chair and inserted his own body before the kits could scramble back again.

A Sprung Service Brake.

A car came into the shop with the left side service brake so badly "sprung" that the band hung halfway off the drum on the inner side of the brake—the side away from the wheel. The smith was figuring how to get the brake strap off so as to straighten the end of the plate to which the brake was attached.

The smith found that the plate was riveted to the rear axle mechanism and was studying how to proceed next, when the Old Man got up out of his chair, looked at the bent brake and said, "just wait a bit."

The Old Man then went to the stock rack and picked out a piece of one-half inch hexagon tool steel about two feet long, hunted out a bit of chain which was large enough so the bar of steel would pass through the links. Then he went to the automobile, told the smith to take off the link from the bent brake. After this had been done, the Old Man passed the rod underneath the plate lug and passed the rod through the chain and brought the latter up behind the bent plate.

An old ⅜-inch bolt chanced to be lying on the floor. The Old Man put the bolt over the

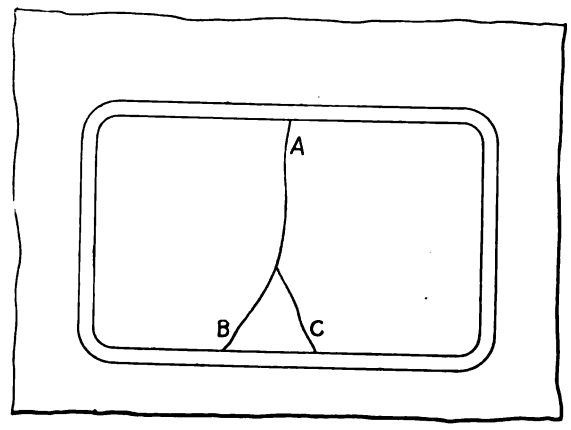


Fig. 2—Broken Rear Curtain Light.

top of the brake lever housing in such a manner as to engage a link of the chain and to make the chain fast to the housing. Then the Old Man, holding the bolt, which he was able to do by the great leverage with which he had attached it to chain and housing, told the smith to "heave on the rod." This the smith did, lifting with all his might and making two or three tries at it before the Old Man said: "There, that'll do." Then the brake band was found to hang true upon the drum. The bent plate had been straightened.

"I've seen that trick done before," the Old Man said, as he went back to his chair. "One day I got caught in a bad storm, in a clay country, where the roads soon got full of mud as thick as cream and as slippery as glass. I stopped to put on the chains, and being in a hurry, and unable to move the car by hand, I had to lay the chains out and pull the car over them by power.

"Well, the car came over the chains all right, but I couldn't stop as I wanted to and one chain caught on the tire, came up over the wheel and wound up in a tangle over the service brake and bent the plate almost exactly the same as this one was bent.

"I managed to get home, and went to work to straighten that brake. If there had been a large monkey wrench handy I could have done the job with that. But the largest wrench I had was nine inches long and it was no good for that heavy work.

"Just then I saw a whippletree hanging to the slats of the corn crib in which I kept my

Digitized by Google

machine. Instead of rings in the ends of the tree, for trace chains, there chanced to be stout hooks to which either trace chains or leather tugs could be attached. Well, I put that whippletree under the plate lug, same as I did the steel bar. The hook in the end of the tree came just high enough above the brake lever housing so that I could get an old bolt into the hook over the housing, same as we did on this job. Then I had my man heave on the whippletree for a lever. And he did heave, until suspender buttons flew around, but he straightened the plate lug, same as we did, a few minutes ago!"

Repairing a Rear Curtain "Glass."

"Say, Mr. Smith," said the driver of a four-passenger car which had just stopped in front of the shop—"can you help me out a bit? Just look at the celluloid window in the rear curtain of this car. The wind is coming up and if I drive with the window in that condition it will be torn all to pieces before I get back home. The wind will get under the torn edges and tear the celluloid all to ribbons. Can you fix it a bit?"

"How about this, Dad!" called the smith to the Old Man who came out, looked at the curtain window and said to the smith: "Get me eight good sized common pins, then plane a piece of soft wood board and saw it out the size of the window. John!" the Old Man called to the boy: "get an old three-corned saw file and grind the tang sharp, slim and square to make some holes with."

The celluloid was broken as shown at A B C, Fig. 2, one crack extending clear across, about eight inches, the shorter crack C, running into the other crack as shown. "How did you do that?" asked the smith of the car driver.

"Why," said the driver, "last night I got stuck in a clay-hole and had an awful time. I was in a hurry to get some tools and threw the rear cushion up so hard and far that a corner of the cushion struck the window and 'busted' it as you see. I never had that happen to me before—and it won't happen again."

"Here are the pins, Dad," said the smith as he handed them to the Old Man who at once proceeded to cut off the heads and points as shown at D and E, Fig. 3. Then he seized each piece of brass in a pair of plyers and bent both ends of the wire as shown at F and G, forming some very "long-waisted" staples. Holes were drilled in the celluloid, the staples inserted and then they were hammered down as shown at H and I, holding the celluloid securely and preventing wind-currents from getting under the torn edges and "whipping them to a frazzle."

The piece of board having been planed smooth and sawed to fit inside of the setting N, Fig. 4, the boy was given the task of holding the board securely in place while the smith used the sharpened file-tang to drill holes J and K, spacing the holes apart exactly the length of one of the staples, which was done by making one hole, inserting therein a staple-leg and then marking accurately where the other end of the staple touched the celluloid.

The pairs of holes were also spaced as evenly apart as possible and as fast as a pair of holes was drilled through the celluloid, the staples were driven in as shown at L and M. After all the staples had been inserted, the boy was directed to very carefully remove the piece of board, to take it off very gently and the smith tapped any staple which chanced to stick, so the board was removed leaving all the staples hanging in the celluloid.

"Now, put the board back on the other side of the curtain," said the Old Man—"then bend down the end of the staples as at O very carefully. Better hold on to one staple leg while you bend the other," he continued, "then there will be less danger of driving the wire sidewise and tearing the celluloid. After one end of a staple has been bent over it will hold itself while you bend over the other end and you can do a good job without splitting the celluloid through any of the holes.

"Here! Scat you beast!" called out the Old Man as he started to rescue his paper of tobacco with which one of the kittens was playing tag around the barrel easy chair. "Beats all what fool cats and fool folks there are in this world"—he snapped as he rescued his tobacco and sat down to fill his pipe—"'nan I shouldn't be surprised some of these fool days to see fool men taking fool cats out to ride in autos, same as some fool wimmen take out fool dogs!" And the Old Man settled down for a quiet smoke.

"Knocking Out" a Knock.

"Say, you Auto-Sharps," called a man from an auto, stopped before the shop, "can you folks take the knock out of my engine? They tell me at home that it is caused by carbon deposits and there may be something in that for after I have the carbon burned out, the engine works well for a little while but very

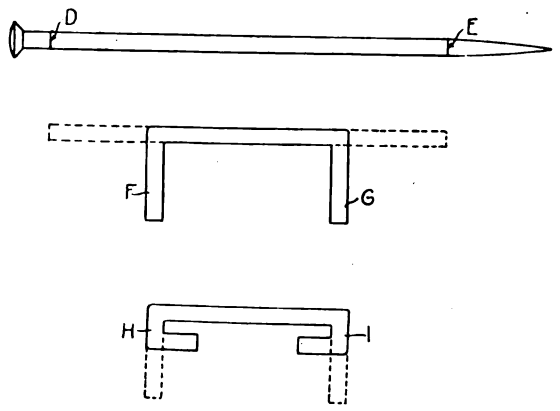


Fig. 3—Pin Staples.

soon it begins to thump again and the longer I run the car the worse the knock gets!"

"How does the engine crank?" asked the Old Man as he hung his pipe on a nail keg and started down to the car. "Notice any difference in the cranking of the car just after the carbon has been burned out and after the engine gets to knocking?"

"Why—yes—come to think of it, there is a difference. The engine cranks a lot easier after the carbon has been burned out and it is all I can do to pull her over the center now, and the engine sure knocks badly."

Too Much Compression.

"All right, then," said the Old Man, "we can stop that knocking and carbon burning all at the same time. It will take about two days to do the job and we shall have to take down the engine and make quite a lot of adjustments. We will take the cylinders off, put a fiber washer under each one, make new connections where necessary to suit the different location of the cylinders, and when you start again I assure you there will be no knock due to carbon deposits!"

"How do you figure it out that way?" said the auto driver. "What good will it do to

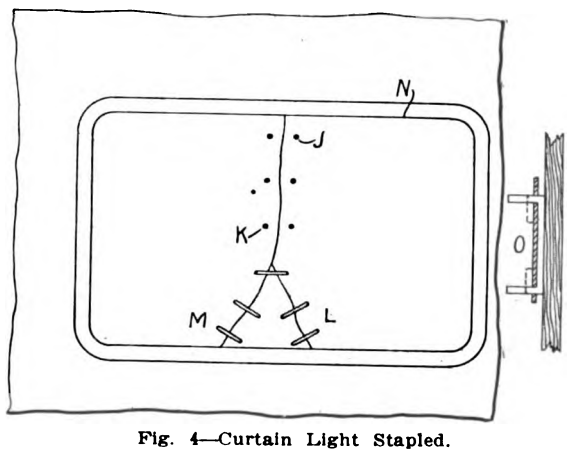


Fig. 4—Curtain Light Stapled.

raise the cylinders a little? I don't see how that is going to stop a carbon knock?"

"It is this way," said the Old Man; "the manufacturers of your car, or of the engine, made the cylinders with just as little clearance as possible and not pre-ignite the compressed charge of gas and air. This was evidently done to gain as high compression as possible. When the interior of the combustion chamber becomes lined with carbon, the compression space is reduced and the charge pre-ignites from compression, forming the nasty knocks.

"When I raise the cylinders, the combustion chamber is enlarged, the compression becomes a little less, the engine cranks easier and the danger of preignition is removed, together with its accompanying disagreeable and dangerous knocking and thumping. That's what will be accomplished by raising the cylinders a little," said the Old Man as he reached to his pocket for his pipe.

"That sounds good to me," said the car driver. Go ahead and get ready. I will be back past here in an hour, as soon as I can get somebody to take me to town, and then I will leave the car for you to fix up. Suppose you will guarantee that the treatment will cure the knocking?"

"It sure will," said the Old Man. "It will cut down the power of your engine a very little, compared with what it is when the cylinders are clean, but the power after the change which I will make will be more than you get now, when the combustion chamber is covered with thick carbon, and, say, use a leaner mixture and you will not be troubled with carbon in a hundred years after the combustion chambers have been enlarged a trifle. Bring on your car and we will put you on easy street where they don't have carbon pavements!"

If you like this magazine and feel that it is useful and interesting, the one best way to show your appreciation, is to purchase your accessories and supplies so far as possible from our advertisers. Also write to our advertisers for catalogs, printed matter and prices, not forgetting to always mention the fact that you saw the advertisement in the Blacksmith and Wheelwright.

THREE HANDY CHUCKS.

Perhaps there will come a time when someone will mix an alloy that will be so hard it will last forever, but until then the mechanic will have to be content with lathe tools which wear and break.

No part of a lathe receives such constant usage as the chuck and after the jaws have

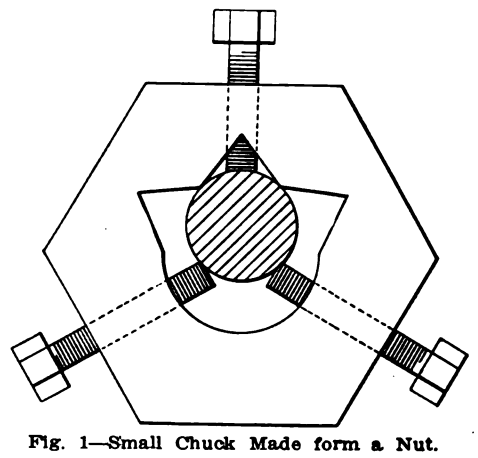


Fig. 1—Small Chuck Made form a Nut.

been set up many times against steel pieces, they are blunted and will not hold small objects.

If the smith is called upon to turn pieces or rods of less than half inch he should be supplied with small chucks which he can make very easily himself.

The chuck shown in figure 1 is made from a ¾-inch hex. nut, the inside of which has been cut by three wedge-shaped slots. If the slots are properly located opposite the two side screws and over the middle screw practically any size stock up to the limit of the nut may be handled.

In figure two are shown two types of chucks which may be used in the lathe chuck

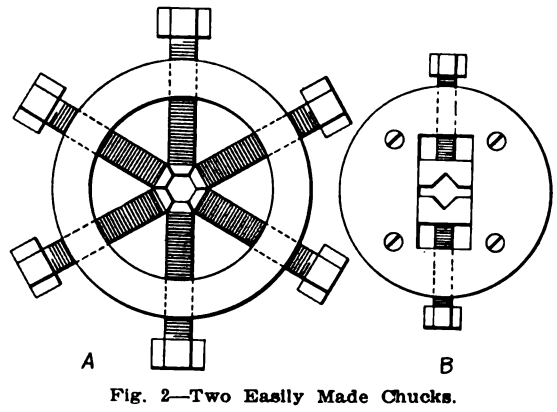


Fig. 2—Two Easily Made Chucks.

or bolted to the face plate. The first, shown at A, is made from a one-inch steel ring, while the one shown at B is made from a flat steel circle.

Digitized by Google

BLACKSMITH & WHEELWRIGHT

The Pioneer Journal of Its Class in the World.

Member of the Audit Bureau of Circulations.

PUBLISHED MONTHLY BY

M. T. RICHARDSON COMPANY,

71-73 MURRAY STREET, NEW YORK.

POST OFFICE BOX, 654. TELEPHONE—7377-7378 Barclay.

CHICAGO OFFICE, Garland Building, 58 East Washington Street.

Entered as second-class matter at the Post Office in New York City.

M. T. RICHARDSON, President and Treasurer
F. R. WHITTEN, Secretary
M. T. RICHARDSON, Editor
FRANK L. AVERY, Managing Editor

F. R. WHITTEN, Advertising Manager
H. F. LUDINGTON, Western Representative
GEO. A. SMITH, Eastern Representative
FRANKLIN MYERS, Art and Copy Dept.

FOREIGN AGENTS:

NEW ZEALAND
MR. R. HILL, Matlock House, Davenport, Auckland, New Zealand.

GREAT BRITAIN
ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance.....$1.00
One Copy, six months, in advance.....60 cents
Single Number.....10 cents
Canadian subscriptions.....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English Money.

Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

ADVERTISING RATES SUPPLIED ON APPLICATION.

SPECIAL NOTICE

Subscribers failing to receive their magazine regularly will favor us by giving us notification to that effect.

CHANGE OF ADDRESS

Subscribers who desire the address of their paper changed should send us the old as well as the new address.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

Our Editor's Letter.

JUST about this time of the year all of us feel that if we had plenty of extra money we wouldn't bother to put on our overalls or office coats but would spend our time sitting in the sun on the south side of the house. Leastwise, that's the way I feel, and I think most of the readers are affected by these warm spring days just as I am.

Notwithstanding this general laziness, you and I, brother reader, have work to do and being Americans, we don't yield to the temptation but we buckle down to work just as usual.

There is a class of people, however, who are lazy by nature, who want to take advantage of our work and spend the money that we have earned. A class of men who are willing enough to divide our savings and so obtain a share for themselves, but when it comes to parting with any of their own—that is another question. They call themselves Bolsheviki and threaten to overrun the world.

We have a fair sample of what they can do to a country if they get into power. Russia never was afflicted with too much freedom, but under the old monarchial conditions, Russia was a Paradise as compared with what it is at present. It is not safe for one to go on the streets in that country.

Despite this horrible example, despite the murders of innocent people, there are a few people in this country who are frank to say that Bolshevism will soon visit us, therefore it is up to us to prevent such a fatality.

If we have accumulated a little money, by hard work, so we will not need to depend upon our neighbors, the county or the state in our old age, we do not want someone to take it away just because that "someone" has been so lazy that they have not saved anything in the past.

Bolshevism is a fine creed—for the man who has nothing. But if he has an extra suit of clothes he can't afford to adopt it or he will lose that extra suit. No matter how little a person may have, there is always someone who has less.

Riches are but comparative; in the eyes of an African you are wealthy if you have anything more than a string of beads and a loin cloth. But do you think that you should work twelve hours a day and share your profits with that African who has spent his time hunting or fishing? If your answer is "yes," then Bolshevism is a good creed for you to adopt. If your answer is "No," then you should discourage all Bolshevism.

If you are a good Bolshevik, you will set fire to your home and shop, because dwellings and buildings are a sign of wealth. If you are a good Bolshevik, you will purchase a gun and shoot every one who wears a collar or owns any property. If you are a good Bolshevik you will try to upset all law and order, you will kill and plunder, but you will expect to be killed or robbed yourself at any minute, for is not that what Bolshevism is?

The Bolshevists say that they will soon rule America—let's see that they suffer a disappointment. Let's show them that they can't instill their crazy doctrines into a nation of intelligent, cool-headed, honest people. But let's begin to show them now, we can't afford to wait until they have gained a foothold.

The Most Popular Topic of Our Discussions at Present.

DOUBTLESS all of us have openly discussed the biggest topic of the day, the League of Nations, we have our own opinions about it. Some of us think the scheme is visionary, others impossible, but we must all remember that nothing is impossible.

Let us consider just what might be meant by a League of Nations and how such a visionary league might be compared with present day conditions. Every individual in the country is subject to a general law which has been made by people elected or appointed for the purpose.

A person cannot start a street brawl or steal from his fellow man without being punished by the law. We admit that such a general law is necessary and we all do our parts in enforcing it. We admit that it is for the common good. We know that to a certain extent it restricts our personal liberty but we do not protest.

In the same way, the states of the country are forced to obey a certain code of laws. One state cannot infringe upon the rights of others. That code of laws is so drawn up that it takes into consideration the good of the greatest number.

Indirectly the individual is responsible for all laws. True, one cannot elect or appoint whoever one chooses for any political position, but every one has a voice in the appointment and the majority wins.

Such a state of systematic law we term as government. We admit it and we would not know how to do without it.

The various nations of our earth have realized that a government of some sort is necessary and working upon the same basis have decided that a government of the governments is just as essential.

Just as the individual is subject to certain state laws, so should the nations be checked by a master code, a set of laws that would govern the relationship of countries in so far as the rights of one country affect the rights of other countries.

If such a league existed in 1912, germany would have been in the same situation as the thief who enters your house at night, she would have been punished by the united might of all the other nations of the earth. She would have been hauled into court like any other common criminal and would have been the defendant in the case of Belgium versus Germany. The world would thus have been saved the cost of a four years' war and the destruction of valuable lives and property.

Like every other legal process, undoubtedly there would be those who would object, but in the main and on the average, laws would be made for the majority of the nations.

In discussing this subject, the League of Nations, therefore, let us be governed in our arguments by practical examples, the details can be worked out and will work out at a later date. At present we are mostly concerned in arriving at some sort of tentative understanding with the other nations.

Your Reputation Is Based Upon Your Responsibility.

THERE is a general tendency to-day, on the part of the average man, to shirk responsibility. How often one purchases an article or has a piece of work done only to find that the article or the work is worthless. When the article is returned or the worker criticized one is met with the question, "What do you expect for your money?"

For the past few years we have come to expect this treatment and have taken it as a matter of course. We have taken what we could get, paid the price, whatever asked, and if we were not satisfied, we have smiled and said nothing.

But those days have passed; we have no sympathy with the fellow who shirks responsibility for his work, we have no use for idlers. If a thing is worth doing at all, it is worth doing well—this is the present day spirit and the man who takes that as his motto will succeed.

Everyone should be willing to take the responsibility of their own work, it is what they are paid for. No matter whether one is driving a nail or building a wagon, there is no excuse for poor work. That being so, one should be willing to stand behind one's work, to be willing to say to the customer—"I did that and as far as workmanship is concerned, I know the product is the best on the market."

When a man comes into your shop and pays you to do a certain kind of work, either you must do that work right or refuse to accept the pay, for only upon that basis can you build a reputation.

Our Own Manufacturers Can Furnish Excellent Products.

THERE is one form of propaganda that is very annoying to the good American, the statement that "It is not as good as before the war because we cannot obtain such excellent dyestuffs or chemicals. Those products were obtained from germany and can't be duplicated by American manufacturers."

Such a statement, and one hears it on every side, should be questioned at every opportunity. It is not true, moreover, because American manufacturers can and do make just as good products as did germany, but the store clerk has adopted this form of excuses for his product.

If such an excuse is used to you—don't buy the product, go to some store that can furnish you with an American-made article that they are willing to vouch for. Above all else, be loyal to America and home trade.

Every time you discourage American-made goods you are catering to foreign trade. Ultimately our own manufacturers will be forced out of business and taxes will thereby be increased.

Let Us Know What Kind of Articles You Want Published.

AT the present time there are but few blacksmith books on the market, the young blacksmith, in learning his trade, depends largely upon the experience of his teacher and has no chance to study. This is one reason why there are so few expert smiths.

Horseshoeing is a science and requires a great deal of experience, if the work is to be done well. Just one little mistake, or one slip, and the horse is injured.

At present we do not receive enough letters relative to horseshoeing from our readers. But it is time for our readers to get busy and

Digitized by Google

send us some, so that we can publish them. It is our intention to run a series of articles dealing with scientific horseshoeing in the very near future, but we would like to hear from some of our readers first.

While you are writing the letter to us, you might give us a few suggestions for articles, undoubtedly you are looking for information along certain lines, and if so, don't hesitate to ask for it. We want to publish articles which will interest our readers, but we want to know just what the readers want.

In "Those Good Old Days" of Long Ago of Which the Old Timers Speak.

THOSE who are compelled to pay the exorbitant prices charged now for meats of all kinds will be interested to know what meat cost seventy-five or eighty years ago.

The editor and publisher of this journal recently came across a bill for meat which was delivered to his father, Thomas Richardson, in 1832. One item is 6 lbs. veal at 4 cents—24 cents; another item is 5 lbs. beef at 6 cents—30 cents; 4¾ lbs. pork at 10 cents—48 cents.

In those good old times it did not cost so much to live as it does now, but perhaps the people of those days had just about as much trouble paying their bills because wages were low and hours long, and money not easy to get hold of.

The writer remembers when carpenters and other mechanics worked twelve hours a day and thought nothing of it. It was the regular thing.

The value of scrap, whether in industrial works or in moral law, is on the same basis—we cannot waste the milk without losing butter.

The Metal Turning Lathe

Part 4—Shaping and Grinding the Lathe Tool, Cutting Threads, the Use of the Steady Rest and Correcting Centers.

The grinding will be a matter of resurfacing the top face and bringing it to a new flat surface parallel with the old. If the nose needs, however, to be heated for the purpose of reforging, we may have a good deal to do besides. It would seem advisable to seek to avoid all reforging if possible, in order to prevent warping and other deformations, which lead to the necessity for extensive grinding. Now it may happen that, when we regrind a dull tool, even though we grind only the top surface, we may heat up the edge enough to destroy part of its hardness. This will require that we reharden the tool. And rehardening requires reheating and possible warping.

Care in Grinding.

The thing to do, then, would appear to be to handle the grinding in such a way as not to affect the hardness. About the only sure and simple way is to grind in water. We may arrange for a stream of water direct onto the nose of the tool. Let this stream be rather a generous one, fully up to its duty of carrying off the heat generated by the friction of grinding. If this is done, we may reasonably expect that, in many cases at least, we shall have no other grinding to do after we are once at work than the mere resurfacing of the top of the nose end of the tool.

The grinding and regrinding will naturally result in wearing down the nose of the tool on top. We will need to pay attention from time to time to the matter of making sure that this top surface is exactly on a level with the axis of the prospective screw. This is an important matter, wherever an accurate screw thread is to be cut.

In cutting a screw thread, as in lathe work in general, the final cuts should be very light ones. This matter is, of course, regulated by the hand.

Screw threads are of many kinds. One of the principal varieties is the 60-degree, sharp

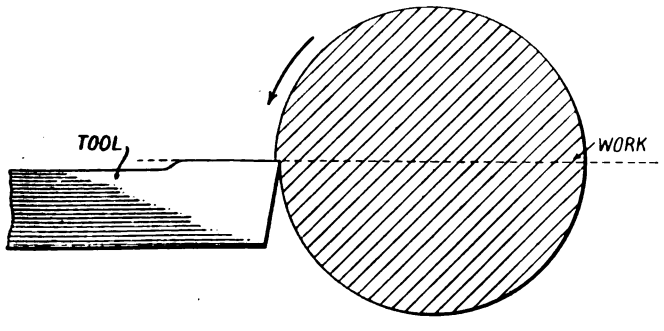


Fig. 3—The Top of the Cutting Edge of the Tool Nose Should be on a Level with the Center Line of the Work.

V thread. With this thread an axial section shows an equiangular triangle, each of whose angles is 60 degrees. The corners are either left sharp or are rounded a very small trifle. The groove is precisely the same as the thread. There is another type of thread in which the top of the thread—and the bottom of the groove—is flattened.

Then there is the Whitworth (British) thread in which the angle at the top of the thread is 55 degrees. So also with the bottom of the groove. Then the top of the thread and the bottom of the groove are decidedly rounded. There is also such a thing as a square thread, including a square groove. The lead screw on the lathe will probably have a square thread. But the threads that are more or less pointed are the ones in common use. They may be cut by following the directions I have given.

Making the Tool.

Perhaps the most difficult matter will be the making of the tool to do the cutting. The vital thing in forging and grinding the cutting end will be the accurate shaping and

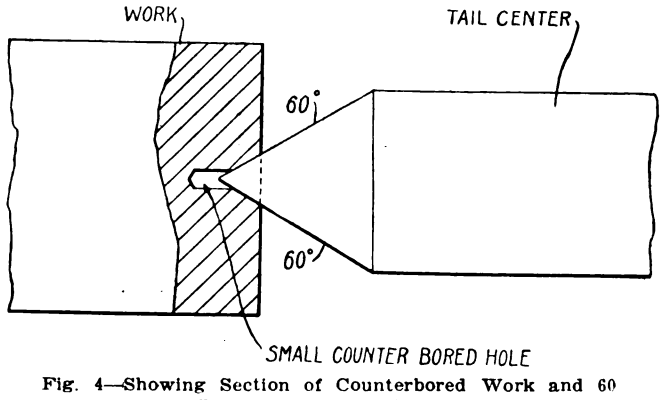


Fig. 4—Showing Section of Counterbored Work and 60 Degree Tail Stock Center.

sizing to the exact form and size of an axial section of the proposed screw. This work done, the rest ought not to give much trouble, unless we attempt to deviate from the directions I have been giving.

The work of screw-cutting that I have been explaining concerns particularly external threads. In the shop, however, we shall have to deal with internal threads as well. Ordinarily we will do the cutting by means of taps.

Let us now consider a point or two with regard to the mounting of the work for external screw-cutting. The work will ordinarily be put together in a chuck and be supported entirely by the head stock or else it will be mounted between centers set in the head stock spindle and in the tail stock. Where the latter method is applicable, it will probably be found to give the most accurate results. There are many cases of work having small diameters and short length for which a mounting between centers would be almost or quite absurd. Then there is work which cannot well be set up between centers.

There is one thing to remember with great faithfulness in connection with work mounted in a chuck: Never disturb the work after it has once been secured and the cutting started. Work mounted on centers may be taken off when half done and put back again later for finishing, without serious danger of getting it "out of center"; but this is not the case with ordinary mountings in chucks. When you have once begun, then, don't let up until the job is finished. Of course it may be left on the lathe over night or over Sunday, provided it is not disturbed. The cuts should be light, even from the beginning. This reduces the work's liability to dislocation or to bending. A fairly high speed and a very light cut is the combination suitable to thread cutting.

I have already used language implying that exactness might be expected when the work is mounted between centers. This should be understood in reason. It is possible to mount the work imperfectly, which will then make errors possible. Besides, work mounted between centers will often be long and of rather small diameter as compared with the length. Such work is liable to bending during the cutting operation. There are at least two remedies.

The Steady Rest.

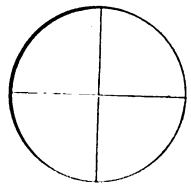
First, the work may be supported at a point intermediate between centers by means of a steady rest. This is an upright frame or bracket suited to support the work without interfering with its rotation. The steady rest may be shifted from point to point as the conditions at the moment demand and permit. The second remedy is gentle cutting. High speed and a light cut constitute again a very good combination.

I come now to the matter of mounting the work on the two centers. The center in the spindle of the head stock rotates with the work—it is a live center. The tail stock center, on the contrary, remains fixed. The work twists around on its point. The two centers have conical points. These should be neither too slender nor too blunt. If the full angle of the conical vortex is 60 degrees, the center will be just about right for average work.

Conical holes, also with 60-degree angles, are bored in the ends of the work. These should be deep enough to cause the support given by the two centers to be supplied in part by rather thick portions of the center points. Then the conical holes should be bored deeper at the bottom by an ordinary cylindrical drill bit of small size. The depth of these little holes should be more than sufficient to enable the conical center points to be introduced into the conical holes and brought up tight without running any danger of the extreme tip of the center point coming into contact with the metal of the work. Make the little holes deep enough and to spare. The object in view is to prevent damage to the tip of the center.

The lathe operator may find that it is not at all easy to bore the conical holes so that the work will run true. There are two difficulties. First, the holes may not be started in the exact centers of the ends of the work. When it occurs, this is a bad error and calls for correction before going on with the work. The second difficulty is to keep the conical hole central with the work as we continue to bore it.

It is a bad error to get these holes out of



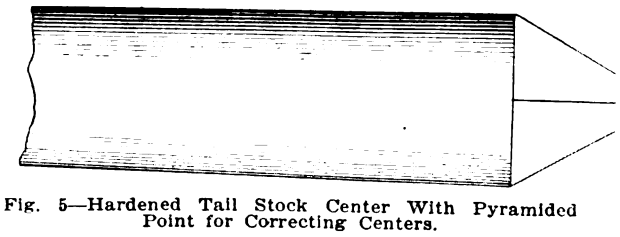


Fig. 5—Hardened Tail Stock Center With Pyramided Point for Correcting Centers.

line with the axis and consequently very probably out of line with each other. However, in respect to both difficulties, it may be as well to say at once that slight errors may often be corrected.

The following method may be used with

Digitized by Google

a view to correcting small displacements of center holes. Provide a piece for the tail stock that shall be a duplicate of a center point with the exception of two things. First, instead of a conical point, a three-cornered or four-cornered pyramidal point is used. Second, this point is to be hardened. It is proposed to use it as a boring tool. To do this, the work is run on this tool as if it were the dead center.

Correcting a Poor Center.

Use plenty of oil in the center hole and on the center point. Now bring a tool up close to the work—say, half way between the ends—as if it were the intention to make a cut. By rotating the work, by running the lathe slowly by hand, it will be noticed that the work approaches and recedes from the end of the tool. This is because the center holes are wrong. Now, instead of a cutting tool, bring up against the work a blunt piece of

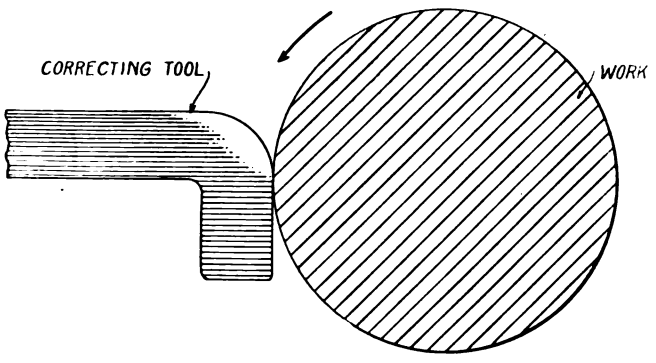


Fig. 6—Illustrating Method of Correcting Center Hole, Slightly Out of Center with Axis of Work.

steel. Have this piece held firmly in the tool post. As the work goes round, the hand being used as before to effect rotation, the work will rub the blunt end for a moment and then be out of contact with it.

The idea now is to gradually force the blunt piece against the work. A slight cutting action will start up in the center hole at the tail stock end of the work. Continue to press the tool forward until the work runs perfectly true and bears evenly against the blunt piece all the way round. The operator must judge when he can use power to work the lathe. When beginning with power, begin with a very slow speed and feel your way.

When the hole at one end is in perfect shape, take the work out and reverse it. Then do the same for the center hole now bearing against the pyramidal center point in the tail stock as you did for the other hole. Start by working the lathe by hand, and feel your way as before.

LAURINBURG NORMAL AND INDUSTRIAL INSTITUTE.

One of the worthy enterprises which has sprung up in the South and which has been incorporated for the benefit of colored men and women is known as the Laurinburg Normal and Industrial Institute.



The Blacksmith Shop of the Laurinburg Normal and Industrial Institute.

This institute is supported largely by popular subscription and in addition to its regular courses of study, blacksmithing is taught. Herewith is reproduced a picture of the blacksmith department. The shop is located on the northeast side of the campus and is 18 by 32 feet in size. It is a single story frame building, but is fairly well equipped.

The shop is furnished with a stationary forge, a Champion blower, a 98-pound anvil and a tool bench 2½ by 5 feet. The bench is furnished with both a sledge and hand hammer, eight iron swages, five pairs of tongs, six hand punches and a blacksmith vise.

The smith course is divided into three years' work and extends from shop cleaning to scientific horseshoeing.

In the first year the students are taught proper shop arrangement, the names of tools and machinery, and simple work like the making of hoops and staples and the management of horses.

The second year the students take up the anatomy of horses' feet, the setting of axles and general repairing. In the third year forge practice, tool making, implement repairing and scientific horseshoeing.

In addition to the ordinary work the students are given a general idea of bookkeeping, billing and stock inventories.

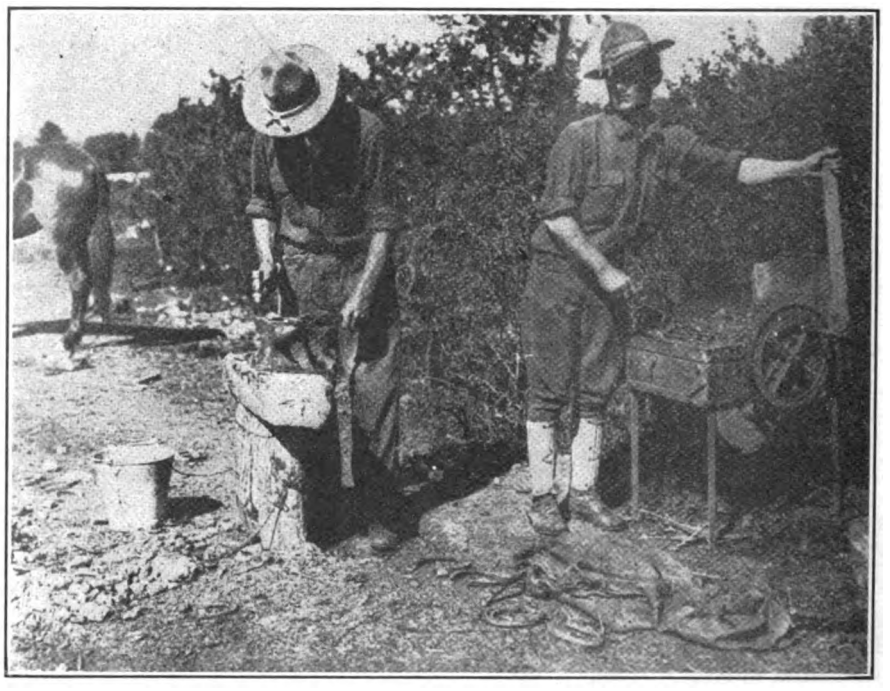
Our Boys in France.

On every hand we hear stories about the various departments and industries that made possible the defeat of the hun, but seldom do we hear anything about the blacksmith. One should not get the impression that the worker in iron was a negligible factor for on the contrary he played an important part.

Both horses and mules, particularly the latter, were used in enormous numbers and our Government trained men especially for smith work. It is a question as to whether the mechanic or the blacksmith was the most necessary. The average automobile and truck mechanic might have been able to make ordinary repairs, but machines underwent terrific service over rough ground; service which strained the machines, smashed the axles and bent the frames.

Repairs of this class required the attention of skilled smiths, men who did not depend upon lathes and similar machines, but who could really work the iron or steel and put it into shape again.

When Uncle Sam's boys do a thing, they do it well, and when their country called for blacksmith and metalworkers, they responded with a will. Whether the work was to restore a truck which had encountered a hun shell, or shoe a horse as shown in the photograph, the boys cheerfully did their work.



Two of Our Boys Busily Engaged in Smith Work on the War Front. Photo by Press Illustrating Service.

ANNOUNCEMENT.

We are informed that Mr. E. R. Yarnelle has been elected president of the American Horse Shoe Co. to take the place of Mr. Philip S. Dyer, who recently passed away and whose obituary notice appears elsewhere in this paper.

Mr. Yarnelle was formerly vice-president of the same concern and his promotion shows how well the board of directors regard his services.

A LITTLE SLICE O' LIFE.

So runs the title of a short story which appeared in the Evening Mail (New York) a short time ago. The article is so interesting that it bears repeating for our readers:

Job hunting has become acute.
The other day a jobless man
Stood by the river and another man
Was drowning. The drowning man
Cried for help.
"Where do you work?"
Asked the Jobless One.
"Thirty Green St.," was the reply.
"Go ahead and drown," said the
Jobless One. "I'll get your job."
He hurried to 30 Green Street
And said to the proprietor:
"Your man has just drowned.
I have come for his job.
Hurry up and give it to me."
The proprietor said calmly:
"You're too late, young man,
The guy who pushed him in
Has got the job."

If you like this magazine and feel that it is useful and interesting, the one best way to show your appreciation, is to purchase your accessories and supplies so far as possible from our advertisers. Also write to our advertisers for catalogs, printed matter and prices, not forgetting to always mention the fact that you saw the advertisement in the Blacksmith and Wheelwright.

Digitized by Google

Entries In Prize Photograph Contest

We are pleased that the blacksmiths are beginning to send in photographs for our prize contest regularly. For a time it looked as though all of our readers were ashamed of their shops or were not proud enough of them to have any pictures taken, but evidently the signs were wrong, for we have received a number within the past week.

Just before the magazine went to press we received a very interesting picture from one of our subscribers which showed the front of his shop. In all of our experience we have never seen such an idea in the shop line. We say this because we want all of our readers to watch for the next issue in which the picture will be reproduced.

PRIZE PHOTO NO. 4.

We reproduce herewith a picture of Mr. Theo. Anderson's shop and in the Workshop Experience Department we have given Mr. Anderson's letter in which he gives some details about it. We did not put Mr. Anderson's letter on this page simply because he gave a number of interesting suggestions and sketches which really belong under the Workshop Experience Department.



Evidently Mr. Anderson Takes No Chance With the Fire Fiend. His Shop Is Fireproof.

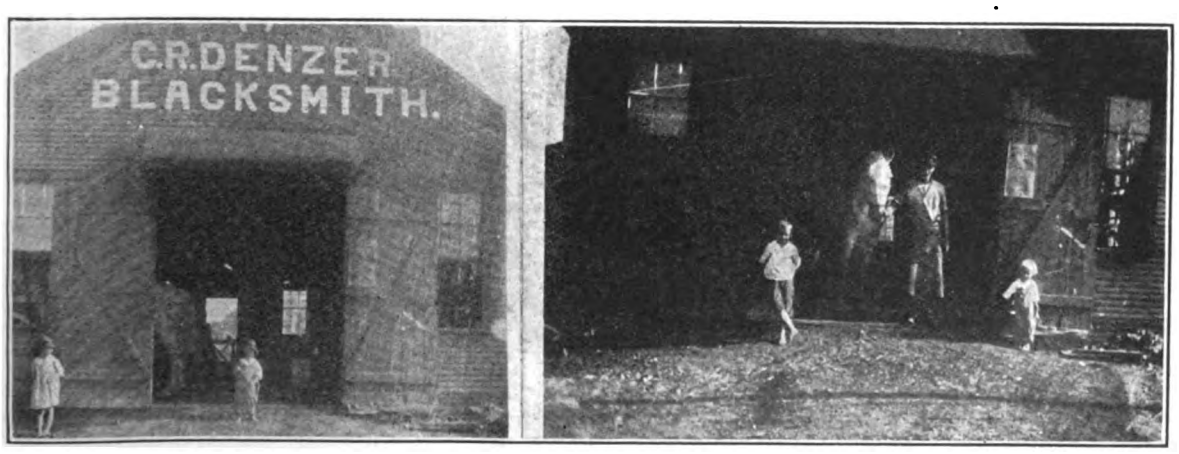
PRIZE PHOTO NO. 5.

From C. R. Denzer, Ohio.—I am sending two pictures which I should like to enter into the contest. Picture No. 1 is of my shop, and the fellow with the hammer in his hand is my youngest son. His sister is standing by the door. The other picture is of my oldest son on the right, the youngest son on the left, and myself in the center.

My shop is 24 by 50 and has 12 windows in it. We have plenty of light. I have two fires as I have some help sometimes.

We are getting $2.40 up to No. 5 shoes, $2.80 for No. 5 and No. 6's, $3.20 for No. 7 and No. 8 open shoes. Reset up to No. 5's, $1.40, No. 5 and No. 6, $1.80, No. 7 and No. 8, $2.20.

I read The Blacksmith and Wheelwright every month. I get it here at the newsdealer's and think it is a great help. I do some auto work such as repairing radiators, truss rods, tenders and such work as that.



C. R. Denzer's Shop, Showing Himself and his Two Sons.

PRIZE PHOTO NO. 6.

From H. F. Towner, California.—I have read the Blacksmith & Wheelwright quite frequently in the last three or four years and though I have but just become a subscriber I have always appreciated the paper.

I often read and get different ideas about doing work and various tools and this information is a big help. I seldom see articles in your paper written by California blacksmiths and so, being somewhat of a plunger, I am going to dive into your columns (if you will permit me) and give you a few ideas as to the way we do things out here.

My shop is located in Santa Ana, the county seat and center of Orange County, the richest county in the state, where we raise almost everything that grows and farm twelve months in the year.

Doubtless everyone knows that the work we do here is altogether different from work done in the east, since everything in the tool line is much heavier. (Western tools are called "California Specials" by the eastern jobbers.) Among the special tools are subsoilers which were originated in California for deep tillage.

This subsoiler is built with as many as seven standards which break the ground to a depth of from 18 to 22 inches. Subsoilers are usually worked with the 75 Holt caterpillar and are becoming quite popular in this district. If any of the readers are interested in knowing more about these subsoilers I will gladly furnish drawings for the magazine.

In my shop I have two hammers, one heavy, which will handle a 3½-inch weld in one heat. This hammer I had built to order. The lighter hammer, 50 pounds, a Giant, is fitted with special dies for forging, this with the hammer tools makes it equal to a 75-pound head. I have used several makes and am perfectly satisfied with the Giant.

I also have two base drills, one with a back gear for reaming up to three-inch holes, mostly for well tool work, the other with the base cut off on the front side so that it will take wheels or bands.

I have also a pair of shears which I designed and had built to order in Los Angeles. The shears with a five horsepower motor cost $1,000, and they will cut one-inch flat steel six inches wide, or 1½-inch round or square steel, or 4 by ½ inch angle iron, and will punch a one-inch hole in one-inch steel.

To complete the list of power-driven tools, I have a number 34 automatic thread cutter, an emery wheel stand and a back geared hack saw which will handle 12 by 1 inch plow steel, stock that I use for subsoiler standards.

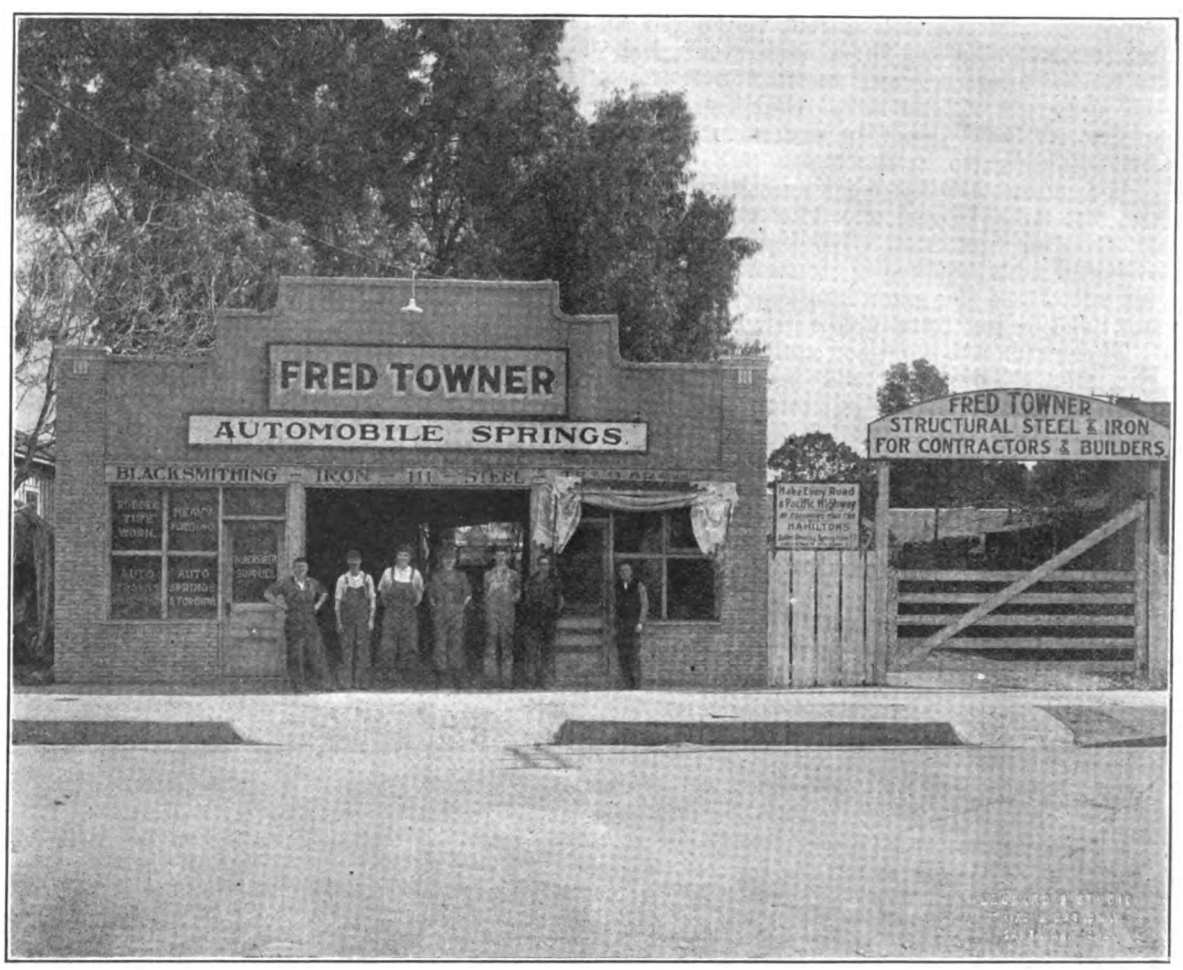
For forging, cutting round ends on finished work, swedging, fullering and flattening, I use the power hammer except in a very few cases.

As additional equipment I have a Burdett welding and cutting outfit with a double hose so that I never have to change from a welding torch to a cutting torch, all I need do is to change the tips for different size jobs. Two 300 feet Presto-Lite tanks and several oxygen tanks assure me of a good supply of gas at all times.

Automobile spring work is also in my line and I carry springs for all standard makes of cars. I carry a full line of bolts up to one inch and a few lengths of 1⅛ and 1¼ inch iron. I also carry a full line of steel up to 6 by 1 inch flat, up to 3 inch round and 3 inch square. I also deal in blacksmith coal.

I have the county agency for roller bearing inserts for automobile springs and will say that they have been a good money maker for me. If any blacksmith would like to make money in his odd times, let him write to me.

(Editor's Note:—Mr. Towner has sent us the sketch for a special spring hammer which will be reproduced shortly in the Workshop Experience Department.)



Mr. H. F. Towner's Smith and Auto Shop.

Digitized by Google

A Practical Truck Body

The Average Blacksmith or Wheelwright Can Earn Money In His Spare Time Building Truck Bodies

BY F. L. ALMY

Herewith are reproduced the details of a handy truck body which the average blacksmith or wheelwright should be able to build. This sort of body should be of general utility to the farmer but is designed more especially for contractors who move household furniture or similar articles.

The body is mounted upon a Studebaker chassis which has a wheel base of 125 inches. In length the body measures ten feet, while the width is five feet four inches. Inside the distance between the floor and the top is five feet ten inches.

The body is built upon two runners, one of which is shown in the illustration at F. This runner is ten feet long, seven feet wide and three inches thick, and the two runners are held together at the back by a board thirty inches long and of the same width and thickness.

Resting upon these runners are five cross members, G, which carry the body. These cross members are five feet in length and made from four by three inch stock, bolted to the runners as well as to the frame of the car. It will be noted that they extend out over the wheels in order to give the maximum width to the body.

Extending lengthwise upon these runners are the sills H and J. The two side sills H are ten feet long, five inches wide and two and a half inches in thickness. The center sills J are the same length and thickness, but need be but four inches in width.

These sills are mortised and screwed to the end sills. The front sill is five feet four inches, while the rear sill measures six feet three inches in length. Both sills are two and a half inches in thickness. The floor should be made of two-inch stock and reinforced by hoop iron running lengthwise.

For the sides there are six posts, K, and one at the front shown at L. These posts are five feet four inches in length and made of two by four inch joist. Across the tops of these posts are two top sills as well as one crosswise piece, N. These sills are all made from two by three inch stock.

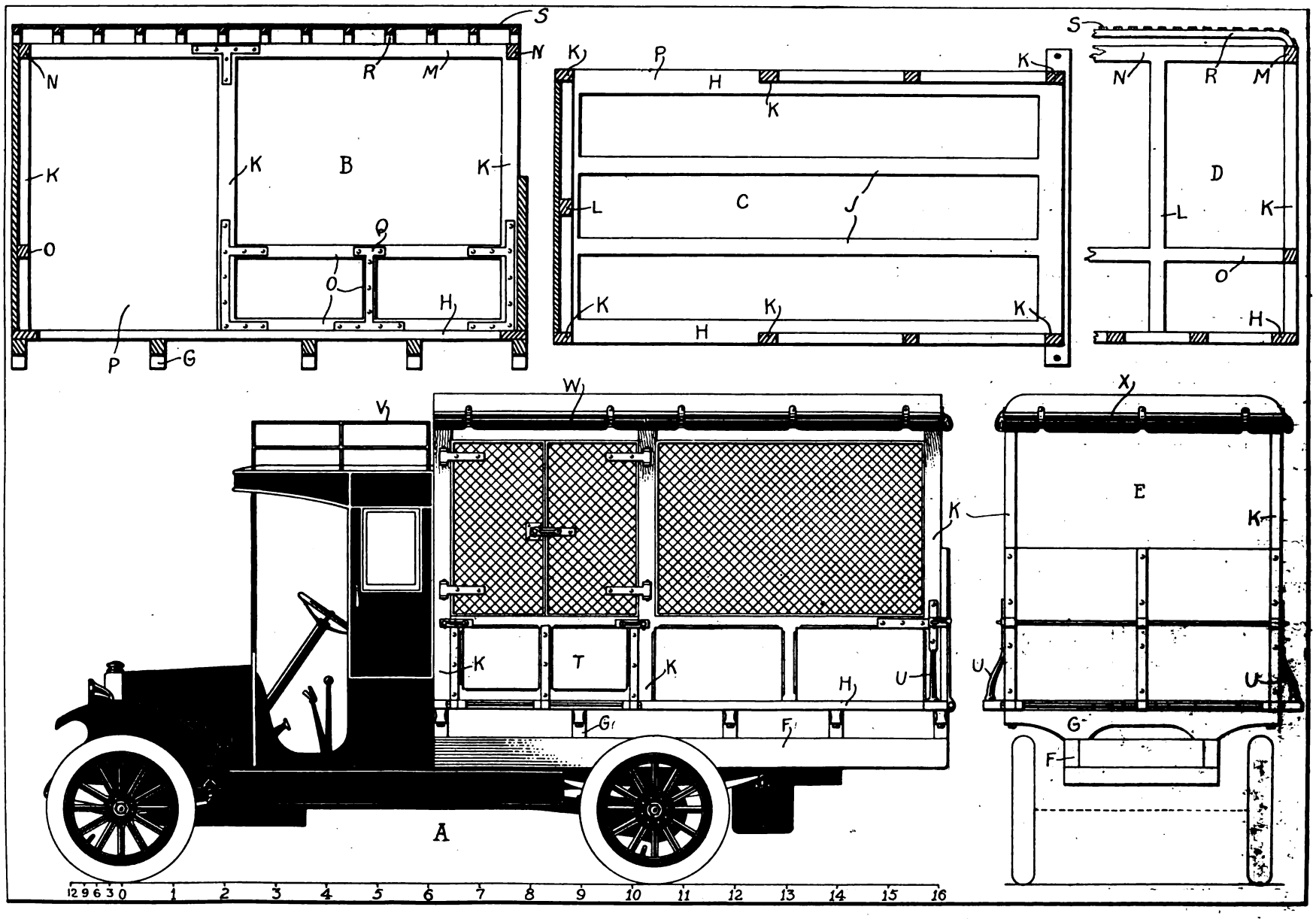
The panel support, O, are made from two by three inch stock, the top panel support being located twenty inches from the floor. The side opening or door at P is three feet eight inches wide. All of the sills and supports should be well braced with strap iron as clearly shown in the various sketches.

The forward end of the body is panelled its full width and height. There are thirteen roof bows, R, made from one-inch square stock. The ends of each bow are bent so as to give a five-inch drop. Running lengthwise at the top there are twenty roof boards, S, measuring one and one-quarter by one-quarter inches and ten feet long. These boards help to shape the roof and hold the covering in place.

The sides ordinarily should be made of heavy wire screen held in place by wood screws. The two panels shown at T in the door should be arranged so that they can be opened without disturbing the screen doors at the top and the two top doors can also be opened without disturbing the panels T at the bottom. The side door is very handy especially on rural express routes where the loads can be removed both at the front and at the back.

The tail gate at the rear measures five feet four inches by three feet and is hinged at the bottom as well as at the middle. For carrying spare tires the top of the driver's cab is enclosed by a metal railing, V.

Extending over the sides of the body as well as across the back and illustrated at W and X are side and back curtains which can be unrolled and fastened to the panels at the bottom in case of wet weather.



An Easily Constructed Body for a Studebaker Truck Chassis.

AN EXTRA FINE LETTER

From Tobias W. Nolan, New Jersey.—For the past sixteen years I have been a faithful subscriber to your famous paper, and I want to give testimony that each and every copy has given me the greatest pleasure; each and every issue has contained some article that has proven of great value and information to me, that I have said many times that one article is worth the price of an entire year's subscription.

I have saved every copy from the very first one I received, with one exception, and I think a tramp blacksmith who was in my shop stole that one while I was outside hitching up a horse that I had just shod for a lady. The tramp must have known a good thing, for when he went, my paper went also; I don't accuse him of stealing it, but it just kinder followed him off. Well, I hope the reading of it made him see the error of his ways.

I hope he has reformed and now has a prosperous shop of his own, and reads these lines. My only regret was the loss of the copy which spoils the collection. And my greatest regret was that I had not subscribed 10 or 15 years sooner.

After I read my first copy I realized how great my loss was, but the publisher had taken care of just such cases as mine, for a short time before he had published a set of four books entitled "Practical Blacksmithing" in four volumes.

These works contained the best articles that had been published in The Blacksmith and Wheelwright for ten years previous, put in book form for the price of $1.00. Oh, how I read these works and figuratively devoured every article. Shortly afterward he published the "Practical Horseshoer." You can just bet that I got the first copy. Next came "Artistic Horseshoeing." I bought that also. I also bought some similar works from another publisher and although I have a couple of hundred volumes in my library to-day these same old works have a prominent place in it, and I have never tired of reading them.

I have been in seven different States of the Union and part of Canada, and must say the blacksmith who forges ahead is the one

Digitized by Google

who reads and learns how. When I stop and look back, I consider I spent eight years under instruction in some of the best shops trying to learn the trade at very low wages, but after that I just coined money. The trouble with most of our young blacksmiths is that they start in business before they have really mastered the art, for bear in mind, brothers, the blacksmith's trade is an art; it is the most difficult of all trades to master, for you must work fast while your iron is hot, and think while the iron is in the fire.

Always try to have a clean fire. Many smiths try to weld steel in a fire so dirty that you could not successfully weld iron in it. Bear that in mind. Also weld the thin ends of your laps first, for they get cold first, then pound the middle or thick part afterward, for a loose lap makes a weak weld.

In shoeing a horse be as kind as possible to him; remember that he is one of God's creatures, and if he appears restive, let his foot down for a few minutes. Sometimes he has a cramp in his leg, and after a short rest will stand quiet.

Also remember that the foot is a sensitive, living thing, operate on it as such. Do not cut away too much, leave the frog alone except to trim loose pieces, it sheds off so often anyway.

Do not open the heels or cut away the bars—it only weakens the foot; use a good sharp rasp to level the foot, apply a hot shoe only lightly for a second, so you can see where to rasp. The man who burns it in level should be arrested.

Drive your nails only high enough to hold shoe on, heel nails the lowest. Try and keep hoof at the proper angle. Don't file gutters under the nails when clinching up and when all done, black off the outside of the hoof with some dressing—pine tar makes an excellent dressing thinned with oil—this fills up the pores of the hoof that the rasp has opened. Unless filled up, rain will get in and the hoof rots.

Take your time, charge a good price for your work, and never do a job that you are ashamed of. Success will crown your efforts. I have never regretted that I learned the good old trade, but I see that the automobile has put a big crimp in wagon work, so be up to the times, follow the band wagon and as you lose wagon customers make up your mind you will have to fix automobiles or you will be left by the wayside weeping.

The auto repairing game is a trade by itself, and will have to be learned. This is the way to do it. First buy a Ford for yourself, the older the better; it will soon get out of order. Try and find out what's the matter. If you don't know, ask all your friends. The chauffeurs will tell you, and I will guarantee that before a year is up you will be fixing Fords for other people.

You can always keep busy building grocery and express bodies for them. Also there are plenty of second-hand ones always for sale. Buy one, fix it up, put a business body on it, paint it, and you will find it quite a side line, and as you go along you will become more expert.

The publishers of The Blacksmith and Wheelwright have been printing articles lately instructing us how to do certain repair jobs in automobiles. If you are not in the game, all of these articles are Greek to you, in fact maybe they are somewhat distasteful, but wait until you are in the trade, how eagerly you will read and profit by these articles.

I have retired from the good old blacksmith trade, but never, never have I regretted the day I learned it, and now as I go past some door of an open smithy and stand and look in as the little children did of yore, and the aroma of burning horse hoof floats out and greets my nostrils, I feel sad, and wander on, for fear the strong impulse which overwhelms me will cause me to rush inside, and shout "Here I am" and don my old leather apron again.



An Oil Fire Furnace.

From Mr. Theo. Anderson, Nebraska.—I have been intending to write to you for the past year, but have had so much to do in the shop in addition to work in the garden that my time has been fairly well taken up.

There are a number of things that I want to tell about which might be of interest to

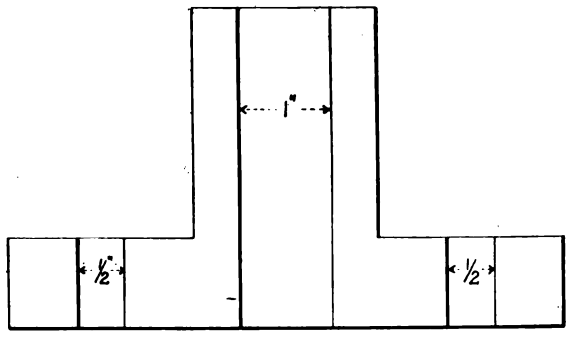


Fig. 1—Mr. Anderson's Rig for Threading One-Inch Stock.

the other blacksmiths. In the first place, I have used my Monarch disc sharpener for cutting threads. I have a sixteen-inch pulley on the line shaft and installed a six-inch pulley on the disc sharpener shaft, so as to get the proper speed.

For cutting a thread on a three-quarter inch size stock, I first cut a thread about half an inch long on the bar and screwed it into the place where the bolt is located which holds the disc to be sharpened. Then I start the die on the three-quarter inch shaft and give the shaft plenty of oil. The die feeds itself without any attention.

For cutting threads on five-eighth inch shaft, I obtained a buggy stub and cut the thread so that it would fit in the disc sharpener plate, then I bored a hole and tapped it for five-eighths of an inch stock, cut a five-eighth inch thread on the stock at one end and screwed it into the buggy stub.

For cutting thread upon a one-inch stock, I obtained the square part of a one and one-quarter inch stub and drew it out a little so as to leave plenty of metal both on the flange and at the center as shown in figure 1. Then I bored a one-inch hole at the center and two half-inch holes at the sides so as to fasten it to the machine.

I tapped the one-inch hole at the center to take the one-inch bar. This arrangement has saved me lots of hard work when cutting the thread on long rods and bolts.

In my shop I have a two H. P. electric motor, an emery wheel and stand which has a

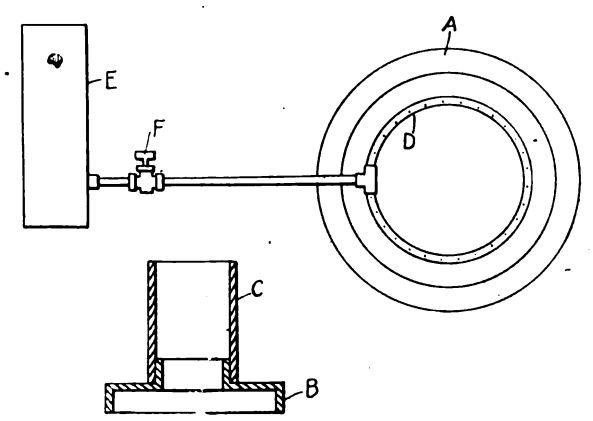


Fig. 2—Details of the Oil Heater.

saw on one end, a disc sharpener, a drill, a Little Giant Hammer, a lawn mower grinder, a double forge, two anvils, a cold tire setter and a rubber tire setter.

Where I have wide tires I heat them in an oven built according to my own design which is heated by kerosene and wood from the shop.

My building is built of cement blocks and is 25x60 feet in dimensions with a cement floor. I have electric lights and power and city connections. I don't believe in using booze and won't employ men who do use it if I know it.

The tire heater of which I spoke is built of brick and is circular in shape, as shown in figure 2 at A. Over it there is a hood, B, with a stove pipe, C, at the top. This hood and pipe slips into place after the tires have been put in the stove.

I use about a gallon of kerosene together with shavings for the fire. The kerosene is contained in the tank E and controlled by the valve F and leads to a circular burner, D, which is punched with a number of small holes.

I have a cross trestle upon which to lay the wheels while the tire is being set. This trestle is located out of doors and is made of lumber two by ten inches in dimension and shown in figure 3. Upon the top of the trestle are located two by four inch joists which are hinged upon bolts at one end. One end of the joist is cut down so as to form a handle. You can lift the wheel by this handle without burning yourself.

In this part of the country we get fair prices and have plenty of work both on plows and horseshoeing. I do some auto repairing

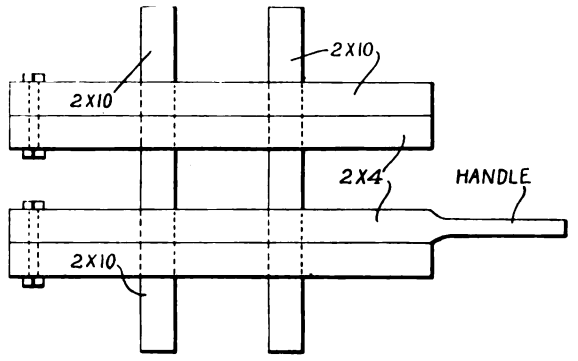


Fig. 3—Tire Setting Trestle.

as well as work on tractors and do job work on most anything from a pocketbook to a threshing machine. I have been in this town in business for about ten years, that is, working for myself.

Prices in Iowa.

From J. S. Shultz, Iowa.—I am well pleased with The Blacksmith and Wheelwright and get lots of good information from it. It's surely cheap for the price. Have had all the shoeing that two of us could do for seven weeks. We are getting:

$0.50 for resetting.
.85 for steel plugs.
6.00 for wagon axles.
5.25 for wagon tongues.
6.00 for sled runners.
1.00 for setting tire 1½ in. and smaller.
5.00 per set over that size.
.40 for new spokes.
.35 if more than five are put in.
1.25 for sharpening plows.
2.00 for pointing plows.
.25 for sharpening each disc blade.
1.75 for sharpening shovels.
2.75 for pointing up shovels.

These are a few of our prices, and I'm not a cheap fellow. The farmers don't kick about the price of anything. They want to get the work done, and I have been offered a dollar extra if I would go to my shop to shoe a team after supper, but I refused to go; I tell them that from six to six is shoeing enough for one day.

Lots of the farmers tell me that they would not work as hard as I do shoeing horses for twice the price. Collections have never been better. There is very little money outstanding, hardly enough to speak of.

Digitized by Google

A NUMBER OF ANSWERS.

From S. F. Clatterbuck, California.—I have only taken the Blacksmith and Wheelwright a short time, but as I notice that the editor is very glad to have the brother blacksmiths write him, and give a story about their part of the country, I am going to tell a bit about the trade out west.

I have noticed in several issues of the Blacksmith and Wheelwright that most of the blacksmiths are anxious to hear more from their brothers in California. I see that most of the smiths give their price lists and a story of their experience, and many of them ask different questions about different kinds of work.

Particularly one in the November number, in which some brother asked how to point a plow, and in the next issue Mr. J. A. Allen says to use a horse rasp or a piece of hammered steel ⅜ x 1¾.

I agree with Mr. Allen that will make a nice point for the average plow from Colorado on east. But the further west you go from Colorado the heavier the plow points are made. The forming is done on a little larger scale, and a little cheaper than it is in the East.

For instance, we will take California. I have been here about five years in different parts of the State, and its about the same all over, and the average plow in this part of the country is ½ x 2 or ⅝ x 3 hammered steel for a point, and then we draw it out until it is about 5 or 6 inches long or sometimes as much as 8 inches from the throat to the end of the point. And then they wear them out from one to two day's plowing, away up to the bar of the share, and I harden them as hard as fire and water will make them.

Most of the plowing in California is done by caterpillars, and they generally break the ground from 9 to 16 inches deep. So it takes good long points to do it. Generally, they figure on each share to plow about 12 to 18 acres of land at each sharpening.

Each caterpillar has from ten to twelve, and sometimes as many as twenty 18-inch shares, and they turn over two to three hundred inches of soil at once, and they keep them going day and night.

I have had several shops in the East and Middle West. Now I have a nice shop of pressed brick, 25 x 70. I have three electric blower fires and one "four-hundred" hand blower, two new Kerrihard hammers, one 30 lb. and one 75 lb., thread cutting machine, saw, emery stands, drill and other machinery.

Every time I buy something I try to get the best, for I have been in the business for the last 46 years, always on the job, and I have found out to buy the best and do good work is always cheapest in the long run. I have had this place for over two years. I started out with one fire and now I own my own building and everything is paid for.

I have two other men working for me and I work myself. In the busiest part of the year I have five men. My shop generally runs from six to twelve hundred dollars a month, and I will not credit anyone unless he can put up good security, or go to the bank and get them to stand good for his work. Having lost many thousands of dollars by credit before I came here, I know that it doesn't pay to do credit work, and I don't do it.

While the work in this State is different from that done by my brothers in other States, I'll give you a part of my price list, for I think that I get a little better price than the average shop, and I would like to see the smiths get together and go still higher, for a blacksmith can never earn too much for his labor.

Wagon Work.

Setting tires 3 and 4 inch, per tire	$2.50
Setting tires 4 to 6 inch, per tire	3.00
Cart tires, per set	4.25
Buggy tires (4)	5.00
Wagon felloes, 3 inch	1.50
Wagon felloes, 4 inch	2.00
New wagon tongues with old irons and up.	$12.00

Horseshoeing.

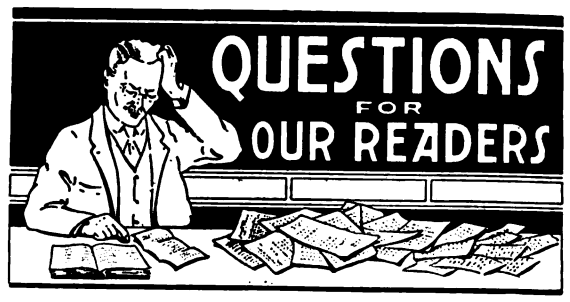
Plain 0 to 3	$2.25
4 and 5	2.50
6 and 7	3.00

12½ cents extra for each calk. No old shoes reset.

Plow Work.

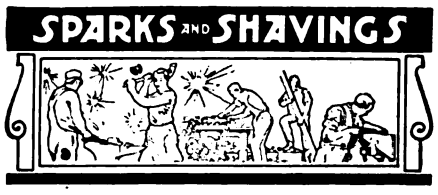
Plows sharpened,	10	inch	$0.30
Plows pointed,	10	inch	1.25
Plows sharpened,	12	inch	.40
Plows pointed,	12	inch	1.50
Plows sharpened,	14	inch	.50
Plows pointed,	14	inch	1.75
Plows sharpened,	16	inch	.75
Plows pointed,	16	inch	2.00

Stockton shears sharpened 40 cents and up. The rest of my prices are based accordingly. One of my smiths has just told me that I ought to have stated above that some farms here have as much as fifteen thousand acres in grain at once.



A Saw Table?

From Chas. Jenkins, Canada.—Will some brother be good enough to tell me through the columns of the Blacksmith and Wheelwright how to build or make a small saw table or stand for a circular rip saw with tilting table and give full measurements and also how fast the saw should run. How many R. P. M., say, on a ten or twelve inch saw for use in a small country shop.



Sandbo Starter.

Now that the automobile owners are putting their cars into condition for the spring and summer seasons, undoubtedly there will be a great call for the installation of starting devices on the older cars which are not equipped with starters.

There is one device called the Sandbo Starter, manufactured by the Bear Mfg. Co., Rock Island, Ill., which is well worth investigating, because it is cheap and well within the reach of the average farmer. It is designed particularly for Ford cars and is termed a "mechanical starter." The device can be placed upon the Ford car very easily and the blacksmith should be able to pick up quite a little money on the side making these installations.

The starter is said to be positive in action because it turns the engine over past two firing points with but little effort on the part of the driver.

Wagon Bodies and Parts.

The blacksmith or wheelwright who has much wagon work, either for repairs or building, should by all means get prices from the American Carriage Co., Kalamazoo, Michigan, who make a specialty of low priced parts. Their line of parts is very large and they also manufacture special wagon bodies. They claim that their products are far below market prices.

Bryden Horse Shoes.

We want to call the attention of our readers to the line of horse shoes which is being manufactured by the Bryden Horse Shoe Co. of Catasauqua, Pa. This concern was established in 1882 and the organization has made a specal study of shoes for many years. In this factory every shoe is inspected by a practical horseshoer of long experience.

Their range of models is the result of long, patient selection and the co-operation with farriers all over the country. The three trade names under which the Bryden horse shoes and racing plates are known are the "Boss," "Banner," and "C and K." This company also manufactures a line of ribbed steel bars as well as racing plate bar steel.

Subscribers should write for their illustrated catalog of shoes and steel shapes.

Wolfe Tire Cooler.

Wheelwrights who do very much tire setting should investigate the Wolfe Tire Cooler which is manufactured by Matt L. Wolfe, West Carrollton, Ohio. This device is a favorite one among wheelwrights and has been on the market for a number of years.

Crane Puller.

The blacksmith who does automobile work, as well as the wheelwright, has a frequent call to remove stubborn gears, pulleys, fly wheels or flanges from shafts. In many cases he is called upon to bend iron rods or pipes to certain dimensions and may be able to do this work without special fixtures.

Undoubtedly one of the tools which the mechanic finds most useful is the gear puller. Many shops are equipped with not only a puller but with a special arbor press. The Crane Puller Co., 54 Lake St., Arlington, Mass., manufactures a puller which has a number of unique features and which should be investigated by all of our readers.

This puller is of such a design that it may be used for removing gears or pulleys or any ordinary pulling work, but may also be used in conjunction with a base as an arbor press. The device is furnished with two sets of arms, a short set and a pair of extensions, so that it can be used for a varied line of work.

As an accessory for the puller, the smith can obtain at a slight additional price a pair of special pipe or shaft bending arms and an attachment for the pressure screw. At an additional investment of very little money, the two arm puller can be converted into a three arm puller, simply by the use of a special crow foot beam, utilizing the same arms and one additional set.

One unique feature about the puller is the special locking arrangement, a feature which makes it a one man device. The adjustable locking screws clamp the arms against the sides of the gear or pulley, while the pressure screw comes against the shaft.

Lawn Mower Grinder.

Within a few weeks your neighbors will begin to use their lawn mowers in a vain effort to keep the grass on their lawns down. This means considerable business for you in the nature of sharpening the knife blades on these machines. Many blacksmiths pick up considerable money doing this work. Hand sharpening, however, is a slow process and the results are always questionable.

The Root-Heath Mfg. Co., 137-149 Bell St., Plymouth, Ohio, manufacture a machine lawn mower grinder which is said to do a complete job in fifteen minutes. It must be understood that the mower blades do not have to be removed. The lawn mower is put right into place and the knives ground in position.

The Ideal Lawn Mower Grinder is a well constructed machine. The bearings are of the ball type and the machine can be driven by belt or by hand, as desired. In addition to the lawn mower grinder attachment, a special attachment is furnished for grinding skates. The machine is sold on terms and our readers should investigate prices.

Sure Grip Calks.

Many blacksmiths prefer the threaded type of calks to the driven kind and many owners have the same preference. A specially large line of this type of calks is manufactured by the American Calk Co., of Detroit, Mich. Our blacksmith readers would do well to investigate the prices of these calks and write to the manufacturers for their latest catalog.

Drednaut Motor Topping.

When the blacksmith or wheelwright is called upon to repair the tops of wagons or automobiles he is frequently at a loss as to where he may obtain the topping material, particularly if the customer desires to obtain an extra good grade.

The L. C. Chase & Co., of Boston, Mass., manufacture a motor topping and sell it under the trade name of "Drednaut." When this fabric is used the top is water proof and has an extremely fine appearance. It is claimed that this material will withstand the hardest usage without showing wear.

It will not seam or crack under the action of the elements and can be obtained in just the right sizes to fit the particular job that is being done. Our readers should write for samples and prices.

Auto and Tractor Instruction.

We know that many of our blacksmith readers realize the value of automobile and tractor repair knowledge. There is a big demand for mechanics who are well versed in automobile work. As a matter of fact the blacksmith himself should be able to increase his business during the dull seasons of the year and so keep himself and his men busy.

The Rahe Auto & Tractor School, 3164 Oak St., Kansas City, Mo., have a special course which we should advise our readers to investigate. Every interested reader should write to this school for their free booklet which tells more about the automobile course.

Bauer Kerosene Engines.

Undoubtedly the farmer makes a good customer for kerosene engines. The intelligent farmer knows that he can increase his output by the use of machinery and the elimination of manual labor. All over the country one finds kerosene or gasoline engines operating separators, ensilage cutters and smaller farming cutters. Our readers should investigate the kerosene engines manufactured by the Bauer Engine Co., 110 Bauer Block, Kansas City, Mo. These engines can be obtained in various sizes from 2 to 18 horse power. The prices are very low and the engines may be purchased for cash or on a term basis.

At the present time this company is willing to place the engines in the hands of the customer for a 60 day trial. They guarantee the engines for five years.

Star Steel Shapes.

In days gone by the village blacksmith often built as well as repaired plows. In many cases he found that he could replace parts or build the plows much cheaper than such devices could be purchased. At the present time, however, the smith will find that he can purchase shapes for plowshares, landside plates, plow points and similar pieces at a much lower price than he can make them.

The Star Mfg. Co. of Carpentersville, Ill., makes a specialty of soft center, solid cast, crucible steel shapes for every line of work. Readers should investigate the line of products manufactured by this company and write for their latest catalog.

Digitized by Google

Automatic Grip Puller.

There is no workman in the industry who spends more time removing gears and wheels from old machinery than the blacksmith. Very frequently if he uses the hammer method of driving off the gears or wheels he is forced to stand a loss on account of breakage.

The smith could save both time and money by purchasing the Greb Automatic Grip Puller. This device is designed especially for pulling gears and wheels of practically any size within its capacity. Two sizes are made. The junior for small work has a capacity from 1 to 7 inches, and the senior size has a capacity of from 1 to 18 inches.



Greb Automatic Grip Puller.

This figure being the spread of the arms.

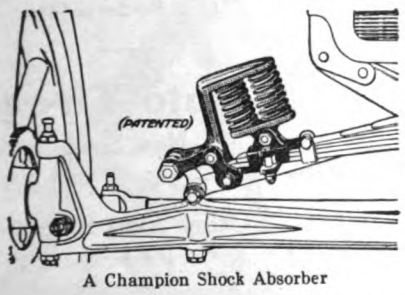
The device consists of heavy body upon which are cast four arm holders. These holders are so arranged that a number of puller combinations are possible. Two puller arms may be placed in them at opposite sides or three arms may be used spaced at thirds at the circumference wheel. The puller arms are held in position by removable pins and two complete sets of three arms are furnished with the device.

As pressure is applied to the center screw all of the arms or jaws automatically are forced inward, thus gripping the work firmly. The greater the pressure on the screw the greater the pressure of the arms upon the work. The price on the device, which is sold by The Greb Company of 219 State Street, Boston, Mass., is exceptionally low and worth investigation by the blacksmith.

Champion Shock Absorbers.

The Champion Shock Absorber Sales Co., of 918 North Senate Avenue, Indianapolis, Ind., manufacture a shock absorber of considerable merit. This device is designed primarily for Ford cars and consists of a unique lever combination of coil springs, and castings.

To the axle housing is attached an inverted L shaped casting and hanging upon the lower end of this casting upon a movable pivot is the car spring. The L shaped casting itself is free to swing vertically.



A Champion Shock Absorber

Between the L shaped casting and the spring are mounted two heavy coil springs. One can see, therefore, that two systems of levers are used, which tend to reduce the vertical body movement and to convert it to sidereal motion. The springs tend to absorb shocks and rebound. The shock absorbers are easy to apply and require no change in spring or car design.

Absorbine.

Practically every blacksmith in the country is fairly familiar with the merits of Absorbine, that remedy which is manufactured by W. F. Young, P. D. F., of 55 Monmouth St., Springfield, Mass.

The remedy has been on the market a great many years and is used by all horse owners who appreciate the value of having a preparation on hand at all times which will kill pain, stop lameness and remove blemishes.

The blacksmith should be able to sell Absorbine to his customers very readily and at the present time there are many arguments in its favor. We say "at the present time" because the spring buying and selling has begun. The buyer of horses is on the lookout for clean, sound stock and is willing to pay a good price.

If the farmer has blemished horses he should get busy at once and try to cure or remove the blemishes so that the buyer will pay a good price for them. In many cases a breeder has been able to increase the market value of a horse by $40 or $50 simply by removing blemishes before selling.

Many of the successful horse breeders are aware that Absorbine will remove blemishes and keep a bottle on hand at all times. W. F. Young, who is an enthusiastic horseman, is willing at all times to help our brother readers out by giving them advice on the care of horses.

Roller Bearing Inserts.

We have repeatedly dwelt upon the fact that a large percentage of spring breakage is caused by poorly lubricated springs and we have cautioned our readers to keep the springs in condition.

A spring will not give satisfaction unless the leaves can slide past each other, and to assist this action, the Hamilton Roller Bearing Insert Equipment has been designed. This insert consists of 112 case hardened Bessemer steel rollers which are mounted in 16 nickel steel cases and designed to slip between the leaves of the spring.

The steel cases are filled with heavy graphite grease and when installed the device requires but little attention. The manufacturers claim that the spring action is much easier and that danger of spring breakage is reduced to a minimum. The Hamilton Roller Bearing Insert equipment is manufactured by the Hamilton Mfg. Co., of Los Angeles, Cal.

Emco Malleable Iron Castings.

Our wheewright readers, or in fact any readers who use body irons for all sorts of vehicles, should get acquainted with the Eberhard Mfg. Co., of Cleveland, Ohio. This concern makes a specialty of malleable iron castings.

The castings are of the best quality and are not to be confused with ordinary cast iron fittings which break under the least strain. Emco Malleable Iron Castings are said to withstand the hardest usage. As a proof of this, the malleable iron castings manufactured by this concern can be bent cold without snapping or weakening. Readers should send for their bulletin entitled "Assemblies of Irons," which will be sent free of charge to anyone interested.

Kazoo Blower.

The R. P. Warner Electric Co., of Kalamazoo, Michigan, manufactures a unique variable speed blower which has one particularly interesting feature. It is complete in itself, that is, it has no outside resistance or rheostat. The speed of the blower can be varied by moving a handle on the blower itself from one side to the other. As the speed decreases the amount of current used is diminished.

The blower and the electric motor are mounted on the same base and use the same shaft, thus eliminating all gears or couplings. The two units are enclosed in dustproof housings which are fitted with bronze bearings and noiseless ring oilers. Undoubtedly it is one of the simplest installations possible and should pay for itself by the elimination of trouble and the saving of time.

The motor is designed for operation on alternating current only. Readers who are interested should write to the R. P. Warner Electric Co. for their prices and descriptive literature.

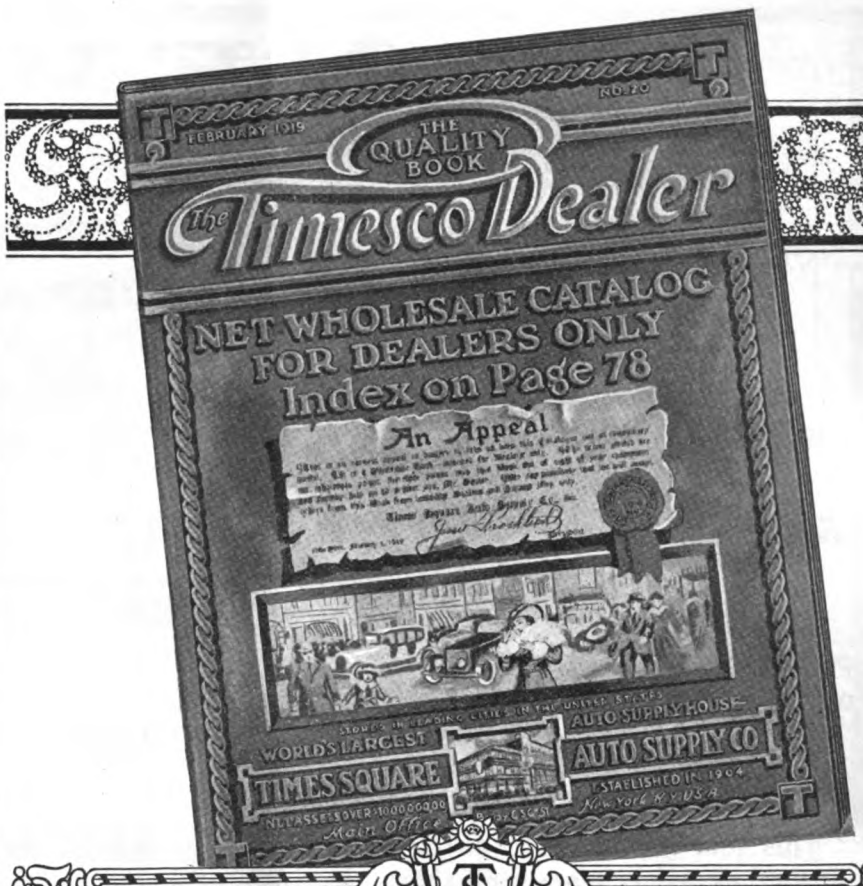
Punch and Shear Combination.

A handy combination of punch and shear is being manufactured by the Plymouth Foundry & Mch. Co., of Plymouth, Wisconsin. The device is extra heavy and made of the best of materials. The shears will cut 1-inch round iron or half-inch iron four inches in width or the equivalent of this amount of metal.

The punch, or punch rack, for it contains seven different sizes of punches varying from ¼ to ⅞ of an inch, can be moved along the base as required, without the use of a wrench or any special tools. The punch attachment is also very heavy and will take care of practically any ordinary work done by the average shop.

Phoenix Products.

One of the biggest problems which the blacksmith faces today is the cost of materials. It would be well for the smith to get acquainted with manufacturers who give him the benefit of lowest possible prices and good service. The Phoenix Horse Shoe Co. of Chicago, Ill., who manufacture horses and mule shoes, as well as Bull Dog toe calks, products well known among the trade, make a specialty of low prices and good service.



BLACKSMITHS

Send for our new wholesale catalogue —"THE TIMESCO DEALER." This is a combined Catalogue, Trade Journal and Dealer's Reference Book—for Dealers, Garagemen and Blacksmiths only. It tells you how to sell more auto supplies at a bigger profit. It represents the result of 14 years' experience in retailing auto supplies, all of which is now placed free, at the service of any auto supply dealer, garageman or blacksmith. It lists everything and anything pertaining to automobiles at *lowest net wholesale prices.* It is a Book that every blacksmith should have.

SEND FOR IT TODAY, FOR IT WILL SHOW YOU HOW TO MAKE MORE MONEY.

Sent free to any Blacksmith or Wheelwright.

Times Square Auto Supply Co.

Main Office

New York, N. Y., Broadway & 56th Street

Dept. T

Distributing Branches in the Following Cities:

Boston, Mass.
Chicago, Ill.
Cincinnati, Ohio
Columbus, Ohio
Dallas, Texas
Des Moines, Iowa
Kansas City, Mo.
Minneapolis, Minn.
Milwaukee, Wis.
Memphis, Tenn.
New York, N. Y.
Philadelphia, Pa.
Pittsburgh, Pa.
Providence, R. I.
St. Paul, Minn.
Toledo, Ohio
Tulsa, Okla.
Wichita, Kan.



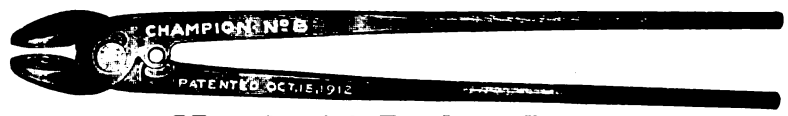
LANCELLOTTI

Digitized by Google

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge

Nothing to get out of order.



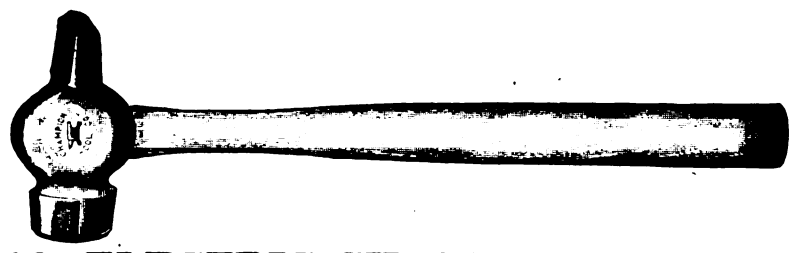
Will hold securely any size of shoe.

No. 8 16 Inches Long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

Weights, 1¼ to 3 lbs.

This Hammer is the most popular Sharpening Hammer on the market.

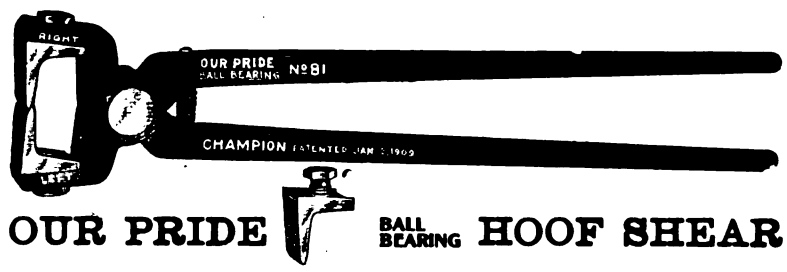


Corrugated Pein.

IT GIVES RESULTS.

No. 12 ELECTRIC SHARPENING HAMMER

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.



OUR PRIDE BALL BEARING HOOF SHEAR

Blades easily replaced when worn out.

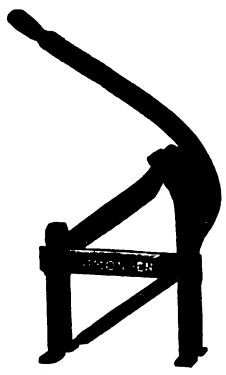
All parts interchangeable.

Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY, - Meadville, Pa., U. S. A.

THE LIVINGSTON CO., 131 E. 23rd Street, NEW YORK, Eastern Representatives

THE SIMONSEN HOT TRIMMING SHEAR SAVES ALL THE WORK AND NEARLY ALL THE TIME.



Hot Trimming Shear.

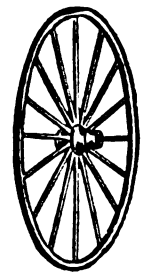
Think of cutting out plow points, or trimming cultivator shovels, etc., without a sledge or helper, and doing a neater job too!

The SIMONSEN HOT TRIMMER is designed especially for hot cutting and in actual saving will pay for itself several times over the first season.

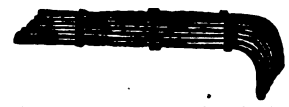
Is made entirely of wrought material and in two sizes. No. 1 cuts hot plow steel 5/16x6. No. 2 cuts hot plow steel 5/16x8. Hold the work with one hand in plain sight and operate shear with the other hand.

Sold by leading jobbers. Write us for free circular and testimonials, mentioning jobber's name when writing.

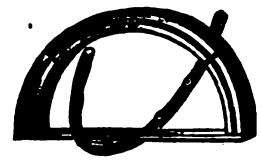
SIMONSEN IRON WORKS, SIOUX RAPIDS, IOWA



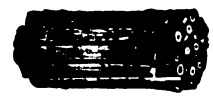
SARVEN WHEELS
$11.90 Per Set and Up



FINISHED BUGGY SHAFTS
$10.00 Per Bundle of 6 Pairs



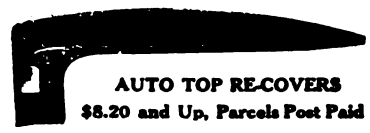
PLAIN HICKORY RIMS
$2.85 Per Set and Up



OAK WAGON SPOKES
$3.25 Per Set and Up.



REPAIR GRADE SARVEN SPOKES
$2.50 Per 100



AUTO TOP RE-COVERS
$8.20 and Up, Parcels Post Paid

Auto Tires
Non Skid
30 x 3½ $11.68
Other Sizes in proportion

Wheel Top & Hardware Co.

Dep't. W2 (Get our Catalogue) **Cincinnati, O.**

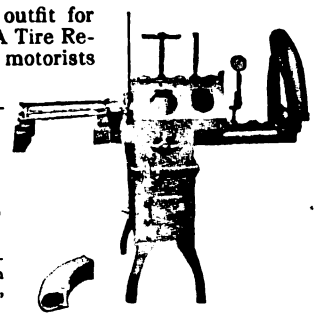
Make Auto Profits

Blacksmith Shops should make profits from the millions of automobiles that ply our highways and streets.

The demand for tire repairing and tire retreading is enormous. The high price of tires is increasing the demand for repairing every day—and the profits in this work is far greater than horseshoeing profits ever were.

Every blacksmith shop should have a tire repair outfit for casing and inner tube punctures and blow-outs. A Tire Retreading Outfit is also a good investment, as many motorists who have worn out their tires want new treads put on.

We make a complete line of tire repair equipment. Write in for full particulars.



Send Coupon for Free Booklet

B&W
Please send free booklet.

Name.....

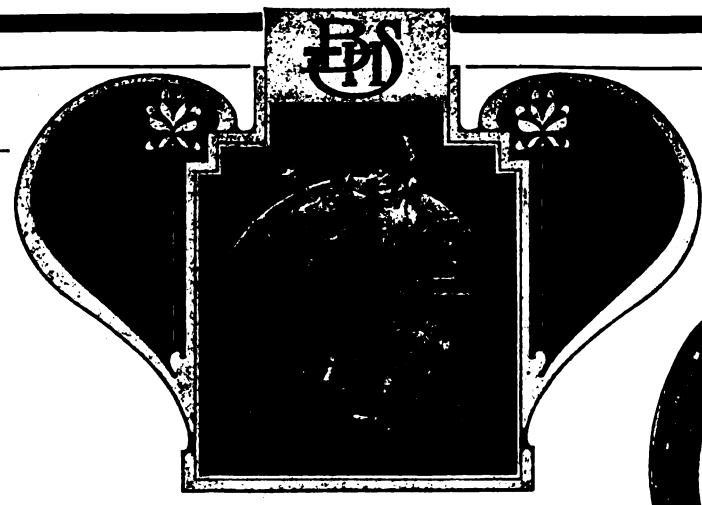
Address.....

THE AKRON RUBBER MOLD & MACHINE CO.
937 Sweitzer Ave., Akron, Ohio

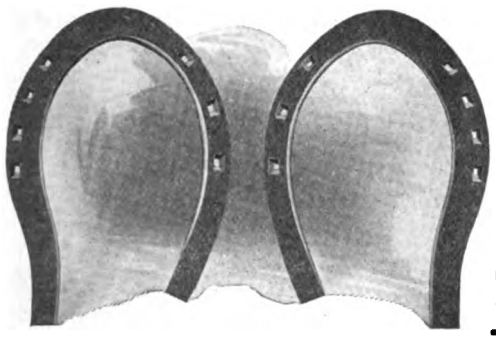
Pacific Coast Distributors: Geo. W. Eno Rubber Company, 1159-63 Post Street, San Francisco; 1026 South Los Angeles Street, Los Angeles.

Digitized by Google

THE ART OF



HORSESHOE MAKING





WE MAKE SHOES

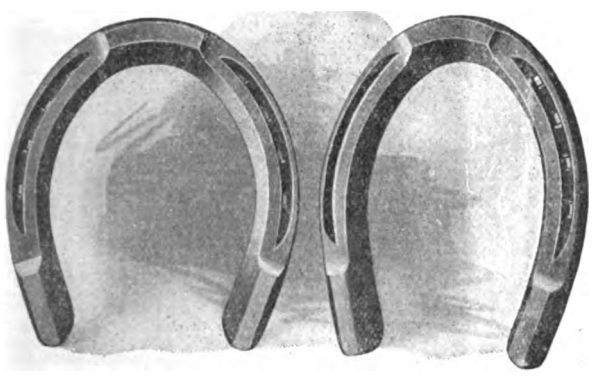
TO MEET EVERY REQUIREMENT

Here Are a Few of Our Specialties

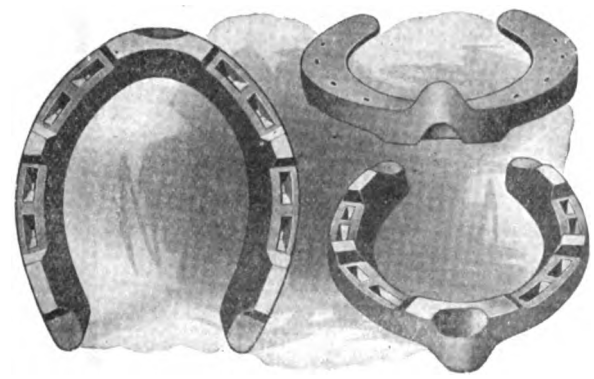
Sideweights—Bryden "C" Horse and Mule
Ideal Calked—Toeweight—Clipped Goodenough

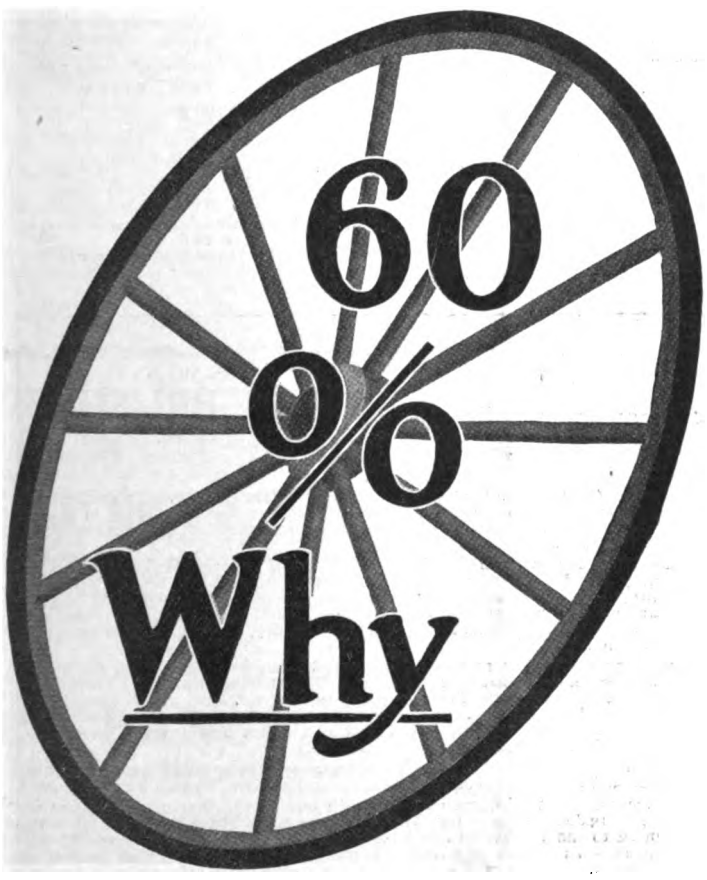
Send for Descriptive Catalog which Shows Our Full Line with Weights, Etc., Etc., Etc.

BRYDEN HORSE SHOE WORKS - CATASAUQUA, PENNSYLVANIA









60% of all carriages are equipped with Firestone Tires, because—

Firestone made the first successful tire, the tire which remains supremely efficient to this day.

Firestone was the first successful tire cured in continuous lengths. No joints, no weakness, no *waste*.

Firestone invented the present design of channels, accepted standard for the industry.

Firestone invented the present method of brazing wires, a convenience to the customer, a profit to the dealer. Write us for further information.

FIRESTONE TIRE & RUBBER COMPANY
FIRESTONE PARK AKRON, OHIO
BRANCHES AND DEALERS EVERYWHERE

Firestone Carriage Tires

Digitized by Google

Index to Advertisers

Aetna Nut Co., horseshoe calks....Front cover
Akron Rubber Mold and Machine Co., tire repair outfits 24
Akron-Selle Co., gears 31
American Calk Co., calks.....Front cover
American Horse Shoe Co., horseshoes..... 2
American Carriage Co., supplies..... 27
Anti-Borax Compound Co., welding compounds 1
Armstrong Mfg. Co., bolt dies..... 27
Armstrong-Blum Mfg. Co., punches and shears .....Front cover
Barcus Mfg. Co, horse stocks.....3rd cover
Barnett, G. H., Co., files and rasps, Front cover
Bauer Engine Co., engines.....4th cover
Bear Mfg. Co., starters..... 27
Bertschy-Bermo Co., welding plants..... 30
Bicknell Mfg. & Supply Co., punches and shears, spark plugs.....8 and 27
Bradley, C. C., & Son, shaft coupler..3rd cover
Brooks, The, Machine Co. welding outfits 5
Bryden Horse Shoe Works, horseshoes.... 25
Buffalo Forge Co., blacksmiths' tools..... 7
Burden Iron Works, horseshoes.....3rd cover
Butterfield & Co., taps, dies and screw plates 8
Campbell Iron Co., supplies..... 30
Canedy-Otto Mfg. Co., blacksmiths' tools, 2nd cover
Capewell Horse Nail Co., horse nails, Front cover
Champion Blower & Forge Co., blowers..... 3
Champion Shock Absorber Sales Co., Inc., shock absorbers 27
Champion Tool Co., blacksmiths' tools..... 24
Chase, L. C., motor topping.....Front cover
Columbus Forge & Iron Co., anvil....2nd cover
Cortland Welding Compound Co., welding compounds 29
Crane Puller Co., pullers..... 28
Cray Bros., blacksmiths' tools..... 29
Crescent Machine Co., woodworking machinery 8
Diamond Calk Horseshoe Co., horseshoes 5
Doxey, N. D., welding compounds..... 28
Durner, A. E., disc sharpeners.....2nd cover
Eberhard Mfg. Co., iron castings..... 6
Edwards, C. D., Mfg. Co., shears..... 31
Electric Blower Co., blowers..... 31
Electric Wheel Co., wheels..... 31
Empire Mfg. Co., wheels.....Front cover
Felton, Sibley & Co., paints..... 1
Firestone Tire & Rubber Co., tires..... 25
Fisher & Norris, anvils and vises..... 8
Franklin Steel Works, toe calks..... 30
Giant Grip Horseshoe Co., horseshoes.... 29
Gillette Clipping Machine Co., clipping machines .....4th cover
Gogel Mfg. Co., tire heaters..... 28
Greb Co., grip pullers.....4th cover
Greenfield Tap & Die Corporation, screw plates and blacksmiths' machinery..... 32
Gwilliam Co, ball bearings.....4th cover
Hart Mfg. Co., stocks and dies.....4th cover
Harvey Spring & Forging Co., auto springs 1
Hay-Budden Mfg. Co., anvils.....4th cover
Heller Bros., horse rasps, tools, etc..... 8
Helwig Mfg. Co., hammers.....Front cover
House Cold Tire Setter Co., tire setters, hollow and spoke augers.....4th cover
Jenner, H. W. T., patents..... 27
Kerrihard Co., hammers..... 32
Little Giant Co, hammers.....4th Cover
Linde Air Products Co., oxygen..... 8
L. S. P. Calking Machine Co., calking machines 1
Lucas, J. L., & Son, auto heel rests..... 27
Macgowan & Finigan Cordage C.o, hammers 8
Ness, Geo. M., Jr., steel stamps....Front cover
Nicholson File Co., files and rasps 29
Ottawa Mfg. Co., engines.....4th cover
Oneida National Chuck Co., chucks..... 31
Parker, C. L., attorney..... 30
Parks Ball Bearing Machine Co., woodworking machinery 31
Peck, Stow & Wilcox Co., pincers..... 32
Phoenix Horseshoe Co., horseshoes and toe calks 4
Porter, H. K, bolt clipper.....4th cover
Prentiss Vise Co., vises.....4th cover
Plymouth Foundry and Machine Co., punches and shears..... 32
Rahe Auto and Tractor School, school..... 28
Root-Heath Mfg. Co., lawn mower grinders .....3d cover
Rosewater Electric Co., blowers..... 30
Rowe Calk & Chain Co., horseshoe calks, Front cover
Sheldon Axle & Spring Co., axles..... 4
Sherwood, W. L., woodworking machinery .....4th cover
Simonsen Iron Works, shears..... 24
Standard Horse Nail Co., horseshoe nails, 4th cover
Star Mfg. Co., agricultural implements..... 32
Sterling Tire Corp., hoof pads..... 30
Stokes Bros. Mfg. Co., rasps.....Front cover
Superior Oxy-Acetylene Machine Co., welding outfits 28
Thompson Tuyere Iron Co., tuyere iron, 4th cover
Times Square Auto Supply Co., catalogue and reference book..... 23
Union Horse Nail Co., horse nails..... 31
United States Horseshoe Co., horseshoes.. 28
Universal Wheel Compressor Co., wheel compressors .....4th cover
Warner, R. P., Electric Co., blowers..... 32
West Tire Setter Co., tire setters, hammers 29
Wheel B, Top & Hardware Co., supplies.. 24
Whisler Mfg. Co., nut splitters, jointer heads .....27 and 31
Witte Engine Works, engines..... 31
Wolfe, Matt L., tire coolers..... 31
Young, W. F., Veterinary remedies..... 28

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co..... 32

Anvils
Columbus Forge & Iron Co.....2d cover
Fisher & Norris..... 8

Attorneys
Hay-Budden Mfg. Co.....4th cover
Parker, C. L..... 30

Auto Heel Rests
Lucas, J. L, and Son..... 27

Automobile Springs
Harvey Spring & Forging Co..... 1

Axles
Sheldon Axle & Spring Co..... 4

Ball Bearings
Gwilliam Co. .....4th cover

Blacksmiths' Machinery
Greenfield Tap & Die Corp..... 32

Blacksmiths' Tools
Buffalo Forge Co..... 7
Butterfield & Co..... 8
Canedy-Otto Mfg. Co.....2d cover
Champion Blower & Forge Co..... 3
Champion Tool Co..... 24
Cray Bros. 29
Heller Bros. Co..... 8
Nicholson File Co..... 29
Peck, Stow & Wilcox Co..... 32

Blowers
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3
Champion Tool Co..... 24
Electric Blower Co..... 31
Rosewater Electric Co..... 30
Warner, R. P., Electric Co..... 32

Bolt Dies
Armstrong Mfg. Co..... 27

Bolt and Rivet Clippers
Porter, H. K.....4th cover

Calking Machines
L. S. P. Calking Machine Co..... 1

Calks, Horseshoe
Aetna Nut Co.....Front cover
American Calk Co.....Front cover
Diamond Calk Horseshoe Co..... 5
Rowe Calk & Chain Co.....Front cover

Calks, Toe
Franklin Steel Works..... 30

Catalogue and Reference Book
Times Square Auto Supply Co..... 23

Chisels
Champion Tool Co..... 24
Peck, Stow & Wilcox Co..... 32

Clipping Machines
Gillette Clipping Machine Co.....4th cover

Chucks
Buffalo Forge Co..... 7
Oneida National Chuck Co..... 31

Disc Sharpeners
Durner, A. E.....2d cover
Little Giant Co.....4th cover

Engines
Bauer Engine Co.....4th cover
Ottawa Mfg. Co.....4th cover
Witte Engine Works..... 31

Farriers' Tools
Barnett, G. & H., Co.....Front cover
Champion Tool Co..... 24
Heller Bros. Co..... 8
Peck, Stow & Wilcox Co..... 32

Files and Rasps
Barnett, G. & H., Co.....Front cover
Nicholson File Co..... 29
Stokes Bros. Mfg. Co.....Front cover

Forges
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3

Gasoline Engines
Witte Engine Works..... 31

Gears
Akron-Selle Co. 31

Grip Pullers
Greb Co. .....4th cover

Hammers
Champion Tool Co..... 24
Helwig Mfg. Co.....Front cover
Kerrihard Co. 32
Macgowan & Finigan Cordage Co..... 8
Little Giant Co.....4th cover
Peck, Stow & Wilcox Co..... 32
West Tire Setter Co..... 31

Hollow Augers
House Cold Tire Setter Co.....4th cover

Hoof Nippers
Champion Tool Co..... 24

Hoof Pads
Sterling Tire Corp..... 30

Hoof Parers
Champion Tool Co..... 24

Trucks
Akron-Selle Co. 31

Hoof Shears
Champion Tool Co..... 24

Horseshoes
American Horseshoe Co..... 2
Bryden Horse Shoe Works..... 25
Burden Iron Works.....3d cover
Diamond Calk Horseshoe Co..... 5
Giant Grip Horseshoe Co..... 29
Phoenix Horseshoe Co..... 4
Rowe Calk & Chain Co.....Front cover
United States Horseshoe Co..... 28

Horseshoe Calks
Diamond Calk Horseshoe Co..... 5
Rowe Calk & Chain Co.....Front cover

Horseshoe Nails
Capewell Horse Nail Co.....Front cover
Standard Horse Nail Co.....4th cover
Union Horse Nail Co..... 31

Horse Stocks
Barcus Mfg. Co.....3d cover

Iron Castings
Eberhard Mfg. Co..... 6

Kerosene Engines
Witte Engine Works..... 31

Lawn Mower Grinders
Root-Heath Mfg. Co.....3d cover

Motor Topping
Chase, L. C.....Front cover

Nut Splitters
Whisler Mfg. Co.....27 and 31

Oxygen
Linde Air Products Co..... 8

Paints and Varnishes
Felton, Sibley & Co..... 1

Patents
Jenner, H. W. T..... 27
Parker, C. L..... 30

Pincers
Peck, Stow & Wilcox Co..... 32

Pullers
Crane Puller Co..... 28

Punches
Champion Blower & Forge Co..... 3

Punches and Shears
Bicknell Mfg. & Supply Co.....8 and 27
Peck, Stow & Wilcox Co..... 32
Plymouth Foundry & Machine Co..... 32

Schools
Rahe Auto & Tractor School..... 28

Screw Plates
Butterfield & Co..... 8
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3
Greenfield Tap & Die Corp..... 32

Shaft Coupling
Bradley, C. C., & Son.....3d cover

Shears
Edwards, C. D., Mfg. Co..... 31
Simonsen Iron Works..... 24

Shock Absorbers
Champion Shock Absorber Sales Co., Inc. 27

Spoke Augers
House Cold Tire Setter Co.....4th cover

Starters
Bear Mfg. Co..... 27

Steel Stamps
Ness, George M., Jr.....Front cover

Stocks and Dies
Butterfield & Co..... 8
Champion Blower & Forge Co..... 3
Hart Mfg. Co.....4th cover

Supplies
American Carriage Co..... 27
Campbell Iron Co..... 30
Wheel B, Top & Hardware Co..... 24

Swages
Champion Blower & Forge Co 3

Tires
Firestone Tire & Rubber Co..... 25

Tire Bending Machines
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3

Tire Coolers
Wolfe, Matt L..... 31

Tire Heaters
Gogel Mfg. Co..... 28

Tire Repair Outfits
Akron Rubber Mold & Machine Co..... 24

Tire Setters
Buffalo Forge Co..... 7
House Cold Tire Setter Co.....4th cover
West Tire Setter Co..... 29

Tire Shrinkers
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3

Tongs
Champion Tool Co..... 24

Tool Grinders
Phoenix Horseshoe Co..... 4

Tuyere Irons
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3
Thompson Tuyere Iron Co.....4th-cover

Veterinary Remedies
Young, W. F..... 28

Vises
Butterfield & Co..... 8
Fisher & Norris..... 8
Prentiss Vise Co.....4th cover

Wagons
Akron-Selle Co. 31

Welding Compounds
Anti-Borax Compound Co..... 1
Cortland Welding Compound Co..... 29
Doxey, N. D..... 28

Welding Outfits
Brooks, The, Machine Co..... 5
Superior Oxy-Acetylene Machine Co..... 28

Welding Plants
Bertschy Bermo Co. 30

Welding Supplies
Linde Air Products Co..... 8

Wheel Compressors
Universal Wheel Compressor Co ...4th cover

Wheel Dishers
House Cold Tire Setter Co.....4th cover

Wheels
Electric Wheel Co..... 31
Empire Mfg. Co.....Front cover

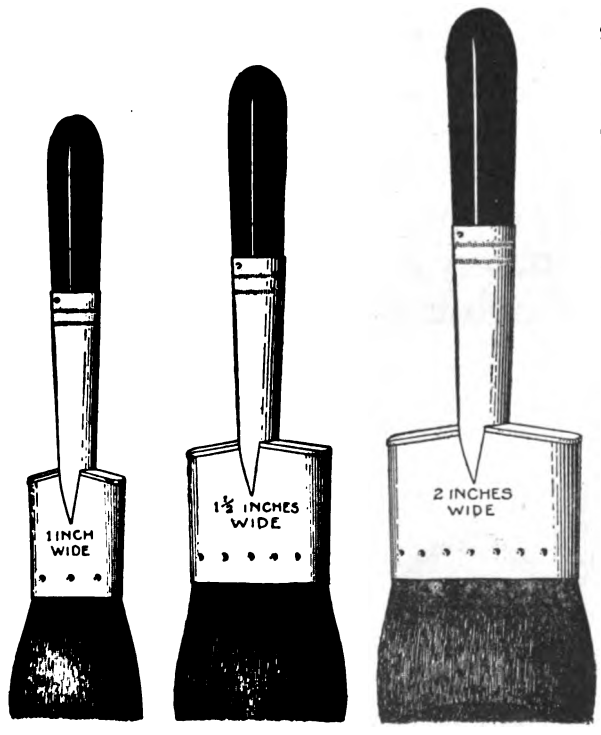
Woodworking Machinery
Buffalo Forge Co..... 7
Crescent Machine Co..... 8
Parks Ball Bearing Machine Co..... 31
Sherwood, W. L.....4th cover

Wrenches
Champion Tool Co..... 24

Wrenches (Knife Handle and Pipe)
Peck, Stow & Wilcox Co..... 32

IMPORTANT POINTS ABOUT PAINT AND VARNISH BRUSHES

A Set of Three Brushes and the Blacksmith and Wheelwright for One Year for $2.00.



Showing Brushes One-Half Actual Size.

Did it ever occur to you that there was much difference between a good paint or varnish brush and a poor one? Probably not. To most people a brush is just a brush. Yet an analysis shows that there is an almost measureless difference between a good brush and poor one.

For instance, a properly made Flowing Fitch brush is hermetically sealed, so as to keep the paint, or whatever may be used, from getting into the brush at the top and loosening the hairs. All such properly made brushes are solidly set in glue cement inside a leak-proof ferrule, and a whole row of neatly clinched nails are driven in at the end of the ferrule to give added security, and a guarantee that the hairs will not pull out.

A Fitch brush is *smooth*, *soft*, and *flowing*, and does not "mush" up or get flabby like a cheap brush, but holds its springiness. The trouble with cheap brushes is that the ferrule is nothing more than a single band of tin, open at the top, with a couple of nails jabbed through. When you use such a brush the cheap hair will pull out and scatter all over your work, because it is not held securely enough to stand the drag of the brush in painting or varnishing.

A brush may be washed with gasoline or kerosene oil, but to clean it thoroughly turpentine should be used. No brush used for painting should be used for varnishing.

We have recently made arrangements with one of the best manufacturers of these properly made brushes in New York to offer a set of Three in connection with a subscription to the BLACKSMITH AND WHEELWRIGHT for a year for an even $2.00. These brushes sell at retail for $1.40. It will be seen, therefore, that there is a substantial advantage in sending to us for the BLACKSMITH AND WHEELWRIGHT for a year, and for a set of these brushes.

Present subscribers can have their subscriptions extended for a year, and secure a set of brushes, on the same terms. These brushes are guaranteed in every respect, and though they cost more than cheap brushes would cost, they are far cheaper in the end, because of their lasting qualities and the good work that can be done with them. No man can afford to waste expensive paint and varnish on any vehicle by using a cheap and poorly constructed brush, such as is usually to be found wherever brushes are sold. The ordinary dealer in brushes himself as a rule has very little knowledge of the quality of the brushes he sells.

Remit by check or money order, and your name will be entered as a subscriber to the BLACKSMITH AND WHEELWRIGHT for a year, and a set of these brushes, which are just the right size and shape (see illustration, which is exactly one-half the actual size of the brushes), will be sent to you, postage prepaid.

Address all orders to the

M. T. RICHARDSON COMPANY, Publishers

71-73 MURRAY STREET, NEW YORK

Digitized by Google

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

will be inserted under this head at 3 cents a word, including the address, for each insertion, payable in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York.

PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT

Patents

PATENTS FOR INVENTIONS.

H. W. T. JENNER, patent attorney and mechanical expert, 622 F Street, Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trade-marks registered.

For Sale

FOR SALE

Blacksmith and wagon shop. Stock, tools, machinery, house and two lots, or will sell half interest. Address SCHMIDT BROS., Waldorf, Minnesota.

FOR SALE

About 100 feet of two-inch internal wire carriage tire made by the Victor Tire & Rubber Co., will be sold cheap to close out. This is new stock. BECK-HAWKEYE TRUCK WKS., Cedar Rapids, Iowa.

FOR SALE OR TO RENT

Fine old established blacksmith's and wheelwright shop; two-story building; 30 by 70 feet; location excellent; well equipped for business; large country trade. Owner has recently died. Address for price and further particulars, A. B. SWAB, St. Johnsville, N. Y.

FOR SALE.

Blacksmith business; lot 200x220, brick shop 35x80, three forges, one frame building 25x50, concrete floor. Extra fine location, plenty of work, good prices. Four churches, fine school, good water, fine farming country. Good man can get rich here. Reason for selling, old age, want to retire. Fine stand for a garage, plenty of that kind of work here if a man wants that kind of work. Too old to do it myself. Address R. B. LINK, Marvell, Arkansas, Box 155.

FOR SALE.

Wagon and blacksmith shop and implement business in a good live town; well equipped and doing a good business; only shop in town. For particulars address THEO. PATZNER, Hannibal, Wis.

FOR SALE.

A rich Iowa community offers a live mechanic a general blacksmith business unequalled anywhere; work for three or four men the year round. Get particulars at once from T. SOLVBERG, Paullina, Ia.

FOR SALE

The only shop in a good town with large territory. Electric power, good equipment, plenty work and top prices. For prices and particulars write or come and see L. J. MILLER, Germania, Iowa.

FOR SALE

Blacksmith's shop, stock and tools, house, barn and two acres of land. Only shop in village and work enough for two men. Reason for selling, poor health. Address CHAS. BEMIS, Burlington, N. Y.

FOR SALE

Shop and tools and small stock, or will sell tools and stock and rent shop. Fine location on paved main street next door to $42,000 City Hall. Only one other shop in city of 4,000. Broken leg reason for selling. F. H. BECHTER, Independence, Iowa.

FOR SALE

Blacksmith and wagon shop, stock, tools and machinery. Also three lots and new six room bungalow house. Enough work for two men. Reason for selling poor health. Address JOSEPH OBETKA, Pittsville, Wisconsin.

FOR SALE

Blacksmith, implement, hardware and garage business. Oil and gas station. All corner property. Ill health reason for selling. Write for particuars, W. J. OTT, Woodlake, Calif.

For Sale

FOR SALE

A few rebuilt ROTO Electric Blowers, good as new. One year guarantee. Until sold $25.00. THE ROSEWATER ELECTRIC CO., Cleveland, O.

FOR SALE

24 inch Hardwood Planer with double belted head and in good shape. Also 24 inch Jointer with new knives and bearing. Will sacrifice the two machines for $260.00. Address JOHN W. SPANGLER, Aspers, R. 1, Penna.

FOR SALE

An old established horseshoeing and wagon shop with stock and tools with nine room house and garage, also 1¼ acres land. Will sell at a bargain. Reason for selling, am in poor health. For particulars write owner, J. ALEXANDER, North Main St., Winsted, Conn.

FOR SALE

6—double and heavy pedestal emery grinders complete—$22.00 each. Lathes, milling machines and other tools. BICKNELL MFG. & SUPPLY CO., Janesville, Wis.

FOR SALE

1—8 h. p. Ohio gasoline engine $175.00; 6 h. p. Rockford $140.00—4 h. p. Webster $70.00. All overhauled and in fine condition. BICKNELL MFG. & SUPPLY CO., Janesville, Wis.

For Rent

FOR RENT

OPPORTUNITY — Excellent opening for good blacksmith at Prosper, Minn. Building rented very reasonably. Will stand investigation. Call or write—MILNE & HARTZ.

Miscellaneous

PRINTING FOR BLACKSMITHS.

Increase your business by handing out our printed business cards with "The Blacksmith's Ten Commandments" printed on back; 100 for $1.25. NEWS PRINTING CO., Stockton, Ill.

AUTOMOBILE REPAIRS

Blacksmith who own automobiles or repair automobiles in their shops should subscribe for the Automobile Dealer & Repairer; 120 page illustrated monthly devoted exclusively to the care and repair of the car. The only magazine in the world especially devoted to the mechanical and practical side of motoring. The "Trouble Department" contains five pages of numbered questions each month from car owners and repair men which are answered by experts on gasoline engine repairs. $1.50 per year or 15 cents copy. Postals not answered. CHARLES D. SHERMAN, 52 Windsor Avenue, Hartford, Conn.

Tires

TIRES--DOUBLE TREAD

Guaranteed for good service. Big—Strong—Extra Heavy. 30x3 Tire $5.50; 30x3½ $7.00; 33x4 $10.00; 34x4 $10.25; 36x4½ $13.00; 37x5 $14.00. Big saving on other sizes and Tubes also. Trade in your old Tires. 10% deposit required on C. O. D. orders. Send for list now! State size and bead of tire. Orders filled same day received.

M. LIBEN & CO., 205-RK, W. 48th St, N. Y. City

DOUBLE TREAD TIRES

We carry a full line of new and used tires and tubes. H. GINSBERG & SONS, 236 W. 48th Street, New York City.

Tires

Tires

BUY EARLY AND SAVE MONEY

Double Tread Tires and Tubes

GUARANTEED

Come to the Tire Clearing House—here are prices—clear cut and plain as daylight. We buy wholesale the best "try out" Tires—and you get the benefit—you want truthful tires, and truth is never crushed to earth if given a square deal—real truth is puncture proof—

SO ARE OUR TIRES.

Size	Plain	Non-Skid	Tubes
28x3	$4.40	$4.95	$2.00
30x3	5.50	6.05	2.00
30x3½	6.60	7.15	2.65
32x3½	7.15	7.70	3.00
34x3½	8.25	8.80	3.00
31x4	7.70	8.25	—
32x4	9.50	10.50	2.75
33x4	9.50	10.50	3.25
34x4	9.80	10.80	3.50
35x4	9.90	11.00	3.50

Get your order in quick for goods listed here—by all means get in touch with us for further information about our special process—it means money in your pocket. Get in right—write to-day—yes—to-day.

Look up rating in Dun's or Bradstreet's.

Size	Plain	Non-Skid	Tubes
36x4	$9.90	$11.00	$3.60
32x4½	9.90	11.00	3.60
34x4½	11.00	12.10	4.00
35x4½	11.00	12.10	4.10
36x4½	11.00	12.10	4.25
37x4½	12.10	13.20	4.35
34x5	11.00	12.10	4.50
35x5	13.20	14.30	5.00
36x5	13.20	14.30	5.00
37x5	13.75	14.85	5.00

For rebuilding your old tires we charge you 60% of the above prices.

We have a special proposition to dealers on Double Tread, new and factory seconds.

With all orders received for tires up to May, we will give a first guaranteed tube for the low price of $1.50.

B. LIBEN & COMPANY

261-A WEST 54th STREET NEW YORK CITY

THE HOME OF DOUBLE TREAD TIRES



BICKNELL'S POWER Punch and Shear

CUTS FLATS AND ROUNDS

A Time Saver in Any Shop

Write for Price

Bicknell Mfg. & Supply Co.

Janesville, Wis.



THE ARMSTRONG MFG. COMPANY

BRIDGEPORT CONN., U.S.A. **NEW YORK OFFICE 248 CANAL STREET**

like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



"Makers of the Genuine ARMSTRONG Stocks and Dies."



Wanted

WANTED

Blacksmith—experienced in forging small tools under power hammer; steady employment. WILLIAM JOHNSON, Hedenberg, Works, 249 Plane St., Newark, N. J.

WANTED

Good all around blacksmith at once. Young married man preferred. M. W. ABTS, Morrill, Nebr.

WANTED

Would like to hear from one who has a blacksmith's stand for sale with from 10 to 20 acres or more of land. Address L. LUBER, Box 23, Prairie View, Illinois.

WANTED.

Good all round blacksmith; top wages for right man. Address T. SOLVBERG, Paullina, Ia.

Universal Battery Service.

The Universal Battery Co., 3418 S. La Salle Street, Chicago, Ill., carry a complete line of battery replacement and repair parts consisting of plates, separators, connectors and terminals for practically every make of battery on the market.

In addition to this, this company manufacturs complete batteries which can be used for replacing standard batteries in practically every popular make of car. Their 1919 catalog which is now off the press is ready for distribution and our readers should write for it now.

Self-Measuring Gasoline Station.

One of the devices which attracted considerable attention at the automobile show was termed the Brady Visible Measure Gasoline Dispenser, manufactured by the Gasoline Dispenser Co. of America, Inc., located at Louisville, Ky.

The pump is operated through an electric motor which forces gasoline to a measuring tank at the top of the mechanism. This tank is fitted with a visible gauge somewhat resembling the gauge on a thermometer, but marked in gallons.

By this system, the purchaser can see just the amount of fuel that is being delivered to him. When the machines are put out by the factory the gauge and the measure are guaranteed and since there is no method of tampering with the device, for the very reason that it does not depend upon a pump for quantity, the purchaser is protected.

A similar device is manufactured by the same company which is operated by hand rather than by the electric motor. In conjunction with the pump is furnished a 250 gallon acetylene welded underground tank. This tank is fitted with a gauge by which the amount of gasoline put into the tank can be checked.

THE SANDBO STARTER

—Two Compression— FOR FORD

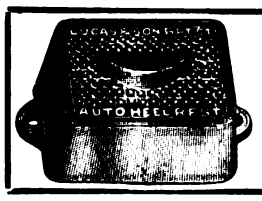
Write BEAR MFG. CO. Rock Island, Ill.

FOR SALE

Axles—half fan, half coach, 1⅛x7 and 1⅛-x1 1/16 x 6½. Long beds, not welded; price, $3.00 per set. Also Bolts, Screws, Clips, and Light Spring Wagon Bodies, Buggy Spring Bars, etc., below market prices.

AMERICAN CARRIAGE CO.

KALAMAZOO, MICHIGAN



Auto Heel Rest

Made in 4 Sizes of Frosted Aluminum ⅛ in., 1 in., 1⅛ in., 2 in.

Ask your Dealer, or sent post paid, 75c.

J. L. LUCAS & SON, Inc.

1 Bridgeport, Conn.



THE only successful Chuck to hold square taper shank wood bits and drills so you can use them in your drill press. See the spring It keeps the drills from dropping out of the chuck. Made right Priced right. If your dealers won't supply you we can.

WHISLER MFG. CO., Gibson, Iowa

"The Timesco Dealer."

We are in receipt in this office of a wholesale catalog issued by the Times Square Auto Supply Co., corner of Broadway and 56th Street, New York City, which is being distributed by them to dealers throughout the country.

The booklet is called the "Timesco Dealer" and is a combined catalog, trade journal, and dealer's reference book. The Times Square Auto Supply Co. have branches in many of the large states throughout the country and upon the inside cover is given a map with the names and addresses of these dealers.

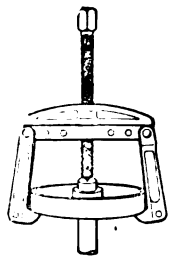
The book contains many thousands of illustrations of accessories sold by this company. As an example of how valuable the book should be to dealers, let us refer to the dealers' reference charts which form a part of the catalog. In these charts are listed practically all of the popular cars on the market together with the model, the light-bulb sizes, spark plug sizes, piston ring, tire, lens and brake lining sizes. The reference chart alone should be worth considerable money to the average dealer.

To every authorized agency a special sign is furnished. Every dealer who is interested in low priced and honest priced accessories should write to the above company for information and their catalog. Dealers should be sure to write on their letterheads, for the catalog is mailed only to bona fide dealers and garage men.

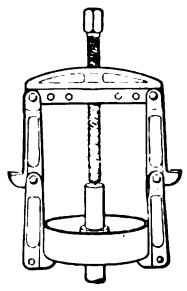
Digitized by Google

INCREASE THE USEFULNESS
OF YOUR
CRANE PULLER

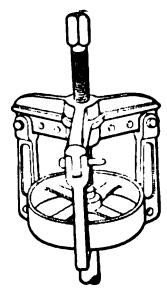
With this New Locking Arm. Absolutely Locks the Puller on the Work, making it a one-man tool



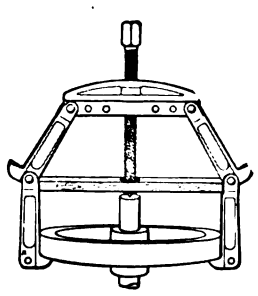
Two-Arm Puller removing work near end of shaft.



Work beyond reach of one set of arms.



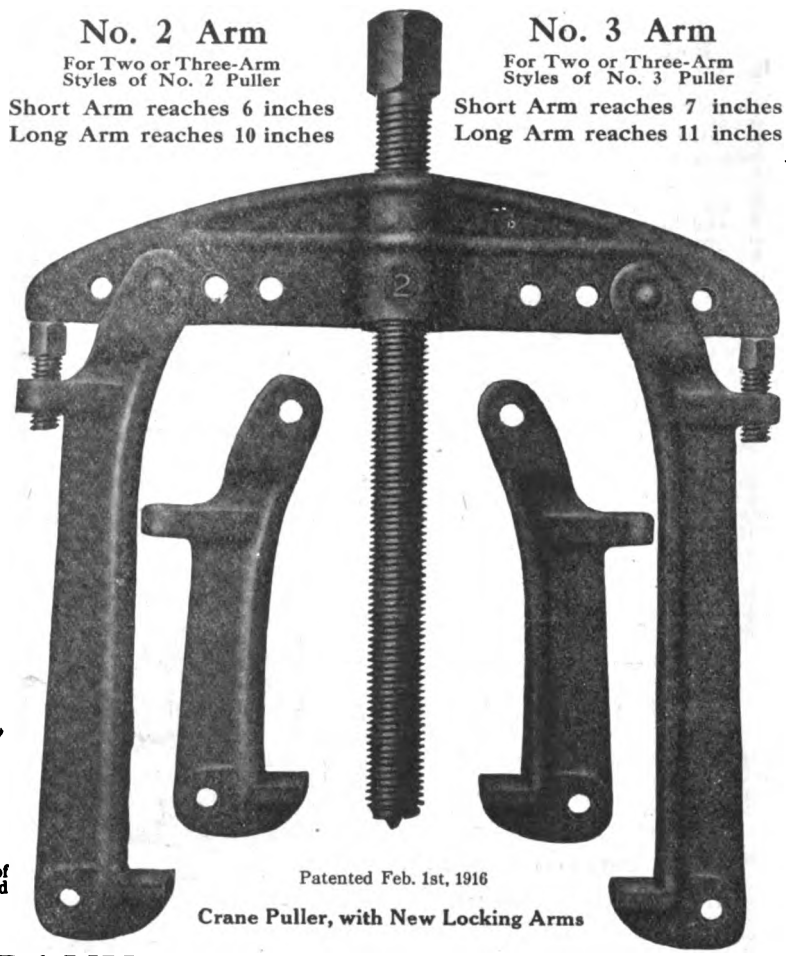
Three-Arm Puller pulling from three points will remove collars and work that cannot be started with the two-arm pullers.



Two-Arm Puller on work of large diameter (a piece of wood being used as a spreader).

No. 2 Arm
For Two or Three-Arm Styles of No. 2 Puller
Short Arm reaches 6 inches
Long Arm reaches 10 inches

No. 3 Arm
For Two or Three-Arm Styles of No. 3 Puller
Short Arm reaches 7 inches
Long Arm reaches 11 inches

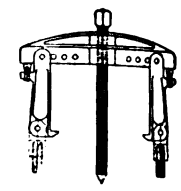


Patented Feb. 1st, 1916
Crane Puller, with New Locking Arms

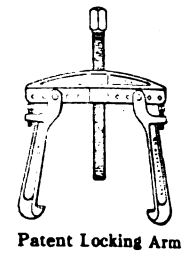
Materials and workmanship absolutely guaranteed. We will replace any part that is defective, without question and absolutely free of charge, upon return of same to us.

Pictures on both sides show different styles of Pullers and Attachments for a wide range of work.

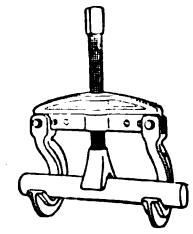
Repair season is here write today for Price List or order from your Jobber.



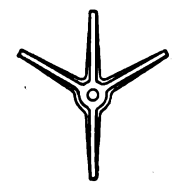
No. 0 Two-Arm Puller



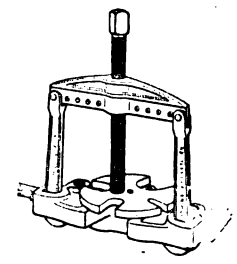
Patent Locking Arm



Pipe Bending and Shaft Straightening Attachment

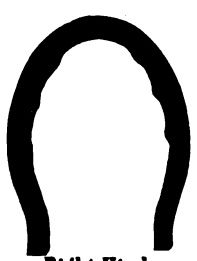


Crowfoot Beam

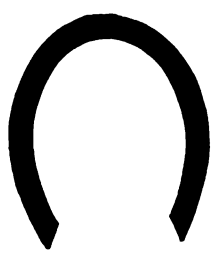


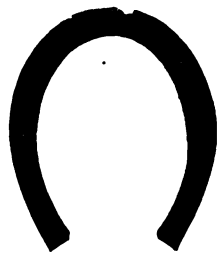
Arbor Press Base

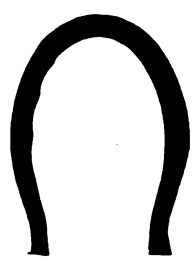
CRANE PULLER COMPANY, 54 LAKE STREET, ARLINGTON, MASS.

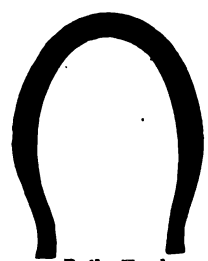


Right Hind Half Rim









Right Hind Full Swedge

"Brock Pattern" Hand Made Racing Plates

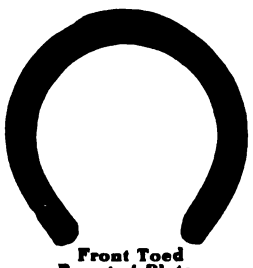
Extra Light, Light, Medium and Heavy weights; in sizes 0-4 inc.

Just What You Need for Trotters, Pacers and Runners

Write for our No. 17 Catalog (free); showing sizes, weights and measurements.

For our regular line of U. S. Horse and Mule Shoes, ask for No. 16 Catalog; showing sizes, weights and measurements of over 500 patterns and sizes.

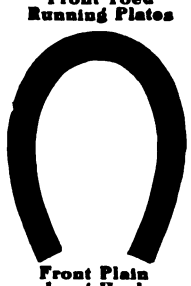
United States Horse Shoe Co., Erie, Pa.



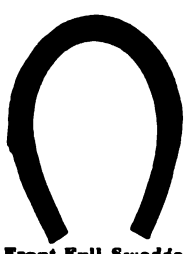
Front Toed Running Plates



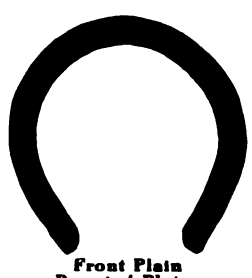
Hind Toe Running Plates



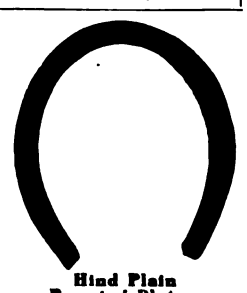
Front Plain Long Heel



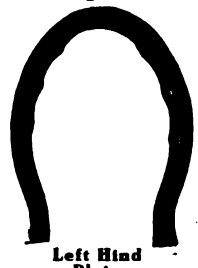
Front Full Swedge Long Heel



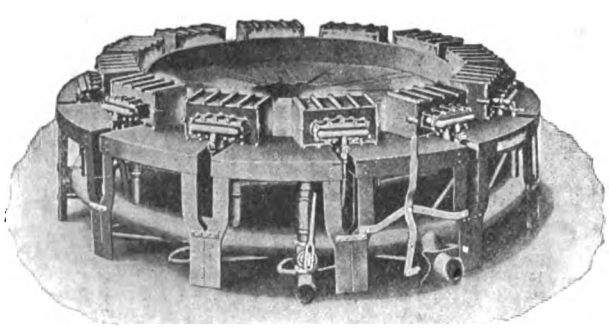
Front Plain Running Plates



Hind Plain Running Plates

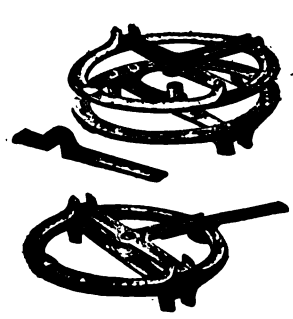


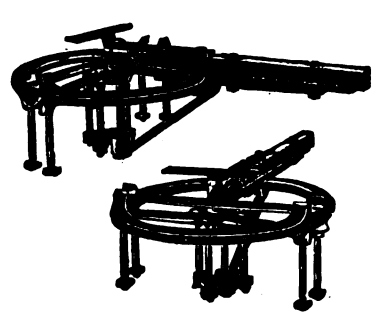
Left Hind Plain



TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas, Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.

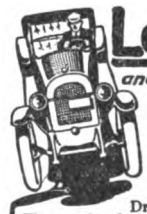
OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.





Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE COCEL MFG. CO., TOLEDO, OHIO.



Learn Auto and Tractor Business

$100 To $400 A Month

GREATER opportunities than ever due to increased production of Autos, Trucks, and Tractors. Big demand for Repairmen, Garage Foremen, Drivers and Tractor Operators. Thousands of our graduates making big money.

Learn in 6 to 8 Weeks

Immense additional equipment from our former Military Division. Same practical method as used to train soldier mechanics for U. S. Army in 60-day courses.

Free Now. Write today, giving age and occupation for **7-Day Trial Offer** and 68-page Opportunity Book.

GOOD JOBS OPEN BOOK FREE

Rahe Auto & Tractor School
3164 Oak St., Kansas City, Mo.

SAMPLE
OF WELDING COMPOUND
FREE

TRADE MARK

BLACKSMITHS!

Let me send you a trial package free and you will use no other. **Anchor Welding Compound** has no equal for strength. It welds the hardest steel. No hammer needed. Good for both big and little jobs. Try it.

Write to-day and mention The Blacksmith and Wheelwright.

N. D. DOXEY, ELMIRA, N. Y.



ABSORBINE
TRADE MARK REG. U.S. PAT. OFF.

Reduces Strained, Puffy Ankles, Lymphangitis, Poll Evil, Fistula, Boils, Swellings; Stops Lameness and allays pain. Heals Sores, Cuts, Bruises, Boot Chafes. It is a

SAFE ANTISEPTIC AND GERMICIDE

Does not blister or remove the hair and horse can be worked. Pleasant to use. $2.50 a bottle, delivered. Describe your case for special instructions and Book 5 R free.

ABSORBINE, JR., antiseptic liniment for mankind, reduces Strains, Painful, Knotted, Swollen Veins. Concentrated—only a few drops required at an application. Price $1.25 per bottle at dealers or delivered.

W. F. YOUNG, P. D. F., 55 Temple St., Springfield, Mass.

ATTENTION, BLACKSMITHS!

BE SURE IT'S A SUPERIOR Welding and Cutting Outfit you purchase. ACETYLENE GENERATORS Welding Supplies. Price Popular. Service Immediate. Quality Superior. Write for catalog and price list.

Agents wanted.

SUPERIOR OXY-ACETYLENE MACHINE CO.
Manufacturers of Everything for the Welder
HAMILTON, OHIO

Digitized by Google

The Best Part of Every Man's Education is That Which He Gives Himself

THE ROCHESTER WEST TIRE SETTER

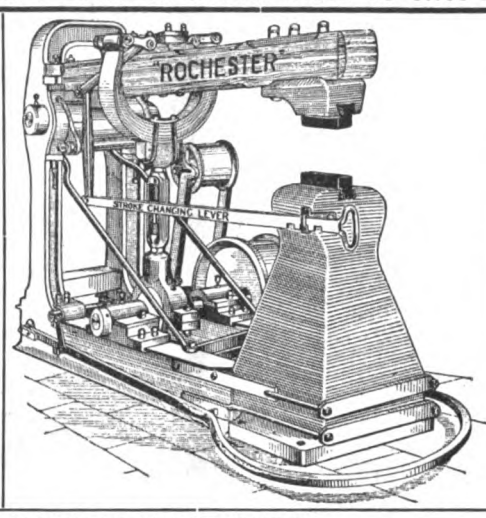
This is An Educated Machine

ROCHESTER

Helve Hammer

It is a well-built, substantial tool for welding and general forging. MADE IN SIX SIZES, 25 lb. to 100 lb. Heads and two styles of frame.

Send for our HELVE HAMMER BOOKLET, and give us information regarding character of your work.



Read More Catalogs and Fewer Newspapers

THE ROCHESTER HELVE HAMMER

SEND A CARD TO THIS ADDRESS FOR OUR CATALOGUE AND PRICES

WEST TIRE SETTER CO.
ROCHESTER, NEW YORK.



Free 448 PAGES OF BARGAINS

POST PAID

WE WANT TO SEND YOU THIS 448 PAGE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

Tells how you can work up a profitable auto supply and repair business.

Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories
1117 W. 11th Street, Cleveland, Ohio, U. S. A.

Stamp YOUR Shop as the Progressive Smithy in Your District

Use Giant Grip Shoes, Calks and Tools

Giant Grips, the famous original drive Calks, and Giant Grip Shoes have been made by us for 56 years. They represent the highest quality that best materials and workmanship can provide.

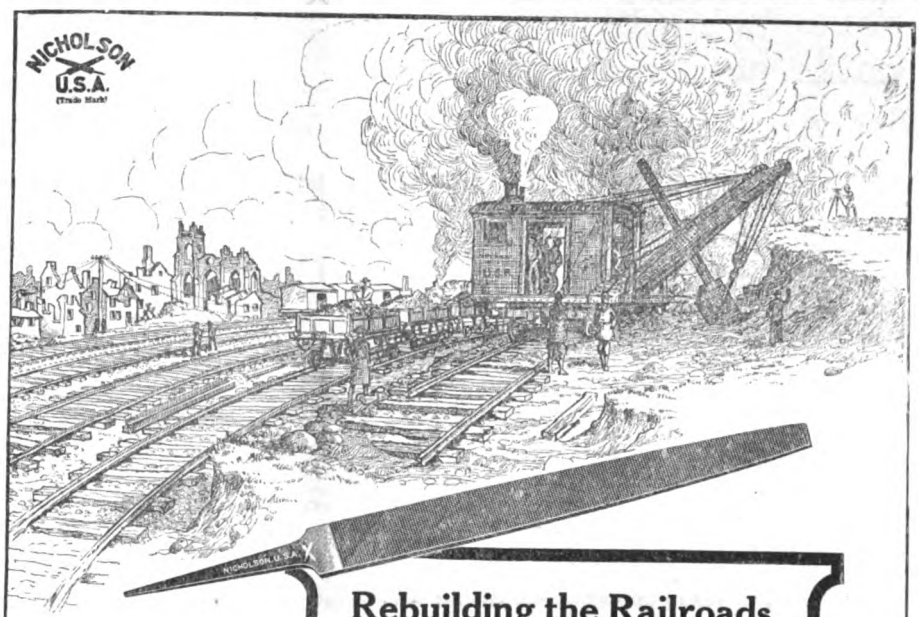
The big G on Shoes and Calks means lasting service and satisfaction—your customers know it and signify their wisdom by **repeat business.**



Write Us for Literature
See Your Jobber

GIANT GRIP HORSESHOE COMPANY
Established 1863
OSHKOSH - WISCONSIN

Also makers of Giant Grip Traction Chains for motor trucks



Rebuilding the Railroads of Ravaged France

Torn and twisted by shell and bomb, or worn by the rush of troops and supplies, much of the railroads of France must be replaced.



Nicholson Files

Used right at home, will work to further world-wide reconstruction, just as they smoothed and shaped for a victorious war—the Files that cut the FASTEST AND SMOOTHEST.

Write for our catalog and for File Filosophy—a fifty-years' education in Files and Filing in an hour's reading.

Nicholson File Co.
Providence, R. I.
U. S. A.

YOU CAN WELD STEEL AS EASILY AS IRON



Specially adapted for welding tires, axles, springs and all lap welding.

Either of these compounds will weld steel at the lowest possible heat that steel can be welded. Also protects steel at high heat.

Owing to our improved process of manufacturing, these compounds do not boil off and waste in the fire but adhere to the metal when applied.

FOR SALE BY ALL LEADING DEALERS IN BLACKSMITH SUPPLIES IN UNITED STATES AND CANADA

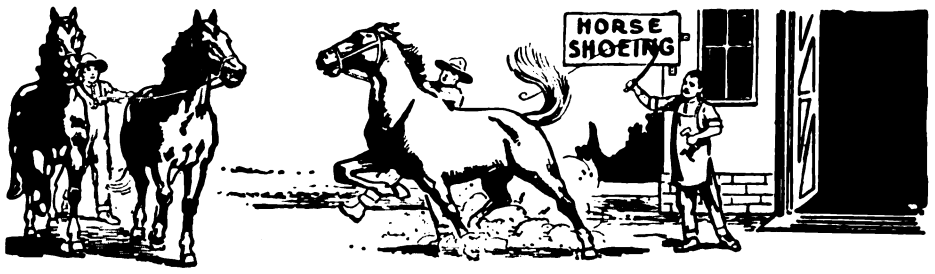
Large Free Samples Sent upon Request

CORTLAND WELDING COMPOUND CO.,
CORTLAND, N. Y.



A flux which causes the steel to weld like iron. Not necessary to apply between the lap, but may be applied to the outer surface of the work, the same as borax. Has no equal for plow work. Just the thing for welding toe-calks so they can't knock off.

Digitized by Google



QUIT DRIVING YOUR TRADE AWAY

Stop! Look! Think! Every time you put on a set of calks that an owner can replace himself, you are driving trade away from your shop.

When you use ***welded*** calks, the owner must bring his horse to the shop when the calks need renewing.

Also, every horse's hoofs need the frequent attention of a horseshoer. You're doing the owner a good turn by using ***Sweet's Toe Calks***—"The Cold Cut Dreadnaught"—as well as keeping your shop full.

FRANKLIN STEEL WORKS

Joliet, Ill. Cambridge, Mass.
Hamilton, Ont.



STERLING

PADS and PROTECTORS

Sterling pads are one solid, inseparable piece. The tough, pliable, waterproof back, made of our patented rubber and fibre compound, is vulcanized (not cemented or stitched) to the resilient rubber heel. They will never pull apart. STERLING Pads and Protectors are waterproof—do not swell, shrink or get soggy in stable moisture.

They are best for the horse's hoofs, and best for the shoer's business.

We sell exclusively through the regular jobbing trade. Please ask us for Samples.

STERLING TIRE CORPORATION
RUTHERFORD, N. J.

WELDING PLANTS, $25.00 to $300.00

Designed for all purposes. Small cash payment; balance, three to six months. Every mechanic and shop should have one.

BERTSCHY-BERMO CO. OMAHA, U. S. A.

Campbell Iron Company

WHOLESALE SUPPLIES

Still carry a complete stock of Wagon, Blacksmith Materials, Farrier Supplies, as well as Tools, Hardware Specialties and Duplicate Parts for Fords.
Write for General Catalogue.
817 Cass Avenue St. Louis, Mo.

PATENTS

C. L. PARKER
Ex-Member Examining Corps, U. S. Patent Office
Attorney-at-Law and Solicitor of Patents

American and foreign Patents secured. Trade marks registered. Searches made to determine patentability, validity and infringement. Patent suits conducted. Pamphlet of instructions sent upon request.
McGill Building WASHINGTON, D. C.

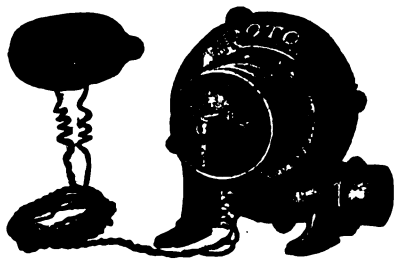
ROBERGE'S GREAT BOOK

"THE FOOT OF THE HORSE"
By DAVID ROBERGE

The author of this book for many years enjoyed the entire confidence of Robert Bonner, who, in his day, owned many of the fastest trotters the world has ever seen. Bonner and Roberge worked together in shoeing the former's horses. Many believe that David Roberge was the ablest horseshoer this country has ever seen. His book is filled with plates and illustrations showing proper methods of shoeing horses for every kind of lameness. We have sold large numbers of these books and they have always given entire satisfaction. The work represents the life experience of its author. Sent to any address, postage prepaid, on receipt of price, $5.00. Address
M. T. RICHARDSON CO., Publishers, 71-73 Murray Street, New York.

The ROTO ELECTRIC BLOWER ONLY $30.00

EXCEPT 220 VOLT WHICH IS $32.00



Write for information about our special cash price of Twenty-Nine Dollars

SAVE TIME! SAVE MONEY!

Are you still blowing your forge by hand? Do you know this time is WASTED? Install a ROTO Electric Blower and SAVE this time. It is the greatest *time and labor saver* you can put in your shop. It will let you do *twice* the work, do it *better—quicker—cheaper.* You will then say, like hundreds of our customers,

I wouldn't sell my ROTO for $100.00 if I couldn't get another.

Buy direct and *save the middleman's profits* of $10 to $20. The ROTO is used in several departments of the U. S. Government. You can rely on it. Write for more information or, better yet, mail the coupon today and try this blower in your own shop. If not satisfied, send it back at our expense. That's fair isn't it?

Send the Coupon—Do it Now

THE ROSEWATER ELECTRIC CO.
5516 KINSMAN ROAD, CLEVELAND, OHIO

Send me by.....An AIR COOLED ROTO BLOWER with one year's guarantee, complete with cord, plug and Speed Regulator. I will return it to you at the end of 30 days, if it does not give me entire satisfaction, and if I keep it, I will pay you $30.00 for the 110 Volt, or $32.00 for the 220 Volt Blower at the end of 30 days.

Name.....Address.....

Current.....Voltage.....Cycles.....

Your Electric Light or Power Company Will Give You This Information.

THE SCREW-CUTTING LATHE

How to select, set up, adjust and operate

By JAMES F. HOBART, M. E.

THIS book is a concise and exhaustive treatise on everything pertaining to the SCREW-CUTTING LATHE, including costs, erection, operation and adaptability. It is written by one who thoroughly understands his subject in all its details, and is so copiously illustrated that everything in it will be readily understood.

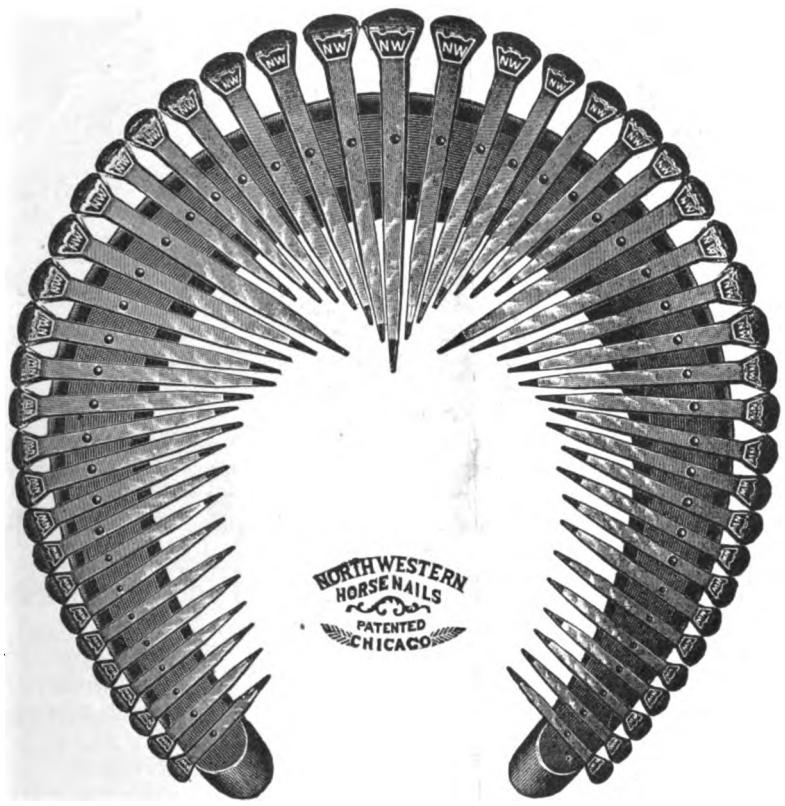
It will be found invaluable to those desiring to know just how a Screw-Cutting Lathe should be run.

There are ***92 illustrations,*** and the book is substantially bound in cloth. ***Price, $2.00.*** A copy will be sent postage prepaid to any address on receipt of price.

M. T. RICHARDSON CO.
PUBLISHERS
71-73 Murray St., New York

Digitized by Google

NORTHWESTERN HORSE NAILS



MADE OF THE BEST QUALITY MATERIAL

The most perfect in form and finish and will hold a shoe longer than any other nail made.

THE RE-ENFORCED POINT makes it the easiest to drive and the safest to use.

UNION HORSE NAIL COMPANY

Manufacturers

CHICAGO **ILLS.**

Edwards Shears

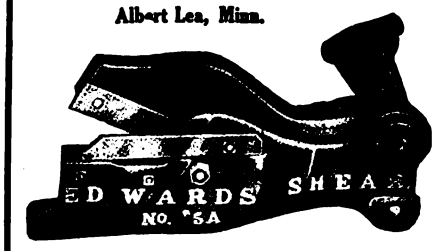
For twenty-four years the **Two Leading Low Priced Shears** in the U. S., representing the **Greatest Value** for the **Least Money.**

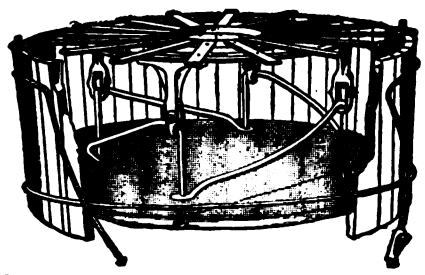
No. 5, weighs 200 lbs., cuts 4x¼ inch soft steel.
No. 10, weighs 430 lbs., cuts 4x¾ inch soft steel.

At their price you should have had one long ago. **Order one** from the first iron man that calls on you. **They All Sell Them.**

Write for descriptive circular and prices.

C. D. EDWARDS MFG. CO.
Albert Lea, Minn.





The Wolfe Tire Cooler has stood the test for 12 years in many of the best shops, and proven all that is claimed for it. The machine is right, so is the price.

Write for circulars.

MATT. L. WOLFE, WEST CARROLLTON, OHIO

"NATIONAL" BLACKSMITHS' DRILL CHUCK



Made especially for Blacksmithing and Carriage Work.

Positive, durable, strongest, self-cleaning, always works, quickest to change Drills, casts no shadow, will save its cost over other Chucks in saving of time. **BUY THE BEST. Money refunded if not as represented.** Ask your jobber for it, or send direct for prices and circular.

ONEIDA NATIONAL CHUCK CO., Oneida, N. Y.

THE WOOD WORKER'S FRIEND



Wood stock and lumber is high. With our Jointer Heads you can buy rough lumber of any kind and dress it to suit your job. Saves time, money and lumber. Would this be any object to you? If so, get circulars and prices. Sold on 30 days' trial. Mfd. by

Whisler Mfg. Co., Gibson, Iowa

Get a WITTE

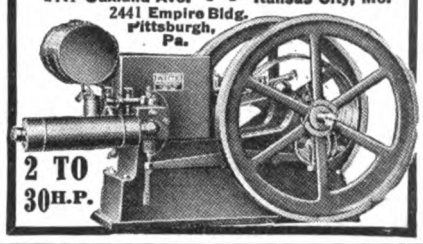


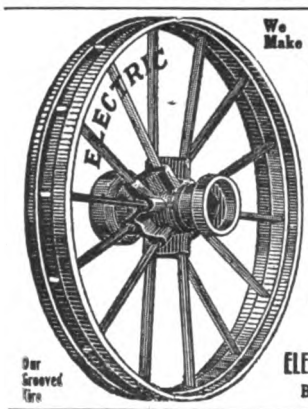
BIG CUT IN ENGINE PRICES

No Cut In Quality

I have made a big smashing reduction in engine prices—for quick shipment—all styles—all sizes—2 to 30 H. P.—Kerosene or Gasoline—Stationary, Portable or Saw-rig—Buy on your own terms. I guarantee safe delivery, make **immediate shipment**—guarantee every part of your engine against defects as long as you use it—no "strings"—no time limit. Write me at once for prices on this special factory direct offer. Book Free.—Ed. H. Witte, Pres.

WITTE ENGINE WORKS
2441 Oakland Ave. - - Kansas City, Mo.
2441 Empire Bldg. Pittsburgh, Pa.





We Make STEEL WHEELS
To Fit Any Axle
Plain or Grooved Tire

Steel or Hickory Axles
Any Size
A Full Line of Wood and Steel

Farm Trucks
With Steel or Wood Wheels

Write for Large Catalog and Prices

ELECTRIC WHEEL CO.
Box N, Quincy, Ill.

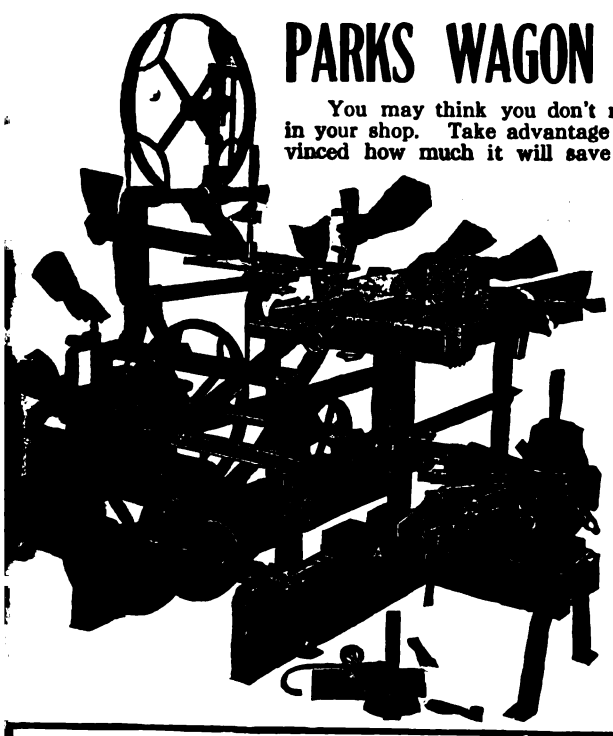
"GEARS AND WAGONS"

Selle Gears

Forty years of success has placed **"Selle Gears"** and Wagons in the hands of the largest wagon users in the world. Express and Transfer Companies, Department Stores, etc., specify **"Selle Gears"** and will take no other after once tried. **230 Page Catalog Free.**

THE AKRON-SELLE CO. Akron, Ohio

PARKS WAGON SHOP SPECIAL



You may think you don't need this practical woodworker in your shop. Take advantage of our trial offer, and be convinced how much it will save you. **Machines sent on trial anywhere in United States and Canada.**

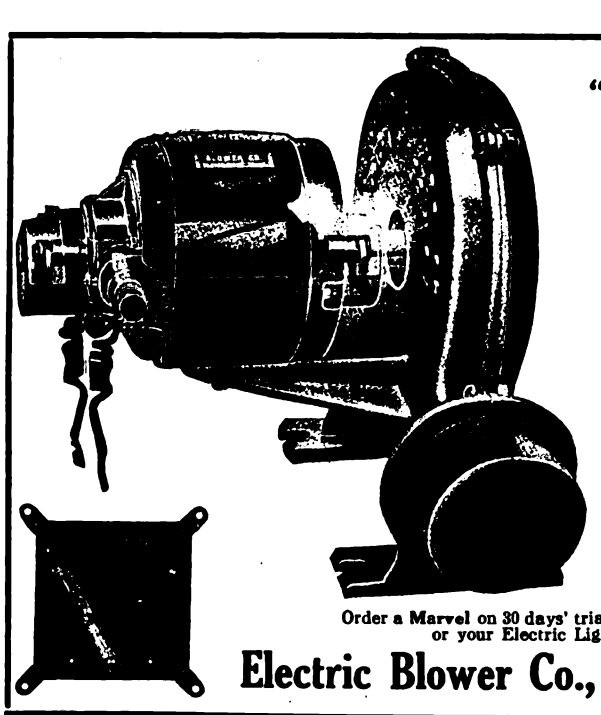
Machine is a combination of Circular, Rip and Cross Cut Saws,
22" Band Saw,
12" Jointer,
Rim Rounder,
Felloe Borer,
Spoke Tenoner,

All ready for instant use. No Changing.

Light size takes 2 to 3 H. P., heavy size 3 to 4 H. P.

Write for catalog and full information about how a woodworker should be arranged to be convenient to operate.

Parks Ball Bearing Machine Co.
North Side Station
Cincinnati, O.



"One Fire" Marvel

A. C. or D. C.
or
UNIVERSAL MOTORS

Extra Large Ring Oil Bearings

Case Hardened Armature Shaft

$38.00 Net

Order a **Marvel** on 30 days' trial through your **Dealer**, or your Electric Light Company

Electric Blower Co., 352 Atlantic Avenue BOSTON, MASS.

940 Pages instead of 824 **NINTH EDITION** **3362 Illustrations instead of 2000**

$4.46 prepaid # DYKE'S AUTO ENCYCLOPEDIA **$4.46 prepaid**

Entirely re-written, hundreds of illustrations and many new subjects added. Practically a new book. A non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 50 Instructions—Simplified and Practical.

3362 Illustrations—the kind you understand at a glance.

2 Supplements, part printed in two colors, treating on the construction, operation, repairing and adjusting of the **FORD** and **PACKARD**—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.

775 illustrations and 279 pages on Electric Ignition, Electric Starters and Generators, etc.

81 pages and 79 illustrations on the Delco system alone.

60 pages and 254 illustrations on Adjustments, Tests, etc., of leading Electric Systems.

164 pages and 1189 illustrations on Repairing.

Oxy-Acetylene welding. Axle, Differential and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.

27 pages and 180 illustrations on Tires and Tire Repairing.

44 pages and 119 illustrations on Carburetion.

89 pages and 291 illustrations on Engines and Parts.

16 pages on Digest of Troubles.

6000 lines to the Index. This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. Index begins on colored paper, easy to refer to.

Dictionary is also included, which gives the meaning of motoring terms.

Inserts: There are five—printed in colors. New features you never before saw or heard of in one of the inserts.

Additions to the Ninth Edition:

TRUCKS, TRACTORS, MOTORCYCLES, AIRPLANES and LIBERTY ENGINE

HOW TO BECOME AN EXPERT AUTOMOBILE MECHANICIAN

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion subject so thoroughly, you can adjust any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

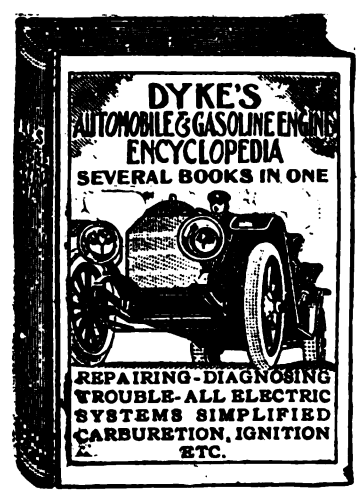
You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical Automobile book in America. Price $4.46, prepaid.

Address all orders to

THE BLACKSMITH & WHEELWRIGHT
73 MURRAY STREET NEW YORK



It's worth ten times its cost if only placed on the shelf and used as a reference.

Digitized by Google

Get a GTD Screw Plate
with O.K. Drop Forged Dies

REG US PAT OFF GTD

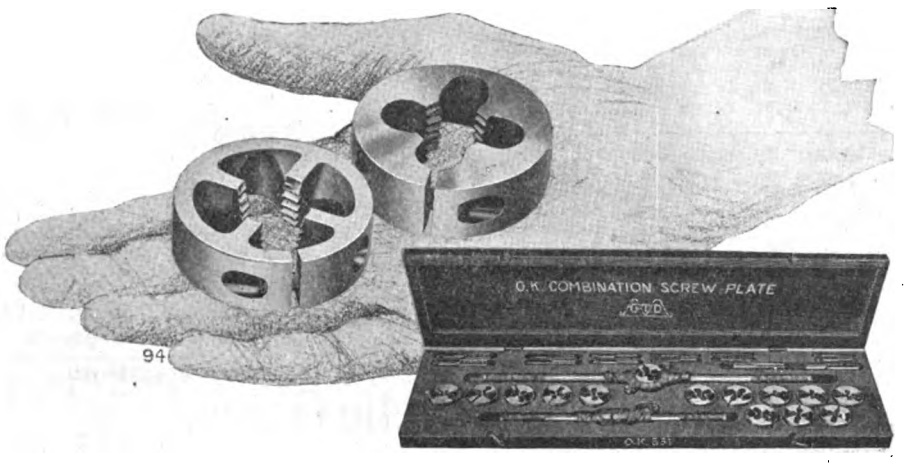
No Blacksmith Shop is complete without a GTD Screw Plate. Not only will it recut jammed threads, but new threaded parts can be made—and it's mighty hard to get spare parts now-a-days.

GTD Screw Plates are made in over a hundred assortments. Yours is among them.

Write for New Small Tools Catalog No. 40 describing Screw Plates, Taps, Dies, Reamers, etc.

Greenfield Tap and Die Corporation
Greenfield, Massachusetts

NEW YORK, 28 Warren St. CHICAGO, 13 So. Clinton St. Detroit Office, 74 Congress St. W
Canadian Plant, Wells Brothers Company of Canada, Ltd., Galt, Ontario



PLYMOUTH COMBINED HAND POWER
PUNCH AND SHEAR

ALWAYS READY **STRONG and SIMPLE**

No lost or misplaced Punches — always in the machine.

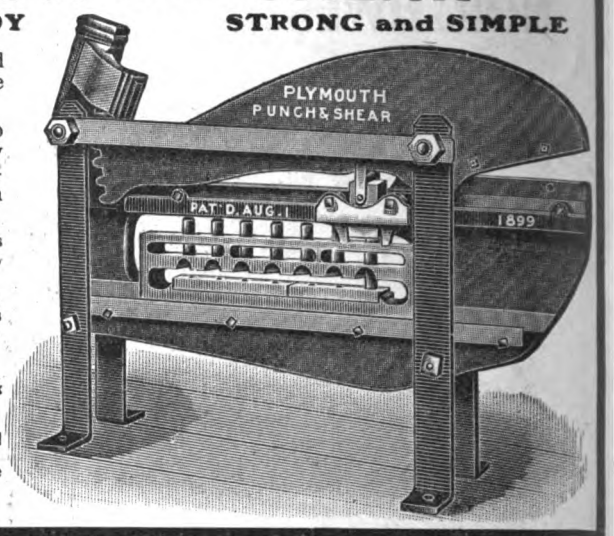
Punch Rack shifted to position for use of any punch in a moment without the need of a wrench or any other tool.

Seven different size punches with every machine, ¼, 5/16, ⅜, ½, ⅝, ¾, and ⅞.

Will punch ½ in. hole in ½ in. iron or its equivalent. Shears 4x½ or 3x⅝ or 1 in. Round Iron.

Manufactured By
PLYMOUTH FOUNDRY & MACHINE CO.
PLYMOUTH, WISCONSIN

For sale by all Heavy Hardware Jobbers and Blacksmiths' Supply Houses.

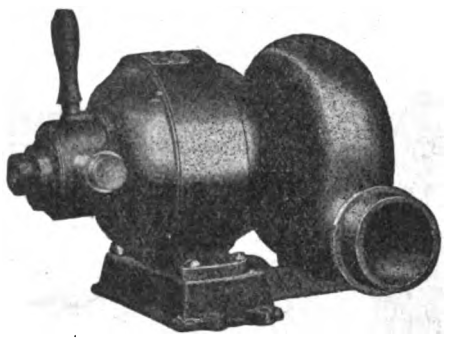


STAR STEEL SHAPES
ARE A GUARANTEE OF QUALITY

PLOWSHARES
LISTERSHARES
MOLDBOARDS
SUBSOILERS
LANDSIDE POINTS
SHOVEL POINTS
DRILL POINTS
PLOW POINTS
SEEDER POINTS
LANDSIDE PLATES
CULTIVATOR SHOVELS



Made from Soft Center, Solid Cast or Crucible Steel.
BEST MATERIAL AND WORKMANSHIP.
STAR MANUFACTURING CO.
CARPENTERSVILLE, ILL.

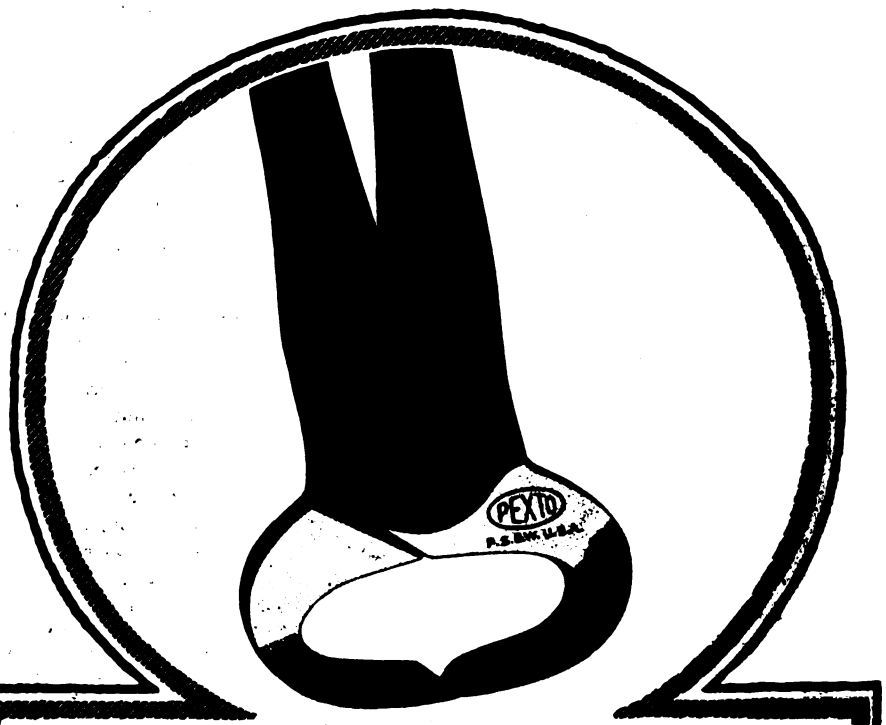


100 OR MORE DIFFERENT SPEEDS IN THE "KAZOO" Variable Speed Blower

Mr. Blacksmith,—Do you know of any other blower that will give these results? The "KAZOO" is made right and stays right. No outside rheostat or resistance—hence you are free of those troubles. It has any desired speed. You stop, start, increase or decrease the speed by simply moving the handle. You actually save current, as it varies with the speed. All enclosed dust-tight, genuine bronze bearings and ABSOLUTELY NOISELESS RING OILERS.

Alternating Current Only

R. P. WARNER ELECTRIC CO., KALAMAZOO, MICHIGAN



For a Clean Cut

Any average-good nipper will cut clean when it's new. But it takes a tool like Pexto No. 132 to stay sharp, and stand up generally throughout a long period of hard usage.

Pexto Blacksmiths' and Farriers' Tools are all conspicuous for their strength, superior workmanship and finish. There's a large line to choose from—pincers, nippers, parers, butterises, farriers' hammers, etc. *Ask your dealer.*

THE PECK, STOW & WILCOX COMPANY
Southington, Conn. **Cleveland, Ohio**

Address Correspondence to 209 West Center Street, Southington, Conn.

100% *American for 100 Years (Founded 1819)*

PEXTO
BLACKSMITHS' TOOLS

Don't Underestimate

the importance of the small competitor.
When he puts in the

Kerrihard Power Hammer

you'll have to hustle to keep up with him.

This Wonderful Hammer Does the Work of Four Men

Write for Full Particulars

THE KERRIHARD CO., Kerrihard Station, Red Oak, Iowa, U. S. A.



Digitized by Google

ESTABLISHED 1880

The Pioneer Journal of its Class

THE BLACKSMITH & WHEELWRIGHT

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U. S. Patent Office.

Entered as Second-class Matter March 4, 1880, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Published Monthly.

Vol. LXXIX. No. 5 NEW YORK, MAY, 1919 TERMS: { One Dollar a Year. Foreign, $1.50. (6s. 3d.)

THE ART OF HORSE SHOE MAKING



WE MAKE SHOES

TO MEET EVERY REQUIREMENT

Here Are a Few of Our Specialties

Sideweights—Bryden "C" Horse and Mule
Ideal Calked—Toeweight—Clipped Goodenough

Send for Descriptive Catalog which Shows Our Full Line with Weights, Etc., Etc., Etc.

BRYDEN HORSE SHOE WORKS Catasauqua, Pa.



Smaller Sizes Will Hold

The Capewell Nail, having by far the greatest tensile strength can be safely used in smaller sizes than can others.

This is important to the horseshoer. The smaller the nail, of course, the more to the pound. This counts in the number of horses that can be shod with a dollar's worth or a hundred dollars' worth of nails.

"The Capewell"

THIS CHECKED HEAD OUR TRADE MARK

Horse Nail

Proven by many years of actual service to be unequalled, the Capewell is preferred by the vast number of horseshoers. Order the world's best nail at a fair price. It is much wiser than to get the cheapest regardless of quality.

The Capewell Horse Nail Co.

HARTFORD, CONN.

Largest Makers of Horse Nails in the World



Saw Those HeavyBars ON A MARVEL Power Hack Saw

Machine stops when work is cut off. Requires very little power.

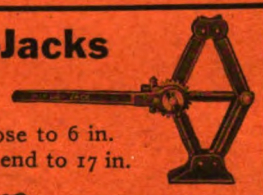
Price is Low. Write Us.

Ask for reply by return mail.

ARMSTRONG-BLUM MFG. CO.
340 N. Francisco Ave., Chicago, Ill., U. S. A.

Hi-Lo-Jacks

Six Sizes



Close to 6 in.
Extend to 17 in.



Capacities ½ to 12 tons

Made by
The Rowe Calk & Chain Co.
Plantsville, Conn.

THE TEETH IN
BLACK DIAMOND RASPS
ARE MINGLED

So as to Cut Clean and Free and Leave no Furrows in the Work

Twelve Medals of Award by Jurors



At International Expositions

C. & H. BARNETT COMPANY

Black Diamond File Works, PHILADELPHIA, PA.

Owned and Operated by NICHOLSON FILE CO.

Copy of Catalog sent Free to any interested file users upon application.



SUREGRIP CALKS

American Calk Co.
DETROIT, - - - MICH.



Auto Heel Rest

Made in 4 Sizes of Frosted Aluminum ½ in., 1 in., 1½ in., 2 in.
Ask your Dealer, or sent post paid, 75c.

The "Ford" Heel Rest

Size, 7⅛ x 4½ x ¾
Made of frosted aluminum, used on mat or floor board. Sold by all dealers, or sent post-paid, $1.00.

Made only by
J. L. LUCAS & SON, Inc.
Bridgeport, Conn.

AETNA STEEL TOE CALKS

Made by THE AETNA NUT CO., Southington, Conn.

BLACK HORSE BRAND

BEST SHAPE
BEST SPUR
TO DRIVE
BEST STEEL



TOE AND HEEL CALKS

SOLD BY ALL DEALERS

Stokes Bros.' Improved Horse Rasps

Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A

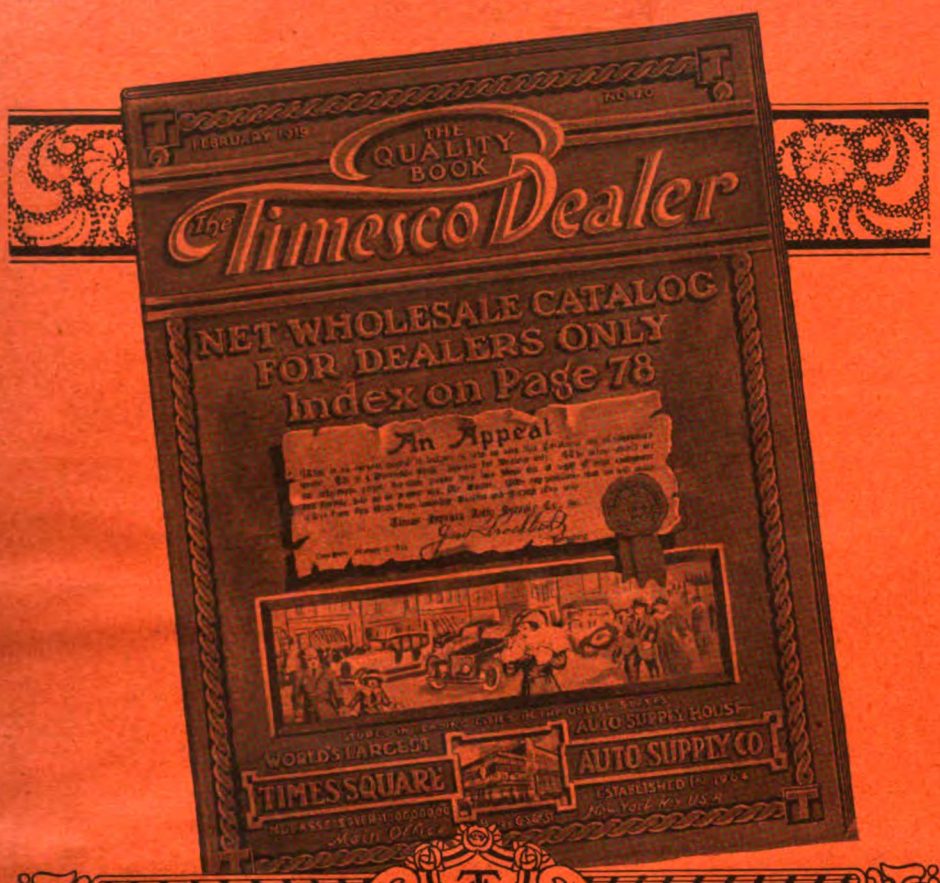
STEEL STAMPS
BURNING BRANDS
RUBBER STAMPS
STENCILS
GEO. M. NESS, JR.
61 FULTON ST. NEW YORK
Send for price list.

"GEARS AND WAGONS"

Selle Gears Forty years of success has placed "Selle Gears" and Wagons in the hands of the largest wagon users in the world. Express and Transfer Companies, Department Stores, etc., specify "Selle Gears" and will take no other after once tried. 230 Page Catalog Free.

THE AKRON-SELLE CO. Akron, Ohio

Digitized by Google



BLACKSMITHS

Send for our new wholesale catalogue —"THE TIMESCO DEALER." This is a combined Catalogue, Trade Journal and Dealer's Reference Book—for Dealers, Garagemen and Blacksmiths only. It tells you how to sell more auto supplies at a bigger profit. It represents the result of 14 years' experience in retailing auto supplies, all of which is now placed free, at the service of any auto supply dealer, garageman or blacksmith. It lists everything and anything pertaining to automobiles at *lowest net wholesale prices.* It is a Book that every blacksmith should have.

SEND FOR IT TODAY, FOR IT WILL SHOW YOU HOW TO MAKE MORE MONEY.

Sent free to any Blacksmith or Wheelwright.

Times Square Auto Supply Co.

Main Office

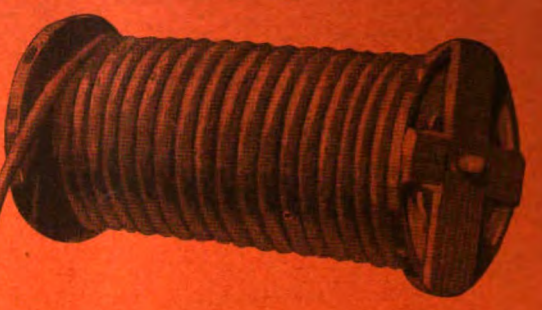
New York, N. Y., Broadway & 56th St.

Dept. T.

Distributing Branches in the Following Cities:

Boston, Mass.
Chicago, Ill.
Cincinnati, Ohio
Columbus, Ohio
Dallas, Texas
Des Moines, Iowa
Kansas City, Mo.
Minneapolis, Minn.
Milwaukee, Wis.
Memphis, Tenn.
New York, N. Y.
Philadelphia, Pa.
Pittsburgh, Pa.
Providence, R. I.
St. Paul, Minn.
Toledo, Ohio
Tulsa, Okla.
Wichita, Kan.

LANCELLOTTI



Tie Up to Firestone

—*because* vehicle owners all know that Firestone Carriage Tires give Most Miles per Dollar. Such is the equipment for you to offer now, particularly when people demand better service than ever and are buying with more care.

The quality of Firestone Carriage Tire makes it wear evenly down to the channel. It does not chip, crack and break. It wears down slowly and gives easy, resilient riding.



Internal Wire

Firestone carriage rubber combines full size with the lightness which makes it profitable equipment for you to apply. Write your jobber or us for our interesting proposition.



Side Wire



Cushion

FIRESTONE TIRE & RUBBER COMPANY
FIRESTONE PARK, AKRON, O.
Branches and Dealers Everywhere

Carriage Tire

Digitized by Google

"F-S" PAINTS



"F-S" Products Stand the Most Rigid Inspection.

Your good work will stand even higher at inspection when you use "F-S" Superfine Coach Colors on your carriage, coach and automobile bodies. The best of material is used as in all "F-S" products—ground in gold-size Japan.

FELTON, SIBLEY & CO., Inc.

Manufacturers of Colors, Paints, Varnishes since 1863

136-140 North Fourth Street, Philadelphia

(147)

BROOKS WELDING AND CUTTING APPARATUS

The Most Important Part of the Tool Equipment in All Metal Working Shops for Both Repairing and Manufacturing

The Brooks flash-back safety valve eliminates all chances of bursting the dry pipe. This is the greatest safety device ever put on an Acetylene Generator. It opens and releases the force the same as the exhaust valve on a gas engine.

The Brooks Machine Co. manufactures welding and cutting torches, automatic acetylene pressure generators, both portable and stationary. This means complete equipment to take care of any and all kinds of welding and cutting. If you can tell us the nature and quality of your work, we can advise you fully as to the size and kind of equipment to meet your requirements best.

All products manufactured by the Brooks Machine Co. are guaranteed for one year against defective workmanship and to be made of first-class material and to do all we claim for them.

We are pretty sure this is the right way to make customers and we are dead sure it is the right way to hold them.

Brooks Universal Welding and Cutting Torch

Ten Welding and Three Cutting Tips

Torch made in lengths of 20 inches over all. With it, either welding or cutting can be done by simply changing tips. This Torch is adapted to all classes of welding and cutting of metals within range of the Oxy-Acetylene welding or cutting process.

Brooks Commercial Welding Torch

Eight Welding Tips and One Extra Extension.

Larger Tips Furnished on Request

Torch made up to 21 inches over all. It can be lengthened or shortened, according to the requirements of the work, by changing blow pipes. One extra blow pipe is furnished regularly which makes the torch 28 inches long. On request, pipes of any length may be furnished.

By taking off the tip elbow head and screwing the welding tip on direct to the short extension, it can be converted into a straight torch, which is often convenient.

The Brooks Commercial Torch will handle all welding work within the limit of the process. This Torch is especially well adapted for pipe line, boiler and machine shop welding.

Brooks Portable Automatic Acetylene Generators

25 and 50 lb. Carbide Capacity, with Welding Equipment



WRITE TO US TODAY

THE BROOKS MACHINE CO., 219-229 W. Lewis St., Wichita, Kansas

STERLING

PADS and PROTECTORS

Sterling pads are one solid, inseparable piece. The tough, pliable, waterproof back, made of our patented rubber and fibre compound, is vulcanized (not cemented or stitched) to the resilient rubber heel. They will never pull apart. STERLING Pads and Protectors are waterproof—do not swell, shrink or get soggy in stable moisture.

They are best for the horse's hoofs, and best for the shoer's business.

We sell exclusively through the regular jobbing trade. Please ask us for samples.

STERLING TIRE CORPORATION

RUTHERFORD, N. J.

Would You Sell Your Life For $65?

You wouldn't part with even an arm or a leg for that figure, would you?

Yet every vicious horse you shoe is likely to do more damage in the twinkling of an eye than can be repaired at several times the cost of **Barcus Stocks.**

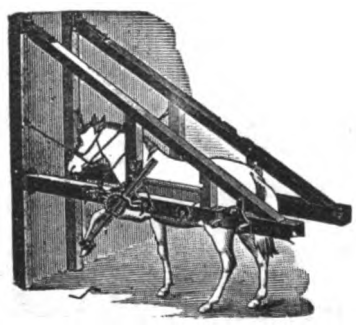
When you place a horse in a Barcus Stock, he is harmless—he cannot hurt either you or himself. Costing only $65 it is cheap insurance, indeed.

BARCUS STOCKS not only furnish the logical way to observe "Safety First," but they are also a positive aid to good shoeing. The BARCUS is a modern Stock – automatic working parts instead of the bothersome ropes, straps and blocks that made the old style stock almost more of a nuisance than a help.

If you don't know about **Barcus Stocks** you owe it to yourself and your family to write **at once** for the complete details.

The Barcus Mfg. Co.,

Wabash, Ind.



Please send me full particulars regarding your Horse Stocks without any obligation on my part.

Name.....

Town.....*State*.....

Digitized by Google

UNIFORMITY

SHELDON AXLES AND SPRINGS

HAVE LONG BEEN

INTERNATIONALLY FAMOUS

For Their Superiority In

DESIGN, MATERIALS and WORKMANSHIP

REASON:

Sheldon Took Guesswork Out of Axle and Spring Manufacturing

which means

UNIFORMITY OF PRODUCT

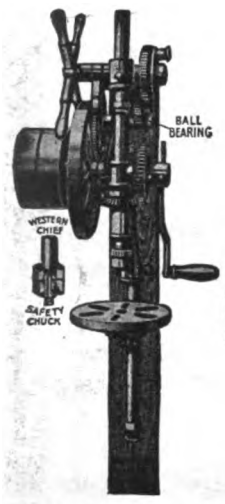
Sheldon Axle & Spring Co., Wilkes-Barre, Pa.

The Better Your Equipment The Bigger Your Profits

Buy CANEDY-OTTO

AND INCREASE YOUR INCOME

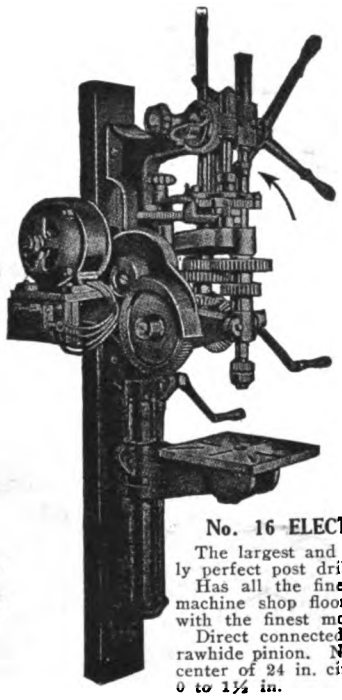
Once Tried, Always Used : There's a Reason—Quality



No. 19 DRILL

A low-priced combined hand and power self-feed drill.

Drills to center of 16½ in. circle.



No. 16 ELECTRIC DRILL

The largest and most mechanically perfect post drill manufactured.

Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.

Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1¼ in.

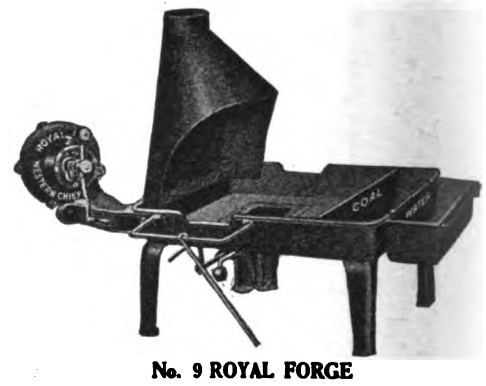
OVER 200 DIFFERENT STYLES

SEND FOR CATALOGUE No. 12



No. 100 ROYAL FORGE

The most popular forge ever made.
Fan, 12 in. Hearth, 31½x45½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x50 in. Blower, 12 in.



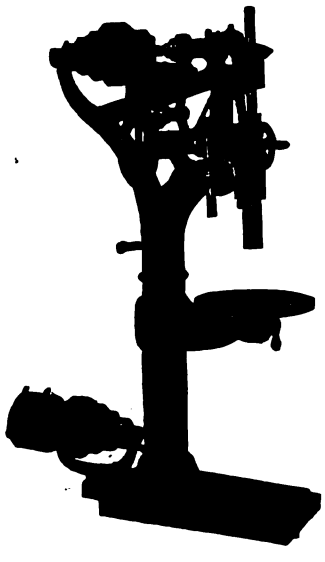
Blower, 12"
Wt., 135 lbs.
Height, 47"

ROYAL BLOWER

(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.

Fire pot is 8x9 in. inside.



No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.

All machines are tested before leaving the factory, and guaranteed in every respect.

Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS



No. 1½ SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



No. 8 ELECTRIC BLOWER

The best outfit money can buy.

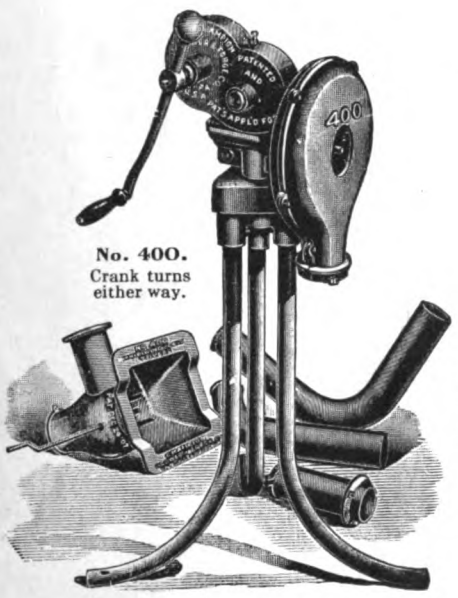
Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

THE FAMOUS CHAMPION BLACKSMITH TOOLS

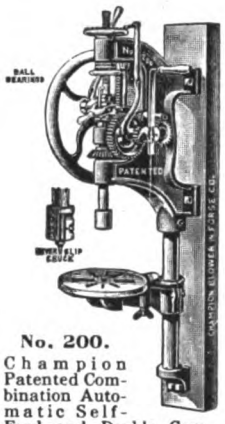
CHAMPION BLACKSMITH TOOLS HELPED TO WIN THE WAR



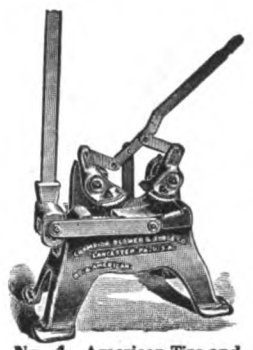


No. 400. Crank turns either way.

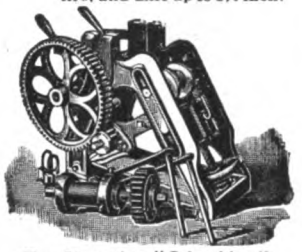
FAMOUS 400



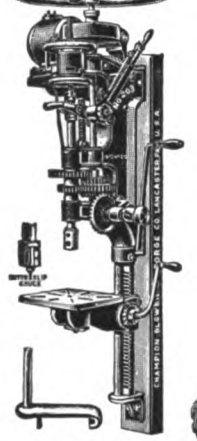
No. 200. Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



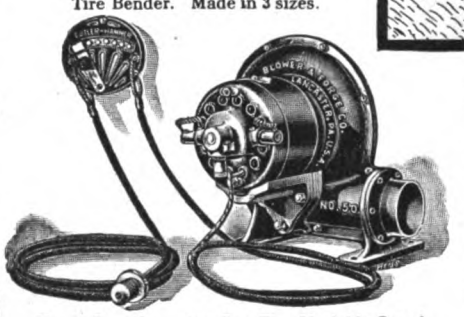
No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



The Champion "Columbian" Tire Bender. Made in 3 sizes.



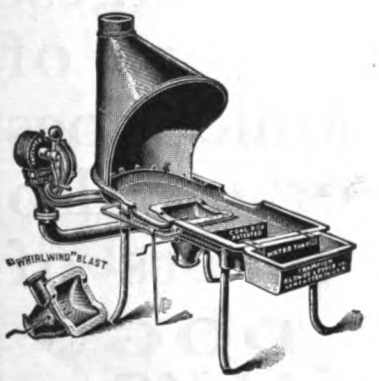
No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.



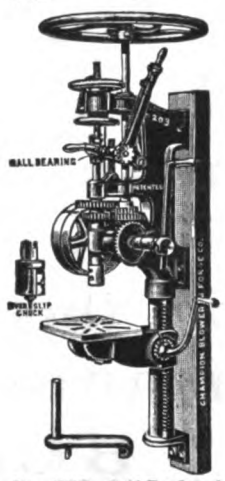
No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower.



No. 408. Steel Blacksmith's Forge.



No. 433. Cast Iron Blacksmith's Forge



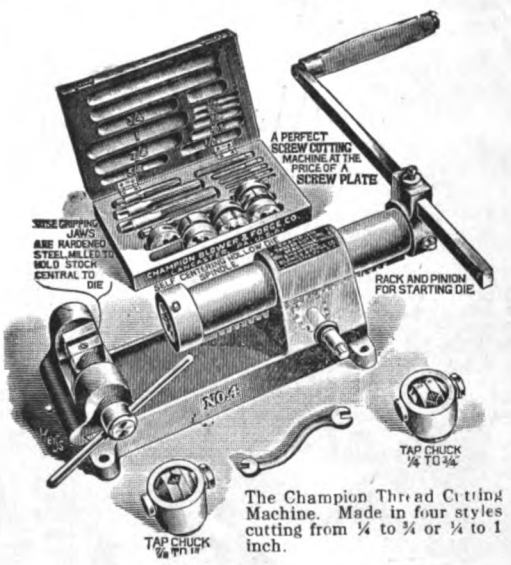
No. 203. Self-Feed and Double Compound Lever Feed Drill.



Hercules Patented Power Hammer. Weight of ram, 65 pounds.

Don't Fail to Get Our 1918 Catalog

Before purchasing a Hand Blower Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



The Champion Thread Cutting Machine. Made in four styles cutting from ¼ to ¾ or ⅛ to 1 inch.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

Digitized by Google



Digitized by Google

EMCO MALLEABLE E IRON CASTINGS

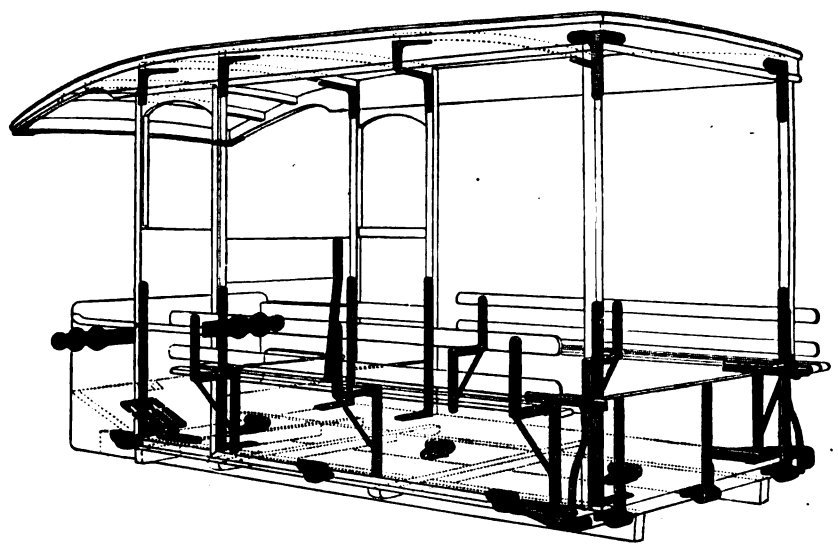
—QUALITY AND SERVICE—

We do not make Bodies,

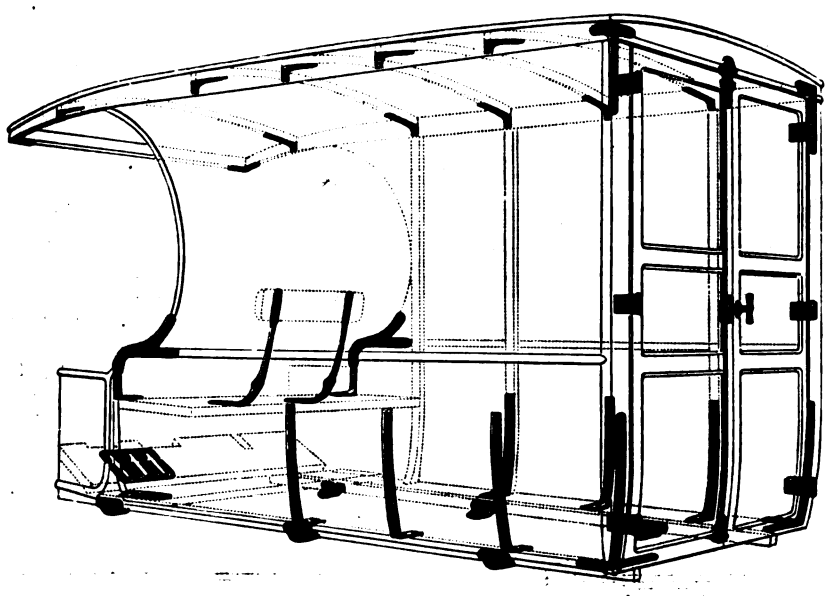
but only

IRONS

for them



Set No. 6



Set No. 2

Our Bulletin

"ASSEMBLIES OF IRONS"

for Vehicle Bodies, will

be mailed on

request

THE EBERHARD MANUFACTURING COMPANY

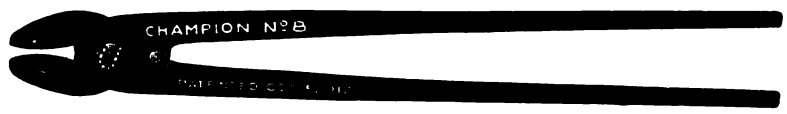
CLEVELAND, OHIO

Digitized by Google

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge

Nothing to get out of order.



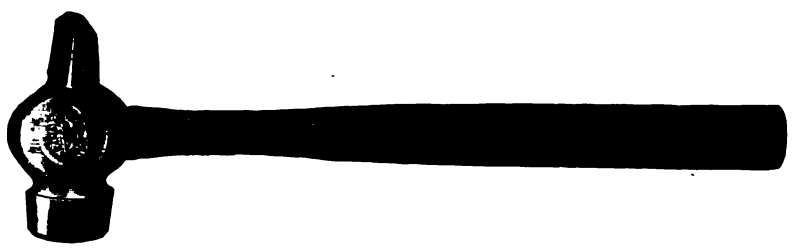
Will hold securely any size of shoe.

No. 8 16 Inches Long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

Weights, 1¾ to 3 lbs.

This Hammer is the most popular Sharpening Hammer on the market.

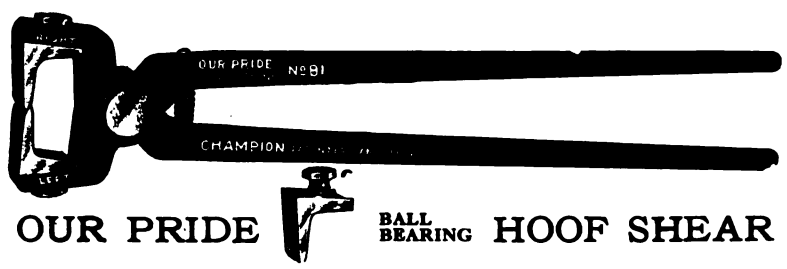


Corrugated Pein.

IT GIVES RESULTS

No. 12 ELECTRIC SHARPENING HAMMER

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.



Blades easily replaced when worn out.

All parts interchangeable.

OUR PRIDE BALL BEARING HOOF SHEAR

Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY - Meadville, Pa., U. S. A.

THE LIVINGSTON CO., 131 E. 23d Street, NEW YORK, Eastern Representatives

YOU CAN WELD STEEL AS EASILY AS IRON



Especially adapted for welding tires, axles, springs and all lap welding.

Either of these compounds will weld steel at the lowest possible heat that steel can be welded. Also protects steel at high heat.

Owing to our improved process of manufacturing, these compounds do not boil off and waste in the fire but adhere to the metal when applied.

FOR SALE BY ALL LEADING DEALERS IN BLACKSMITH SUPPLIES IN UNITED STATES AND CANADA

Large Free Samples Sent upon Request

CORTLAND WELDING COMPOUND CO.

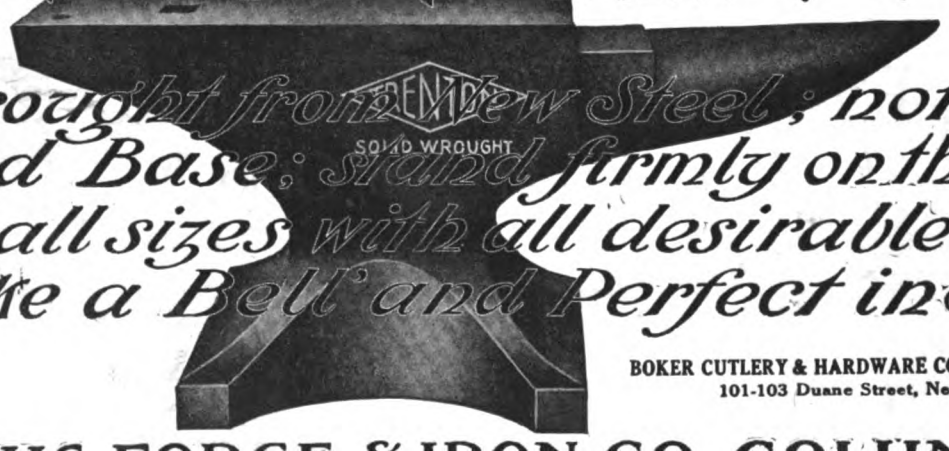
CORTLAND, N. Y.



PREPARED ESPECIALLY FOR WELDING FAR SUPERIOR TO COMMON BORAX

A flux which causes the steel to weld like iron. Not necessary to apply between the lap, but may be applied to the outer surface of the work, the same as borax. Has no equal for plow work. Just the thing for welding toe-calks so they can't knock off.

TRENTON ANVILS

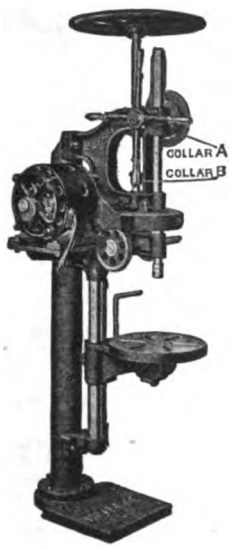


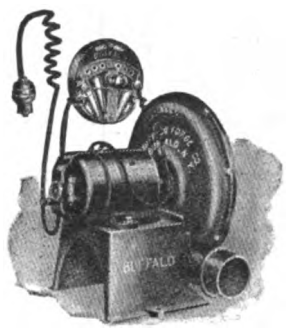
Solid Wrought from New Steel; not cast.
Recessed Base; stand firmly on the block
Made in all sizes with all desirable Clips.
Ring like a Bell and Perfect in Shape.

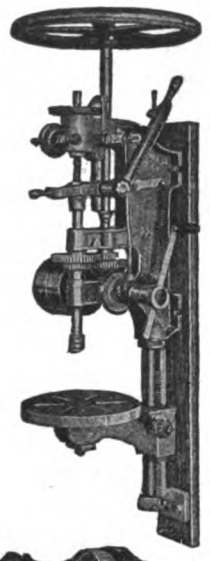
BOKER CUTLERY & HARDWARE CO., Inc., Sole Sales Agents,
101-103 Duane Street, New York City

THE COLUMBUS FORGE & IRON CO. COLUMBUS, O.

Digitized by Google







Modern Shop Efficiency

BLACKSMITHS AND GARAGEMEN are determined to have the best that may be had in Blacksmith Shop Equipment.

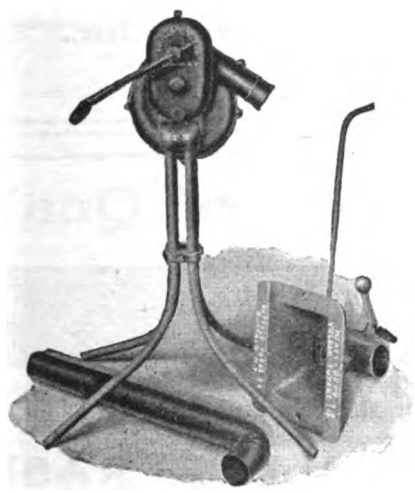
The work of the modern shop demands modern efficient tools—tools that will stand up under severe service.

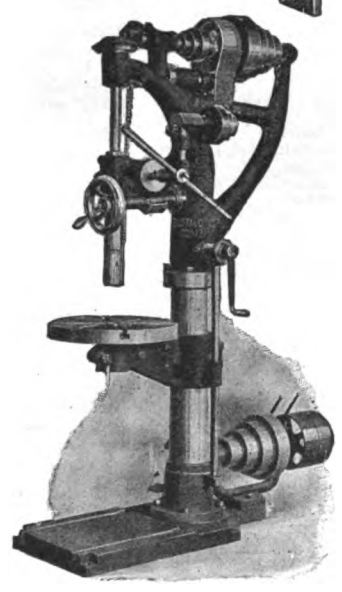
Forges; electric blowers; drills—floor and post type; shears—for cutting angles, bars and sheets—and of every size from the little bench type hand power shear to the heaviest power shear made—these are the tools you should know about.

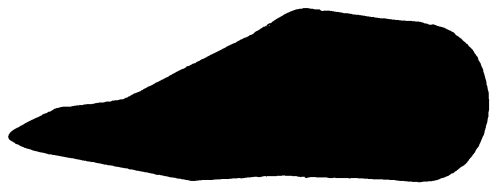
Write Dept. 6 for Catalog

Buffalo Forge Company, Buffalo, N. Y.

"Buffalo"







Good Work May Be Done with Good Tools

but—work that gives lasting satisfaction is done with Giant Grip Shoes, Calks and Tools.

Giant Grip Shoes, Calks and Tools are made for work and wear—the choice of master workmen who know their trade.

To shoe with Giant Grip marks you as the man who works with better tools—and profits by such service.

Ask us for details.

GIANT GRIP HORSESHOE COMPANY

Established 1863

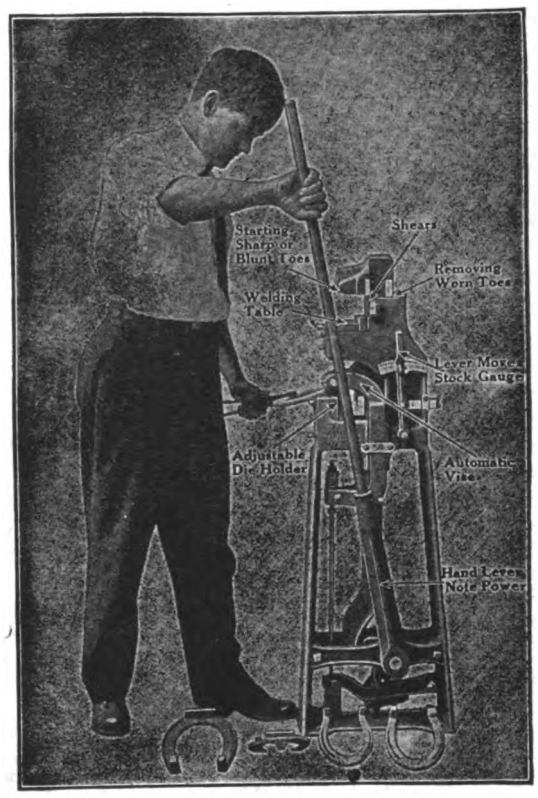
OSHKOSH - WISCONSIN

Also makers of Giant Grip Traction Equipment for Motor Trucks

1919 MODEL

THE L. S. P. CALKING MACHINE

The Greatest Time and Labor Saving Machine On Earth



1919 MODEL—Fully covered with Patents

OUR 1919 Model is the same as our 1918. We agree with the users and so would you, that it cannot be improved.

Do not mistake this for a machine which makes toe calks or a foot vise. This machine is for turning heel calks, both Blunt and Sharp, sticking and welding toe calks, clipping and trimming ends of shoes. IT CALKS SHOES, doing the work just the same as you do by hand with the hammer, only it is done much better and easier, and in a fraction of the time.

In turning heels, you can turn up just as much stock as you wish, upset or stoveup to make as heavy as you like and square up the calks without use of hammer. There is no losing of toes when you weld on the L. S. P.

It is a strong, handsome, well made machine and will last, as you might say, a life time, fully warranted for one year. It is in use in the best shops in the United States, users claiming more for it than we do.

Write at once for full information and prices.

L. S. P. CALKING MACHINE CO.

P. O. Box 225 WYALUSING, PA., U. S. A.

NATIONAL MACHINE CO., Brighton, Ontario, Canada

Digitized by Google

LINDE OXYGEN

From Coast to Coast 65 Producing Plants and Distributing Stations provide an unlimited supply of Linde Oxygen for users everywhere.

LINDE SERVICE means no investment except for oxygen actually received—no expensive overhead or upkeep charges.

Linde Oxygen may be obtained from any of the following Linde Plants and Distributing Stations where a large suppply of charged 100 to 200 cu. ft. cylinders is kept on hand constantly to insure immediate shipments.

Mail or telephone your order to THE LINDE AIR PRODUCTS CO., at the nearest point. **Shipments will be made on day order is received.**

PRODUCING PLANTS AND WAREHOUSES

Alabama
*Birmingham
10th Ave. & 28th St.
California
*Emeryville, Oakland
*Los Angeles
1405 Mission Road
Colorado
*Denver
S. B'way & Exposition Ave.
Connecticut
Hartford
1095 Main Street
District of Columbia
Washington
9th & Maryland Ave., S. W.
Georgia
*Alanta
Plyant St. & Southern R. R.
Savannah
OgeecheeCanal,So.of BaySt.
Illinois
*Chicago
3633 Wall Street
East St. Louis
6th & Walnut Ave.
Peoria
721-731 So. Washington St.
Indiana
*East Chicago
S.E.Cor. Kennedy& 145th St.
Fort Wayne
414 E. Columbia Street
*Indianapolis
2819 Roosevelt Ave.
Iowa
Davenport
118 Harrison Street
Des Moines
117 W. 5th Street
Kansas
Wichita
Rock Island Ave. & 2nd St.
Kentucky
Louisville
126 East Main St.
Louisiana
New Orleans
881 Fulton Street
Maryland
*Baltimore
25th & Montebello Ave.
Massachusetts
Cambridge
25 Waverly Street
Springfield
Napier Street
*Worcester
961 Southbridge St.
Michigan
*Detroit
St. Aubin Ave. & Newton St.
Grand Rapids
Pearl Street by the Bridge
Minnesota
Duluth
Seventh Ave., West
*Minneapolis
1809 Hennepin Ave.
Missouri
*North Kansas City
14th & Charlotte St.
*St. Louis
4218 Forest Park Blvd.
Nebraska
Omaha
1007 Jones Street
New Jersey
*Elizabeth
Linden Ave.
Newark
354 Plane Street
New York
Albany
Montgomery & Colonie Sts.
*Brooklyn
475 Driggs Ave.
*Buffalo
Broadway and Ideal Sts.
*Utica
Walnut & Schuyler Sts.
Ohio
*Cleveland
802 East 72nd Street
*Cincinnati
Stanton & Mellish Aves.
Columbus
310 Dublin Ave.
Dayton
521 E. First Street
Lima
338 East High Street
Ohio
Toledo
441 South Erie Street
*Youngstown
601-621 Jones Street
Oklahoma
Oklahoma City
27 E. Grand Ave.
Tulsa
1 North Boulder St
Oregon
Portland
15th & Hoyt Streets
Pennsylvania
Allentown
211 Gordon Street
Erie
1502 Sassafras Street
*Norristown
*No. Philadelphia
15th & Cambria Streets
Pittsburgh
16th & Pike Streets
*Trafford
Tennessee
Chattanooga
212-238 King Street
Memphis
203 Washington St.
Texas
*Dallas
Harwood and Coombs St.
Houston
Cedar and Baker Sts.
San Antonio
512 Dolorosa St.
Utah
Salt Lake City
112 West Second St., South
Virginia
*Norfolk
22nd St. and Colonial Ave.
Richmond
1709 E. Carey Street
Washington
*Seattle
Henrietta St. & 8th Ave., So.
Spokane
121-123 S. Madison St.
Wisconsin
Manitowoc
810 Quay Street
*Milwaukee
36th St. & National Ave.

(Star) * Designates Plants.

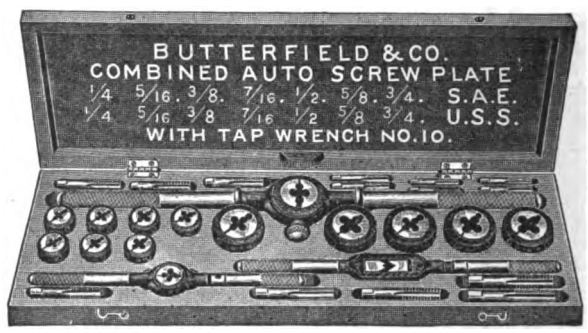
Other Plants and Distributing Stations are planned for other industrial centers throughout the country and will be established as fast as and wherever the local demand for oxygen warrants.

THE LINDE AIR PRODUCTS COMPANY

Largest Producers of Pure Oxygen in America

Forty-Second St. Building NEW YORK

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.

New York Store: 126 Chambers Street

The Horse Rasp of Quality



Ask your Dealer for the

IMPROVED HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, **"Slim," "Light," "Slim Light"** and **"Fine Cut."** Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial. New catalogue mailed **free** on application.

HELLER BROTHERS CO. *Established in 1836* **Newark, N. J.**

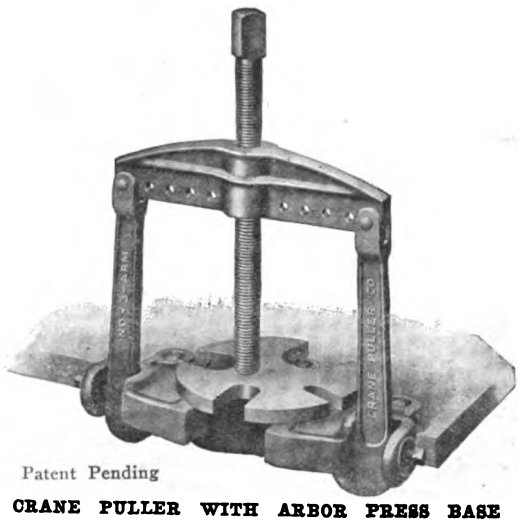
WILL SAVE ITS COST ON ONE JOB

CRANE'S

PATENTED

Wheel Puller

For Removing Fly Wheels, Auto Wheels, Gears, Collars, Commutators, Pulleys, Couplings, etc.



Patent Pending

CRANE PULLER WITH ARBOR PRESS BASE

By using the base as shown in illustration an Arbor Press is made of the Puller, giving a wide range of work. This press will do work on wheels of any size where the hub of the wheels is not over 11 inches in diameter.

Thousands of these Pullers are in use in all kinds of factories. Any good mechanic knows the value of this tool.

Don't wait until you have a bad case, and wish you had a Puller, order now.

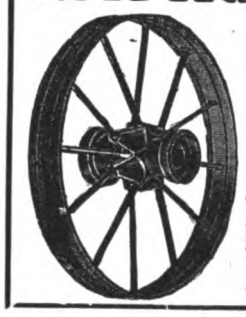
Pullers may be had without base if you desire.

Send for our new catalog.

CRANE PULLER CO.

60 Lake Street, - - Arlington, Mass.

EMPIRE STEEL WHEELS



Plain or Grooved Tire
To Fit Any Wagon.

FARM TRUCKS
All Standard Types

Write today for Proposition to Blacksmiths

EMPIRE MFG. CO.
P. O. B. 209
QUINCY, ILL.

DON'T CUT OUT
A Shoe Boil, Capped Hock or Bursitis
FOR



ABSORBINE
TRADE MARK REG. U.S. PAT. OFF.

will reduce them and leave no blemishes. Stops lameness promptly. **Does not blister** or remove the hair, and horse can be worked. $2.50 a bottle delivered. **Book 6 R free.**

ABSORBINE, JR., for mankind, the antiseptic liniment for Boils, Bruises, Sores, Swellings, Varicose Veins. Allays Pain and Inflammation. Price $1.25 a bottle at druggists or delivered. Will tell you more if you write.

W. F. YOUNG, P. D. F., 55 Temple St., Springfield, Mass.

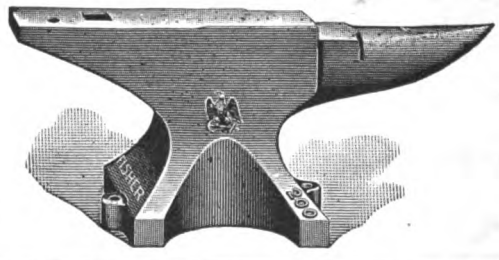
1843 **EAGLE ANVILS** 1919

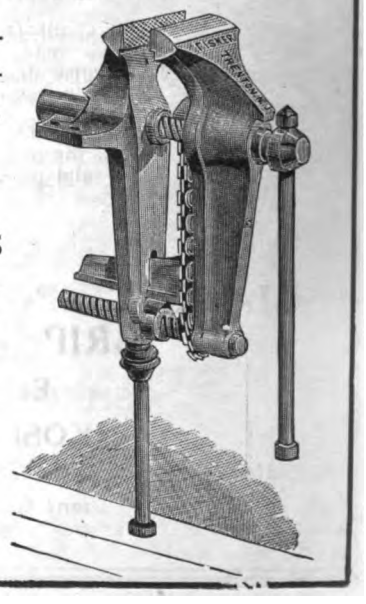
AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE

BLACKSMITH AND WHEELWRIGHT

Vol. LXXIX. No. 5 NEW YORK, MAY, 1919 { TERMS ONE DOLLAR A YEAR

The Care and Repair of Tires

Part II.—Roadside Repairs and the Use of Small Fireless, Gasoline and Electrical Vulcanizers

Copyright: M. E. FABER

IT is generally accepted that the use of an inside liner will prolong the mileage of an old casing. However, they should not be used in new tires as they stiffen the tire, taking from its resilience, and by adding to the thickness of the fabric tend to generate heat.

* * *

The experience of the tire manufacturer has taught him how thick a casing should be in order to give the best possible service. The same statement applies to outer casings adapted to be used over a standard tire, and to the practice of sewing or cementing two tires together.

In the manufacture of tires the strength and durability of the tread is carefully balanced with the resistance of the fabric to the strains it must withstand. The retreading of an old tire is always of doubtful value as the chances are that the fabric has had its day and will not last long enough for the owner to get the full value out of the new tread.

Retreading is apparently a real economy in the case of a comparatively new tire that has had its tread destroyed by some untimely accident such as tight chains, misaligned wheels, careless braking, etc., providing the fabric has not been exposed to moisture enough to cause deterioration. Cord tires, owing to their construction, which largely eliminates wear of the fabric due to bending, will usually outwear the original tread sufficiently to make retreading very profitable to the owner.

Care of Spare Casings.

Needless to say, the spare tire should be protected from light, water and air by the use of a first-class tire cover. If the tire is carried inflated, it should not carry more than half the pressure that it would carry when on the wheel. This may be a little bit inconvenient, but it is better than having a new tire go wrong within a few miles after it is put in use. Many motorists put the new



Fig. 1—Patching a Tube with a Small Portable Vulcanizer.

casing on the wheel at once and carry an old one for a spare, believing that this practice reduces the chance of trouble on the road as well as prevents the new tire from having a chance to deteriorate before it is ever used.

If a spare tire is carried otherwise than inflated on the rim, keep water out of it. Examine it after washing the car or driving in the rain, and if it is wet inside wipe it dry.

Care of Spare Tubes.

From three to six extra inner tubes used to be considered as an indispensable part of every car owner's equipment. Punctures were unavoidable and it was practically impossible to make reliable repairs on the road.

Now, however, a great many thousands of people have replaced their stock of tubes with one of the little vulcanizing outfits that carries the rubber patch and a chemical heat unit in one convenient cartridge all ready to put on the tube and vulcanize a permanent repair at any time. It is just as easy and

The motorist who carries tubes is usually quick to take out a tube, vulcanize it, and replace it as it is to change tubes. Not only is the investment in tubes saved, but a repair bill is eliminated.

forced to carry them in the toolbox with other articles, which unless protection is given, as likely to ruin a tube before it is ever put into a casing. The jack and the pump and the oil-can all do their bit and their job of destruction is made easier by the heat from the engine.

The spare tube should be carefully folded to prevent chafing and carried in a bag that has been well dusted with soapstone. Put it in the coolest corner of the toolbox, away from the exhaust pipe. Pack it in so it can't rattle around.

We illustrate two excellent methods of folding tubes so that they will suffer the least. In both methods it is necesary to take out the valve-inside and let all the air out of the tube while folding, then put the valve back together to keep the air out. Don't tie tubes with a string. Use a wide strip of cloth or some rubber bands half an inch wide, cut from an old piece of tube.

The strength of a tire is in the fabric. The tread is only a covering to keep destructive substances away from the fabric. As soon as a stone cuts through the rubber the weight of the car begins to drive dirt into the cut. The dirt is forced between tread and fabric and usually the first symptom of trouble is a sand blister that may appear several inches from the cut where the dirt entered.

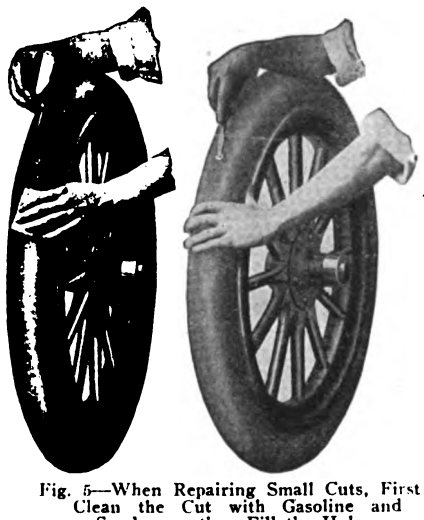


Fig. 5—When Repairing Small Cuts, First Clean the Cut with Gasoline and Sandpaper, then Fill the Hole with Para Rubber.

Of course water gets in, too, and as it has no chance to escape it starts a decay in the fabric that almost invariably causes a blowout sooner or later and then both tube and casing are ruined.

Here is an opportunity to take the stitch in time that is so much easier than the nine that must be taken if the first is postponed. At regular intervals, and especially after long trips the casings should be examined carefully for little cuts that penetrate to the fabric. Take your vulcanizer and seal these cuts before the germs of tire trouble begin to infect them. It means the difference between wearing our your tires and having them blow out.

It's like cleaning your teeth to save trips to the dentist, you know. And it isn't much

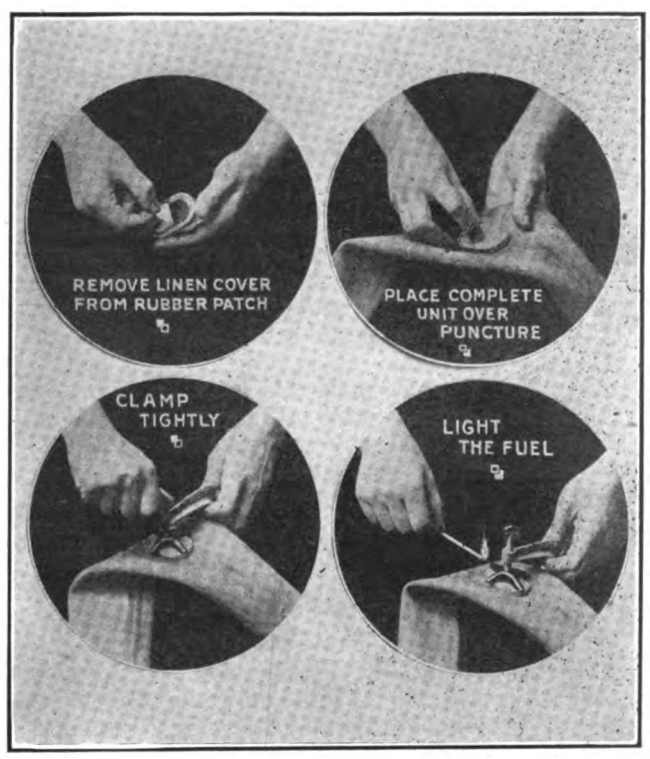


Fig. 2—The Four Steps in Tube Repairing Showing How a Portable Vulcanizer is Used.

more difficult than cleaning your teeth, either, for it isn't necessary to take the tire off the wheel or let the air out of it.

When on a trip or if it is inconvenient to make permanent repairs for some other reason, use one of the prepared patching gums for a temporary filling until you can get around to use your vulcanizer.

In case a sandpocket appears a good way to arrest the progress of it until you can make a repair is to cut through the tread half way around the blister on the side of the tire so that the dirt can get out as fast as it comes in instead of being crowded in further between rubber and fabric all the time.

Second in importance only to proper inflation is the care of small tread cuts and sand blisters. With an open cut in the tire, a few hundred miles is enough to cause a destructive blowout—and blowouts are expensive. It has been said that the last mile in a tire is the cheapest and unless one takes prompt care of the little cuts he can be mighty sure that he will never get any cheap miles.

The information we have given is based largely on the advice of tire manufacturers who have given it willingly in order that users of their products may secure all of the mileage that is built into their tires—and after all mileage is what we really buy when we buy a tire.

We have already considered in detail a great many of the preventable causes of premature tire failure and the precautions that any motorist may take to reduce roadside delay due to tire trouble to a minimum. However, as long as pneumatic tires are used, motorists will always have to face the chance of a puncture, and in the case of an old tire, a blowout. These things are certain to occur

Digitized by Google

sooner or later and the wise motorist will be prepared to meet them as they come.

As protection against the delay caused by a tire going flat, the average car owner carries at least one inflated spare tire. The exchange

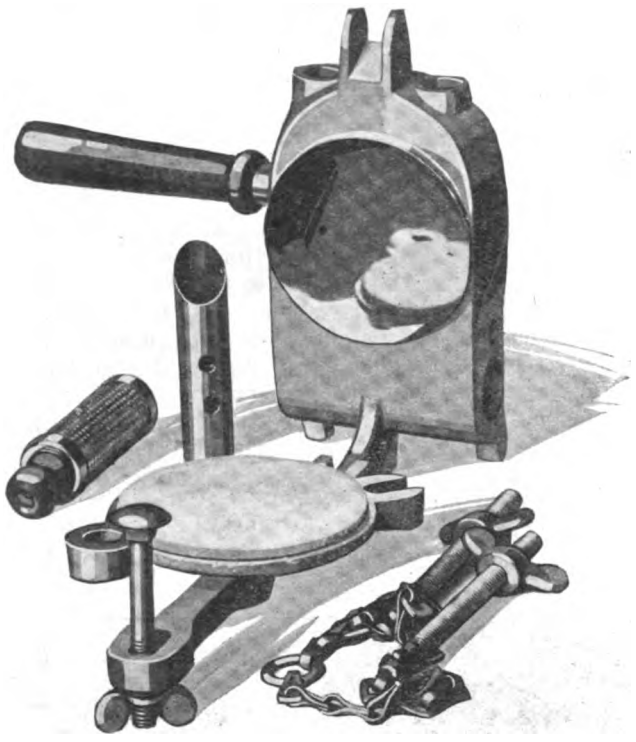


Fig 3—Parts of Road Vulcanizer Which Can Be Used Both for Tube and Tire Repair Work.

of this for a tire that is punctured is merely a matter of minutes. One simply removes the valve cap, jacks up the wheel, removes the clamping nuts around the rim and off comes the rim and punctured tire with it.

This operation is simplified if the wheel is turned so that the valve is at the top and the rim is removed by pulling at the bottom. Care should be taken not to bend or otherwise injure the valve stem as the rim is taken off. (If the ground is too soft to give a firm footing to the jack, take one of the floor boards out of the car and place under it.)

Be Careful in Replacing Rim

In replacing the rim, reverse the operation, and in putting on the clamping nuts, give each a few turns by hand to make them take hold, then go all around the wheel drawing each one up fairly snug, and then go around once more for final tightening. If any one of the clamping nuts is drawn up tight before the rest are up to the point where they hold the rim in its proper place the rim is liable to be distorted and subject the tire to an entirely unnecessary strain.

It almost goes without saying that care should also be taken to attach the rim which has been removed very securely to the carrier, but some people do forget it with the result that at the end of their trip they find that the punctured tire and its rim have been lost along the road.

Sometimes there is no provision for carrying a spare tire on an extra rim, or a second puncture makes it necessary to take the tire off the rim and change or repair the tube. Since there are so many styles of rims that operate differently, there is not space for a description of the method to be followed for each. It is highly advisable for the car owner to have the agent from whom the car was purchased or a competent repair man show him how to make a tire change, as the information is sure to come in mighty handy.

Many motorists still follow the time-honored practice of carrying from one to half a dozen spare tubes as protection against the possible series of punctures that may occur in the course of one trip. The inefficiency and inconvenience of having to patch tubes made the expense of this extra equipment an almost necessary evil of motoring in days gone by.

No matter how carefully a patch was stuck on, the fact that it was not really welded to the tube by means of heat, left it liable to come loose when heated by running. Patches have been much improved since the early days of motoring, and those made now, if properly applied will give almost as good service as vulcanized repairs.

However, during the past few years the development of inexpensive, quick operating vulcanizers that could be used by anyone anywhere, has made it possible for motorists to save the expense of the set of spare tubes, for it is now as easy and quick to take out a punctured tube, vulcanize and replace it, as it is to change tubes. Even those who carry spare tubes also carry the repair outfit for an emergency or for use at home.

For Roadside Repairs

For roadside repairs there are a number of styles of vulcanizers of various degrees of simplicity. The one which we illustrate in Fig. 1 is particularly easy to use.

The outfit consists of a small clamp and a number of patching units, each of which is really a miniature vulcanizer in itself. That is, each patch unit consists of a little metal pan containing the correct amount of a non-flaming solid chemical fuel and having attached to its under side the patch of uncured Para rubber. The metal pan, which acts as the vulcanizing surface, is concave on the bottom so as to mould the repair to a feather edge that it is impossible to loosen. These units are made in several sizes so that both plain punctures and cuts or tears may be mended.

To mend a puncture the tube is cleaned with sandpaper or gasoline and one of the metal pans placed on it so that the rubber patch is centered over the puncture. The pan is then clamped tightly to the tube and the fuel lighted. All the steps in this repair are illustrated in Fig. 2.

At the end of five minutes the pan may be removed and thrown away like a wornout razor blade, and the tube is ready to use with no further chance for trouble from that particular puncture. And this process is as quick and easy as patching and the result is permanent.

Gasoline Fuel Vulcanizers

Other types of vulcanizers use gasoline for fuel, and as they not only make repairs to tubes, but enable any motorist to mend casing-cuts, sand-pockets, etc., without removing the tire from the wheel or even letting the air out; a great number of motorists who have learned the simplicity of vulcanizing from the use of the little five-minute outfits also have these for home use and to carry on long trips that may take them out of reach of repair shops. Such a device is shown in Fig. 3.

In repairing a tube with one of these, the puncture is prepared by cleaning and applying a coating of vulcanizing cement. A small piece of raw rubber is placed in the puncture, another piece the size of a quarter is placed over it, and the tube is clamped in the vulcanizer, as illustrated in Fig. 4.

The correct heat is secured by pouring a

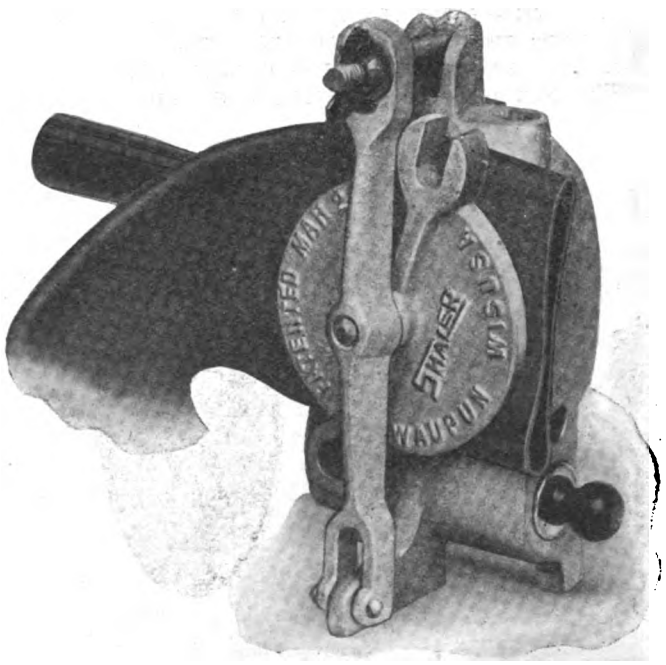


Fig. 4—How the Vulcanizer Shown in Fig. 3 is Used for Tube Repairing.

measured charge of gasoline into the absorbent burner and allowing it to burn which it does without exposed flame or smoke. Repairs made by this method actually renew the puncture tube by not only welding a patch over the puncture, but welding the puncture itself full of new rubber, the same as a repair man would.

In repairing a casing cut, the hole is cleaned, as shown in Fig. 5, coated with cement, and filled with scraps of raw rubber which do not even need to be cut to fit, as they flow together when heated. A curved surface of the vulcanizer is used on casings, as illustrated in Fig. 6, and the heat is supplied the same as to tubes. Repairs of this sort last as long as the tire and should always be made as soon as possible after the cut is discovered of the fabric may be irreparably weakened by exposure.

On a trip it may be inconvenient to vulcanize little cuts of this sort, and as a temporary substitute until a permanent repair can be

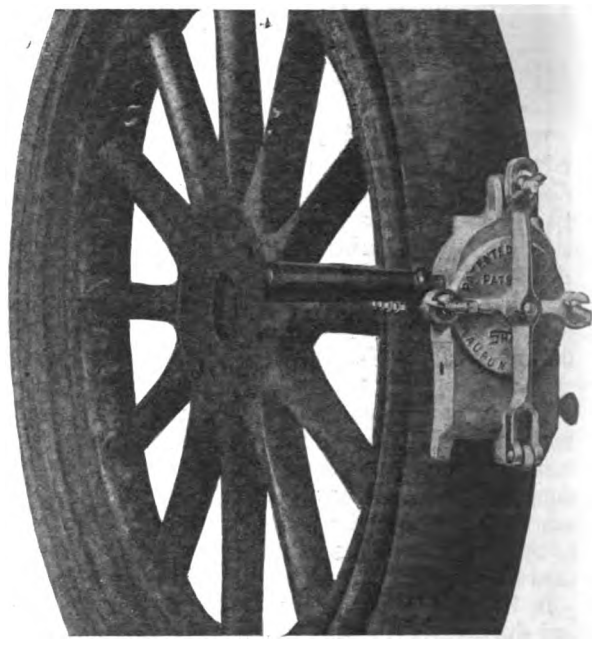


Fig. 6—The Vulcanizer Shown in Fig. 3 as Used for Tire Repairing.

made, it is recommended that cuts should be filled with one of the prepared gums that can be secured from any tire dealer.

Such is the simplicity of the vulcanizing process when carried out with one of these outfits that there is no reason why any motorist should hesitate to undertake his own tire repairing, at least as much of it as it would be inconvenient or impossible for him to take to the repair shop. As a protection against the emergency when the last tube is punctured and it is a case of stop or run on a flat tire, they are well worth the small initial cost.

Should the use of cemented or cementless patches be preferred, simply follow the manufacturer's instructions, taking especial care in cleaning the tube. If cement is used, let it dry thoroughly for several minutes before applying the patch, or in the case of a cementless patch which must be moistened with gasoline, let the gasoline all evaporate.

After applying the patch pound it all over with the hammer handle, or clamp it to the tube for a few minutes in order to secure the best possible adhesion. The chief fault of patches is that they have an appreciable thickness at the edges which makes it comparatively easy for them to start to come loose, and furthermore, the heat of running often decreases their sticking power and prepares the way for the air pressure to force its way between patch and tube.

In addition to punctures, there is a form of accident that may occur as a result of neglected tread cuts, or to rim cutting, or other causes, and that is the casing blow-out. It is impracticable for the average car owner to attempt the repair of blowouts as the expense of the necessary equipment is out of proportion to the amount of work it would be called upon to do.

As a protection against delay due to blowouts every motorist should carry at least one "blowout patch" and a "tire boot." The blowout patch, consisting of several layers of fabric vulcanized together, is placed on the inside of the casing to hold the pressure of the inner tube, and the boot is laced or hooked on the outside to keep dirt from being forced into the hole to tear it larger. The boot should be put in place with the tire only partly inflated and the tire pumped to full pressure later.

Needless to say, a good jack and a good pump are indispensable parts of every mo-

Digitized by Google

torist's equipment, and a small can of tire talc and a pair of tire removing tools should also be carried.

(*To be continued*)

* EDITOR'S NOTE: We are indebted to the C. A. Shaler Company, of which Mr. Faber is the advertising manager, for the illustrations used in this article.

Practical Horse Shoeing

Before the Beginner Can Hope to Shoe Horses He Must Know Something of Anatomy

BY F. L. ALLEN

IT has been demonstrated very conclusively during the past few years that improper horseshoeing is the cause for a large majority of horse diseases. A valuable horse may be permanently injured if the smith makes even a single mistake, and in many cases even if the injury is not permanent, it may give rise to other complications and the value of the horse greatly decreased.

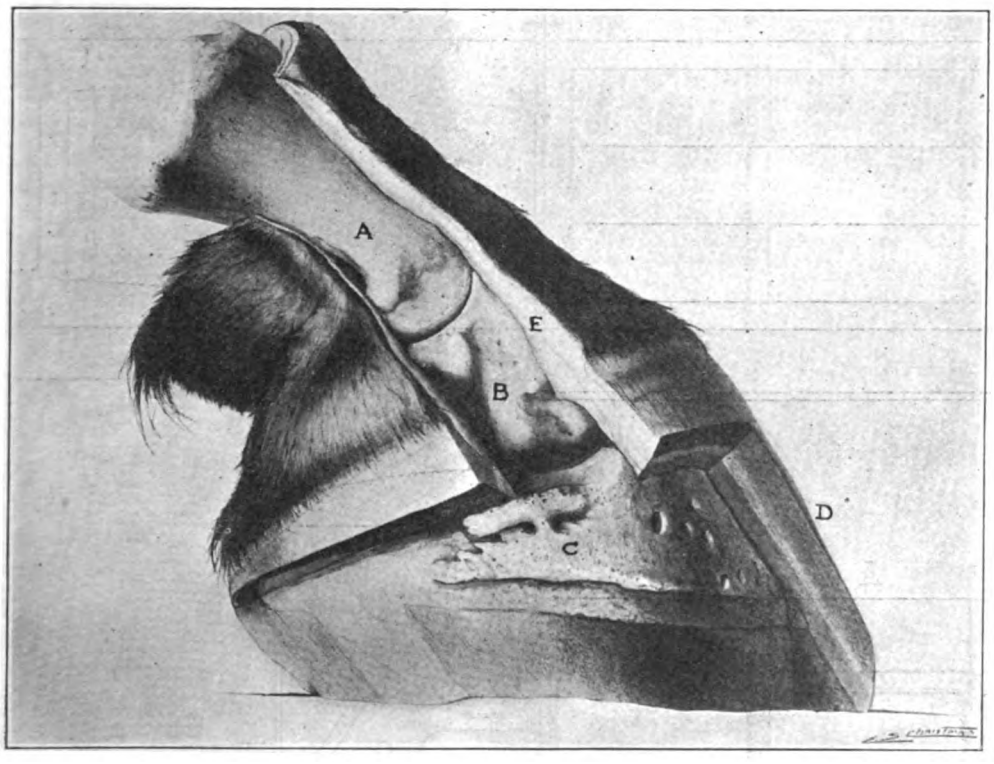
Horseshoeing as an art is almost as old as history. In olden times leather sandals were used and as early as 481 A. D., we have records of metal shoes. Kings and rulers often shod their horses with gold or silver, while copper and brass shoes were frequently used for the purpose.

In his primitive state, the horse probably required but little attention insofar as his feet were concerned. The roads were soft, he roamed the meadows, and he was used mostly for farming purposes. As the hoofs grew, the corresponding amount of friction with the ground naturally removed the horn.

With the advent of hard roads, the necessity for shoeing grew, for if the horse were to walk in his "bare feet" soon his whole hoof would be worn to the skin or bone and he would be unable to walk at all.

Before the smith can hope to become a "Scientific Shoer" he must thoroughly understand the anatomy of the horse's foot and to a certain extent the general anatomy of the horse as well.

I know of no better illustration to use, when describing a horse's hoof than by comparing it with the human foot, encased in a leather shoe. In such a condition there would be a bony framework encased by live flesh and controlled by certain tendons and cords.



Partial Section of Foot. A, Upper Pastern Bone; B, Coronary Bone; C, Coffin Bone; D, Horny Wall; E, Anterior Extensor.

Outside the flesh would come a casing of leather, hard and nerveless.

High Heels

Imagine what might happen if you were forced to walk all day in a pair of boots, the heels of which were from one to two inches high. By evening your legs would be so sore that you could hardly walk. The whole weight of your body would be supported on an inclined surface and rest upon your toes. After a few days of this, you would become a nervous wreck and your body would ache from your shoulders to your toes.

On the other hand suppose the taps or toes of your shoes were too high, the strain of your body would then fall upon your heels and since Nature did not intend that your feet should be treated in this way, you would suffer thereby. The same thing is true if either side of your shoe is worn, your foot is thrown out of balance and every muscle in your body is strained or stretched until everything is readjusted again.

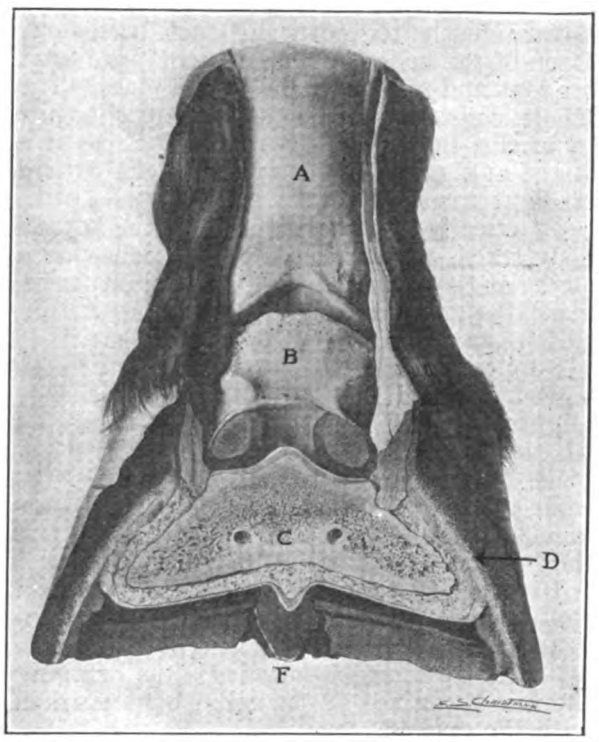
The basis of the foot is a triangular shaped bone called the Coffin or Pedal bone. Scientists call it the "Os Pedis," but at any rate it is upon this bone that all the weight is carried. In Figure 1 the bone is shown at C, while in Figure 2 the same letter is used referring to a cross section taken near the front of the triangle.

Except at the top where this bone joins to the next two bones, the coffin bone is surrounded by a layer of sensitive membrane. At the front this membrane is termed the "sensitive laminae." At the bottom is the sensitive sole and at the rear the sensitive frog. Surrounding this tissue is the horny portion of the hoof through which are driven the nails for holding on the shoes.

This wall is really the horse's toe nail. It is much thicker at the front than towards the quarters and the heels. Where the horny crust joins the flesh of the lower leg the portion of the hoof is termed the "coronet." Instead of completely surrounding the foot, the horny wall ceases at the frog and forms a triangular shaped projection. The sides of this triangle at each side of the frog are termed the "bars." The purpose of these bars is to prevent the walls or horny portion from contracting against the sensitive membrane.

The Frog

The frog is a spongy, elastic cushion situated between the bars at the heel of the foot. Its purpose is to absorb the vibration and jars, much the same as a rubber heel acts on an ordinary shoe. On the primitive horse, it probably served to prevent him from slipping on stony ground or upon ice. The wall of the foot does not form the bottom part. It grows very much like a finger nail, in that it projects downward and does not increase in thickness. It is the growth downward of this wall that necessitates a change in shoes and the leveling off of the foot very occasionally.



Partial Front Section of Foot. A, Upper Pastern; B, Coronary; C, Coffin; D, Horny Wall; F, Section Through Frog.

If this wall grew at the same rate all the way around, shoes might be left upon the foot until they were totally worn. On many horses, however, one portion of the wall has a more rapid growth than the other. The average growth is approximately three inches in a year.

In order to protect the sensitive lower portion of the foot, Nature has furnished it with a horny sole which completely covers the portion inside of the wall. This horny sole when in good condition, increases in thickness, but the increase in thickness automatically scales off. This sole is softer and more fibrous than the wall. Where it connects with the wall it is slightly thicker. The outside surface of the sole runs parallel with the lower edge of the coffin bone and upon this coffin bone depends the whole balance of the horse, as we have stated before.

Coffin Bone Position

We must realize that the lower edge of the coffin bone should be kept parallel with the ground in practically every case. Evidently Nature intended that the horse should walk with this bone in that particular position. She designed the horny frog so that its surface would be parallel with the surface of the bone. This being the case, the smith, in shoeing the horse, should always bear that point in mind and trim the wall down to a level with the horny sole, after having removed the flakes and dirt from it.

On a healthy hoof, the junction between the horny sole and the wall is evidenced on the outside by a white line. Frequently, however, Nature makes mistakes and often after exercising the greatest of care, hoofs are not trimmed evenly. In such a case, the horse himself has a method of making known his trouble by his method of standing upon the foot in question.

Let us examine the anatomy of the hoof still further and see what effect an improperly trimmed hoof might have.

Resting upon the coffin bone "C" and lettered A in Figure 1, is the coronary bone which is often termed the "lower pastern bone, forming a sort of a brace and an additional support is another bone termed the "navicular" or nut bone. At the top of the coronary bone comes the upper pastern bone lettered A in Figure 1. Surmounting this is

Digitized by Google

the cannon or shank bone which is shown in the large illustration.

From the cannon bone to the end of the hoof both the front and hind feet are constructed practically alike. The sizes and shapes differ slightly, but as far as construction is concerned, they are the same.

Various Muscles

Connected with the projections at the front of the coffin bone is a heavy muscle which is termed the "anterior extensor," while fastened to the back of this same bone is another flexor muscle to move the foot backward. Each of the bones is similarly equipped with tendons and muscles to hold it in place. The whole construction much resembles a pile of bricks, the lower three of which are at a slight angle, while the upper bricks extend straight upward.

Practically the whole weight of the horse's body, then, rests upon the foot bones at a slight angle and with the muscular arrangement, the angular weight moves forward until it rests directly upon the coffin bone.

Suppose, however, the coffin bone were tipped slightly, that is, the front of a shoe might be made slightly high. This would tip the whole foot backward, and coronary bone, instead of resting upon the axis of the coffin bone, would press heavily upon the nevicular bone and thus bring a tension upon the tendons of the flexor muscle.

In a short time inflammation and pain would cause the horse to limp and in his endeavor to distribute the weight evenly he would move his foot forward, thus bringing the lower surface of the coffin bone parallel with the ground.

Such a proceeding would lessen the pain in his foot but naturally the relative position of the cannon bone and his body would be changed. His weight would then rest upon the muscles of his upper leg and sooner or later inflammation might develop there.

Should the heel of his foot be raised too high, the foot would be moved backward when the horse was standing and the results to the various upper bones and tendons would be similar to that when the toe was too high.

Thus, it would seem that in all cases of muscular strain and similar troubles, the first point to consider in making the cure would be the shoes and the trimming of the hoof.

Oftentimes the owner of a lame horse is advised that the best cure is to turn the animal into the pasture, but after a week of rest, the horse is very apt to be in a worse condition than before. It is easy enough to see the reason for this, if one stops to think.

Suppose the smith, in trimming the foot, left the front slightly too high. As explained above the horse might go lame and if turned into the pasture his lameness would grow worse, simply because the cause would not be removed.

In grazing, the horse would be forced to strain still further the muscles, and unless the hoof were properly trimmed, there would be no cure.

The smith, therefore, should make a study of each horse when the horse is brought into the shop and before the old shoes are removed. By observation he can tell whether or not the old shoes are properly set and by the horse's standing position just what part of the hoof is too long.

Besides the fact that improper shoeing or trimming causes lameness, there is one more point to be considered, that of nailing. In driving the nails it is important that all of them enter only the hard outer shell, for immediately they enter the sensitive inner foot, they injure the horse and cause lameness. In fact such an accident may cause infection and blood-poisoning.

Farm Truck Body

DUE to war conditions the output of wagon factories and body building shops was seriously diminished and doubtless it will be some time before all of the accumulated orders will have been filled.

Such a condition has resulted in an unfilled demand for farm wagons of all kinds and the farmer is often willing to pay a big premium provided he can purchase just the type of wagon he wants. This opens the market for the country smith and wheelwright. In a farming community there is no reason why considerable money cannot be made by the average smith.

A hand-made wagon body, built from sound stock throughout and practically made to order is doubtless of more value than a mail ordered wagon in many cases. When the farmer purchases a wagon from his local smith he knows that it is suitable for his needs. He can inspect the body and many times he can actually oversee its construction.

The body shown in the drawing herewith is designed especially for attachment upon a Studebaker one-ton chassis and is of general utility. It may be used for carrying green stuff, garden truck, or even live stock to the market or slaughter houses and for the small farm is extremely practical.

As the sketch shows, the construction is extremely simple. The body is built upon a heavy frame composed of four sills measuring 3 by 5 inches, mortised together and so arranged as to rest, at the sides directly upon the frame. The rear sill extends six inches beyond the sides and from the ends, a pair of braces clamped to the sides extend to the flare boards and brace this part of the body.

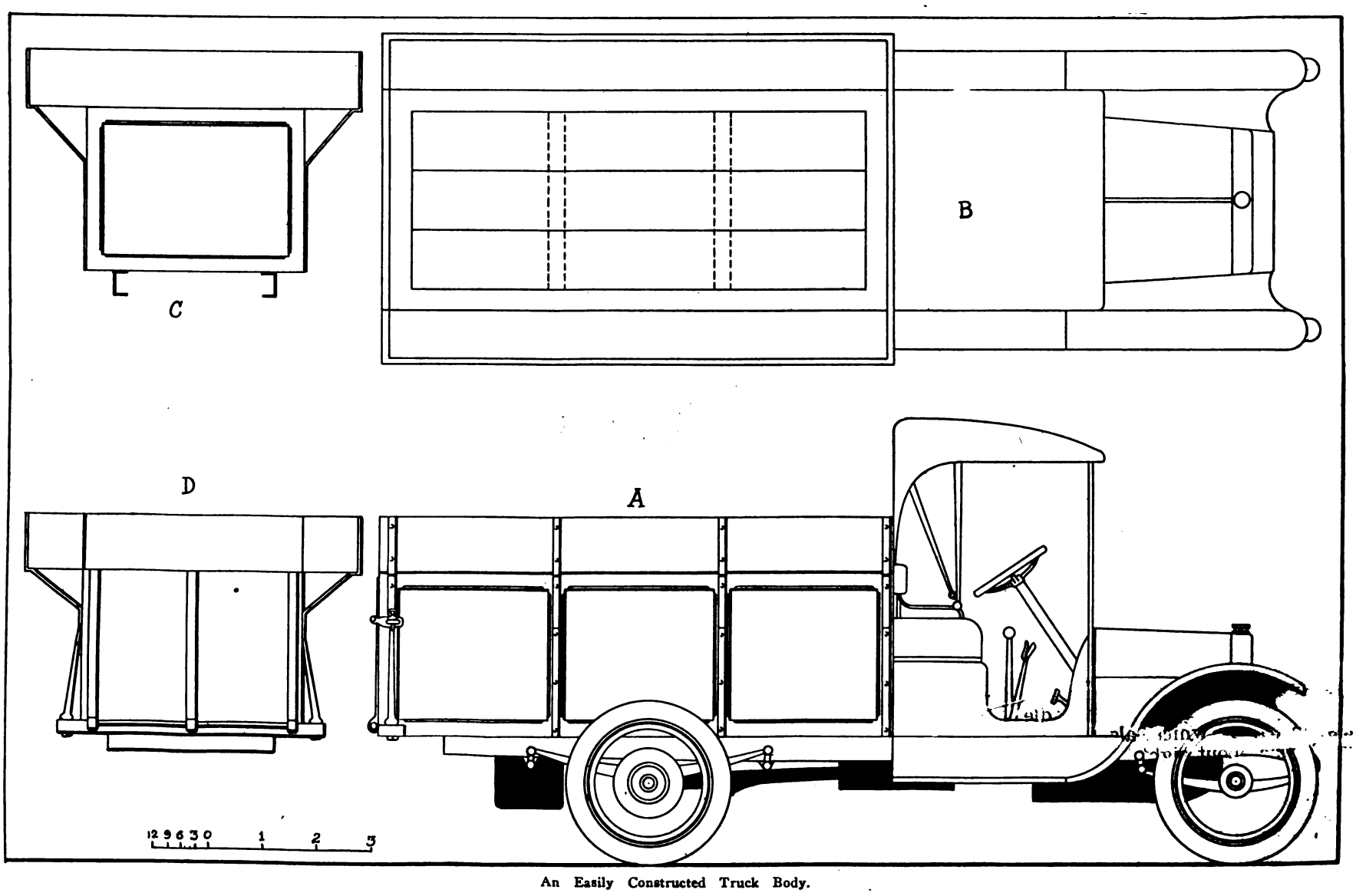
At the center, to support the floor, there are located two cross members (shown by the dotted lines) and these members are made of 1½-inch stock, three inches in width and mortised into the frame. The floor boards should be made of stock at least 1½ inches thick and preferably 12 inches in width. If 12-inch boards are obtainable, three will just fill the space which is 36 inches in width.

To support the sides, four panel posts are used and mortised to their tops are the top sills. These members are all of 3 by 2-inch stock and the panels are 1½-inch in thickness.

The flare or overhang is made 12 inches in width from 1¼-inch stock and is braced from the side uprights by strap iron braces. A convenient height for the flare is 12 inches, or the width of the widest stock obtainable.

For conveniences, the tail gate should be high enough to enclose the main body which is three feet in height and the gate should be made of 1½-inch stock, well braced for the tail gate may then be used as a running skid when loading the wagon.

With the one-ton Studebaker chassis there is plenty of room for a body nine feet long behind the driver's seat. With the construction, as described, and the absence of cross sills the body can be hung upon the chassis considerably lower than usual.



An Easily Constructed Truck Body.

Digitized by Google

A Jack of All Trades

The Village Blacksmith Often Is Obliged to Attempt Some Mighty Peculiar Tasks

By JAMES F. HOBART

THE chap who called the blacksmith a "Jack of all Trades" wasn't far out of the way, for the writer has seen a smith hurry the shoeing of a horse to cut a man's hair, and to finish the woodwork of a wagon and then give it five coats of paint and varnish! Nowadays it is nothing out of the ordinary to see a smith clean carbon from the cylinders of an automobile motor, adjust the carburetor or weld a cracked water-jacket with oxy-acetylene where some chap had let Jack Frost try to run the water-cooling end of the automobile.

But about the last word in Blacksmith versatility is still standing on St. Claude Avenue in New Orleans, where the, or rather "a" smith, made and erected as fine a looking barber's pole as ever was seen inside of New York or out of it. The affair, as shown by Fig. 1, was made mostly from a piece of eight-inch water or steam pipe, some pipe fittings, a cast iron ball from a junk yard, a couple of forgings, United States flag, flagstaff and some good paint and varnish.

The Blacksmith's Barber Pole

I don't suppose the Blacksmith will never corner the Barber's Pole market, but he may occasionally be able to pick up a bit of ready cash by setting up a barber pole, so I will describe the New Orleans pole and the manner in which the smith made it up. The piece of eight-inch pipe A, was about ten feet long. The smith "picked it up" in a junk yard. It originally came from the fittings of a Mississippi River steamboat.

The base B was made of concrete and the entire lower portion of the pipe, imbedded in the ground, was also encased in concrete as shown by the dotted lines. Piece C was an ordinary pipe cap, screwed to the end of pipe which had been threaded on the top end only, the lower end being plain.

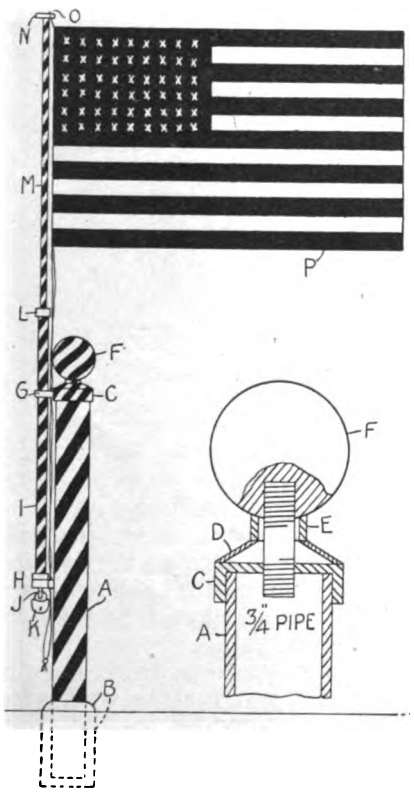


Fig. 1—Details of the Flag Pole.

A hole was drilled and tapped for three-quarter inch pipe in the mid[illegible] of cap C, also [illegible] ball F [illegible] also found in the junk yard, was about eight inches in diameter. A piece of three-quarter inch pipe was threaded into the holes in C and F, the latter being screwed fast against the pieces D and E.

Piece E was nothing more or less than a wall-collar for four-inch stovepipe. The collar was filled with concrete inside, as was collar E, which was nothing but a band from an old buggy hub. The piece of pipe was put in place, D and E located and filled with cement and gravel, then after it was set, ball F was screwed in place and the top end of the pole was complete.

Two screw-sockets were then inserted, one in the post as shown at H, and made as large as the hole inside of three-quarter inch pipe, or a trifle larger. The screw-socket at G, which was screwed into cap C, was made just large enough so that three-quarter inch pipe would slide easily through it. Both these sockets were so located, as shown at G and H, that the pipe I would stand parallel with pipe A.

A piece of black steel was flat-forged and a hole punched in it as shown at J, to receive the staple of a small lock K, then piece J was welded into pipe I. This locking up business was an afterthought—after the "boys" had carried away the fine flagstaff I M, flag and all. They left it in place after lock K had been added. A plain pipe "reducer" applied at L served to receive the "topmast" M, which was made of one-half inch pipe. The first one was made of three-eighths pipe, but it broke off at L twice; so after it was stolen the smith made the new one from one-half inch pipe.

Cap N was made from a cast-iron washer, three inches in diameter. The smith intended to put in a pulley at O, but found it was going to be a lot of work to fit in the pulley, also to keep the halliards Q R on the pulley after it was in place, so he simply drilled a hole through N, at O, rounded off the corners all around the hole and let the cord Q R run directly against the metal of cap N. This worked just as well as a pulley.

The halliards or cords Q R were brought down and made fast to screw-socket H. The barber wanted to fix the halliards in some way that lock K would prevent the flag from being lowered, but the smith gave up that problem in disgust and told the barber that unless he made the halliards of chain or wire cable that the lock K would do very little against jackknife attack on the halliards.

Striping the Pole

When it came to the striping of the pole, the smith scratched his head a bit, then he procured a ball of twine and wound two lengths around the pole from top to bottom. A little experimenting gave just the angle and the equal distance between the strings as required for the alternate red and white stripes. The smith stretched the strings very tight, fastened them securely, then drew his pencil along both strings, making plain marks on the iron post-pipe. Then the strings were removed and the red color "cut-in" between two of the pencil marks and the stripes were formed with no further trouble.

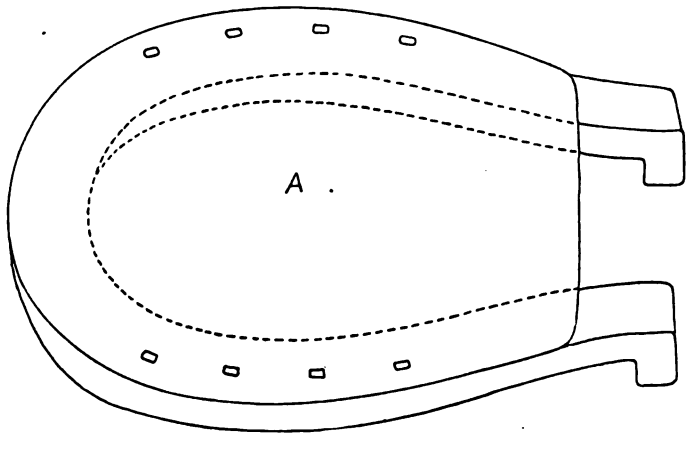


Fig. 2—The Tinned Shoe.

The stripes on ball F were also laid off with a single string. A little hole was drilled in the top center of ball F, a string made fast to a pin driven in the hole, then the string was drawn tight over the ball and against collar E. A soft pencil was then drawn along the string, after which the string was moved along the desired amount and another pencil mark made on the ball. It was found desirable, before stretching the string, to make short pencil marks around the middle of ball F, spacing these marks by the eye, then drawing the string in such a manner that it would pass directly over in turn, each mark made as described above.

"Tinning" Mule's Hoofs

One day I got to talking with a smith in a shop on Girod Street, New Orleans, and found him industriously "tinning" the hind feet of each mule he shod, a piece of tin A, Fig. 2, being cut to fit the hoof and placed under each shoe which was set on mules.

"The tin is necessary," said the smith, "to prevent nails from sticking into the feet and frogs of the animals. There are a good many small nails lying around underfoot where these mules are used and if I don't 'tin' the bottoms of their feet, some of them are sure to be laid up all the time from 'nail prick.'"

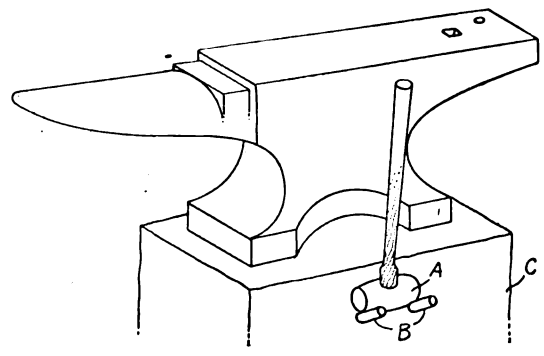


Fig. 3—Handy Place for the Hammer.

One of the smiths in this shop was a bit of a wandering showman, too. He had an educated goose and a rooster. He was repairing a little wagon to which the goose would be harnessed and which the fowl would pull around in great style under direction of the rooster, who, perched upon the "box" would hold the reins in his beak and make a great fuss about "driving" his web-footed motive power!

One day, about a week later, I was in the shop of Herman Nehlig, 633 Montague Street, of the "Crescent City," and we got to talking about using tin under the shoes of horses and mules. Mr. Nehlig condemned the practice very strongly, saying that it spoiled the animal's feet, as it heats and rots the frogs. The practice in this shop seemed to be that of cutting off toes, digging out heels and the free use of quarter-bars.

Making Vehicles "Track"

I heard a very interesting story in this shop about making vehicles "track." A certain cab which had been ironed in a shop where the story-teller worked at the time, always gave trouble by not "tracking" properly. Built to fit the street-car track, the vehicle, when started off down the street, would drop its front wheels between the rails as soon as it hit the track, but the rear wheels would sometimes go for blocks, when they hit no switches, without falling in between the rails.

The smith who told the story said that one day a smith came along who allowed that he "would make the cab track, or he'd eat it"! All the smith did, that the story-teller could see, was to take down one of the springs, cut off a bit, replace the spring, and the rear wheels of the cab fell "bang" in between the street-car rails before the cab had moved ten feet along the track!

Mr. Nehlig had early seen the "handwriting on the wall" and knew that for self-preservation he would be obliged to go into automobile work. To do this, he went to work in a very novel way and one which certainly should prove adequate and effective. The shop had an apprentice, a promising young man nearly "out of his time," and one whom it was the intention to take into partnership at no very distant day. With this young man a scheme was made up that he should appear to leave the blacksmith in order to get into automobile repairing.

Digitized by Google

The "apprentice" got a job in a first-class repair shop and then went systematically to work to learn everything about the business form A to Z, and the amount which a determined young man can absorb of auto work in a year is surely a whole lot. At the end of the year the young man will have complete lists of the tools and equipment needed in a garage and a mighty good idea of how to handle the different classes of work which come to auto repair shops. It seems to the writer to be a mighty good way of "breaking into" automobile repair work.

The smith figures that the horses will be a little scarcer by the time his apprentice has "caught on" to the automobile game, then

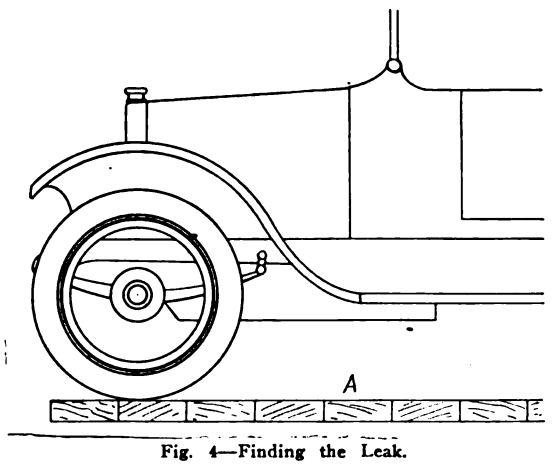


Fig. 4—Finding the Leak.

they will shove the shoeing gear all back into one corner of the shop, the apprentice come in as a full partner, his experience and "know-how" against the shop of Mr. Nehlig, who personally will care for what "hoss-work" comes in, and incidentally "catch on" to the automobile game himself. It looked to the writer as a mighty good scheme and one which other smiths should try out for their own interests before the "hoss famine" hits their business too strongly.

New Orleans' Streets Hard on Shoes

"New Orleans streets are very hard on horseshoes," said Mr. Nehlig. "New shoes will last only about a month on animals which are on the downtown street all day. You see, New Orleans streets, or a large part of them, are paved with big blocks of very hard stone, eighteen by twelve inches. These blocks of stone were brought here by vessels as ballast when they came for cargoes many years ago. Sailing vessels, they were, and had to be ballasted in order to 'stand up' during the voyage here. These hard stones wear the shoes horribly and sometimes the shoes won't last as long as stated above."

From Clerk to Army Farrier

The smith who owned the shop described above had a son who did not care for blacksmithing, and after working at it as a boy, while not in school, took opportunity as he grew up to get away from the shop into an office where he was making good as a clerk. One day the draft caught the young man and he knew that he would have to go, as he was sure of making Class A. His father sent for the young man and said: "Now, son, just quit the office and come into the shop and harden your muscles against the time when you will be called. You will probably have six weeks or two months, and in that time, with what you know of shoeing, you can qualify as first-class farrier and thus get a pretty good standing in the army."

The young man took his father's advice and went at the work of shoeing with much greater interest than ever before. He had not been a month in camp before he was in the farrier's division or squad, and very soon a sergeant's stripes on his sleeve gave him many privileges which he could not have obtained in the trenches. And who shall say that he did not do as much for his country shoeing horses well and skilfully as though he had been firing guns at the Huns?

In New Orleans and other Southern cities it seems to be the universal practice, among the smaller shops at least, to make the shoes used from old iron which may be picked up from junkshops or from machine shops along the big river. "It used to be our stint," said a smith in one of the shops, "to shoe eight horses a day, each man, and to make all the shoes from old bolts, using three-quarter-inch steel for ordinary shoes, seven-eighths inch for the larger horses and five-eighths inch round black steel for racing and driving horses."

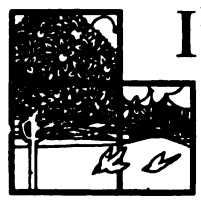
"When two men worked in a shop one would help the other in 'drawing' a batch of shoes with the short-handled, round, double-faced sledge so much used in smith shops in this part of the country. It is much less work, forming shoes from bolts when you have a lusty hand at the sledge to 'belt out' the rods into shoe shape. But when there was only one man in a shop he sure had to 'go some' with his forging arm to draw out and shape those thirty-two shoes and to fit and drive them in one day."

"How do you manage the drawing out without a striker?" the writer asked one smith. "Oh, I usually keep the little double-faced striking hammer A, Fig. 3, on a couple of five-eighths inch pins B, which have been bored and driven into the anvil block C on the back side thereof. The striking hammer lies there all the time, out of the way, and with its fifteen-inch handle projecting up and away from the anvil, I can reach over the anvil at any time and get hold of that striking hammer handle, and, using it one-handed I can forge out those bolt-shoes a whole lot faster than with the forging hammer."

An automobile stopped at a smith shop one day to have a bit of the linkage straightened out, and while at the work the smith was told by the driver of the car that he was using more oil than he thought necessary and sometimes thought some of it leaked out. "But I never have found any leak," he declared, and added that he had hunted the crankcase all over for leaks, but never had found one.

"Let's have a try at leak-finding," said the smith, and upon the owner consenting, the smith brought out a dozen short boards and laid them under the automobile, placing them as close together as they would lie, as at A, Fig. 4. Then he busied himself with the links which were to be straightened, and finished the work in about a half hour. Then he went to the boards under the automobile and looked for oil-drippings—and found some. He traced the points from which the oil came which was falling on the boards and thus located a leak in the gear case and a couple more in the engine, where the driver had never even thought of looking for oil leakage. "That's a mighty good way of tracking grease," said the smith. "I first started to use that scheme to find out whether or not grease was working out of carriage axle boxes, but it's all right for automobiles, too."

Three More Entries in The Prize Photograph Contest



IN the April issue we announced that a novel photograph had been received for our prize photograph contest; here it is on this page, and doubtless you will agree that you have never seen a shop like it.

Evidently the builder was a real artist and knew how to advertise. The occupant of this shop does not need to tell the trade what he does, why, even the horses (so we assume) must have the habit of stopping in front of the place when they need shoes.

Perhaps those same horses often wonder where the horse lives that once wore the shoe around the door; he sure must have been a fairly sizable pacer.

It rather looks as though we might have some trouble awarding the prizes, all of the pictures so far have been so interesting that it will be a difficult matter to pick the best, perhaps we will have to award more than the three prizes, so you had better send in that picture of your shop.

Just bear in mind that it doesn't cost anything to enter your picture in the contest. As a matter of fact every one who enters a photograph of their shop receives a prize in the shape of a halftone engraving, the one we use for printing the picture in the magazine. Practically any printer can use this engraving for reproducing the picture on the tops of bill heads and letter heads.

Send That Picture Today

PRIZE PHOTO NO. 8.

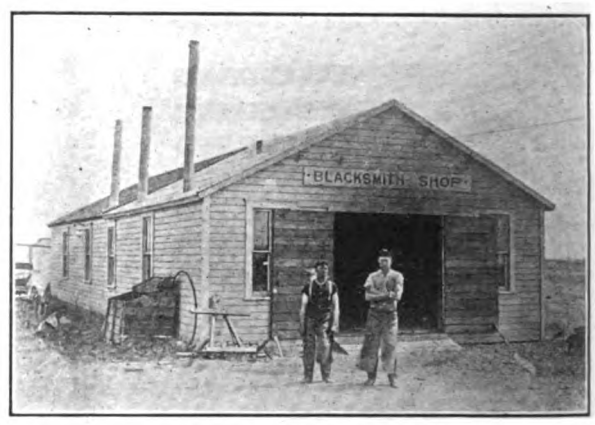
From Fred Littlefield, Montana.—I am sending you a photograph of my blacksmith shop which shows how it looked in the summer of 1917. The tall man in the picture is R. E. Welliever, while the short one is myself.

I built this shop in November, 1916, and during that winter I did horseshoeing. In the Spring of 1917 I put in power machinery consisting of a trip hammer, two blowers, drill press, double-emery stand; tire shrinker, three vises and a foot vise, three fireplaces and one hand-blower.

The power machinery is operated by a five-horsepower electric motor. I have all kinds of small tools and fifty pairs of tongs which I made myself (I haven't enough tongs yet). I am greatly interested in the articles which you publish about welding as I intend to put in an oxy-acetylene plant. The lathe articles also are interesting, and I intend to have a lathe this coming summer.

There is a great deal of automobile and tractor work to be done around here and so I expect to start in the automobile repair business this spring. I think that this is the coming business, but we still have plenty of horseshoeing. Of course, at the present time, the plow work amounts to the most.

Personally, I should like to see articles in your paper about shop systems and business methods, for I think that one of the reasons why the trade is not so successful is because of its business methods. In the near future the blacksmith will have to have an office, a desk and a cash register—a place where he can do business in a businesslike way, and



Mr. Littlefield's Shop.

so train the customers to have a certain amount of respect for our methods.

In fact, I think that the blacksmith business should be run just like well regulated department stores and until the business is run that way, we cannot expect to take our places among businessmen.

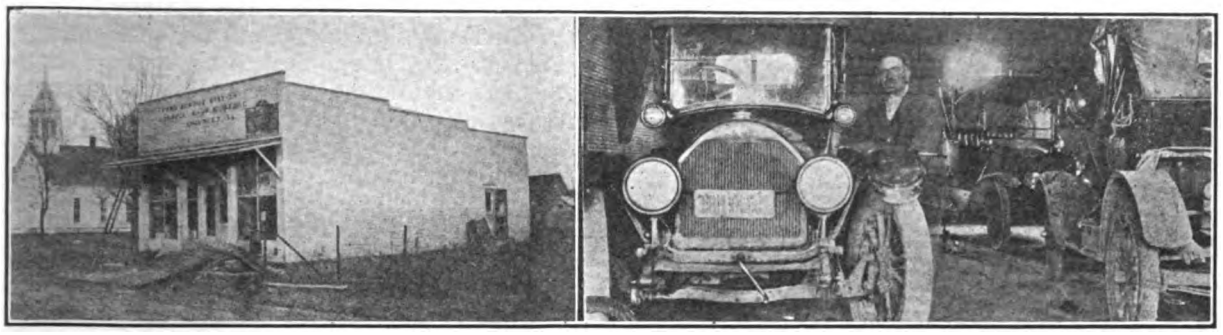
I do a strictly cash business here and find that the customers like it just as well, after they get used to it, as they did the old credit plan. There are three shops in this town now. I was the last one to arrive, but I am getting my share of the business. One of the shops will charge anything and do work on credit. The shop shown in the photograph is 24 by 56 feet.

A good temper is better than a legacy, or a public pension.

Digitized by Google

PRIZE PHOTO NO. 9.

From the Correll Shop, Illinois.—We are sending you a number of photographs of the building in which we do our repair work as well as a picture taken of the inside of the shop, and we would like to enter at least one of them in the prize contest. The writer intends to send in an article a little later, but does not have time now.



Mr. Correll's Shop as Viewed from the Outside and an Inside View Showing Mr. Correll.

EDITOR'S NOTE.—We have taken the liberty of reproducing two of Mr. Correll's pictures, one which shows the outside of the shop and the other, the inside. We trust that Mr. Correll is not quite as ghost-like as he appears in the photograph. Evidently a double exposure was made, and we are sure that the picture is more interesting on this account.

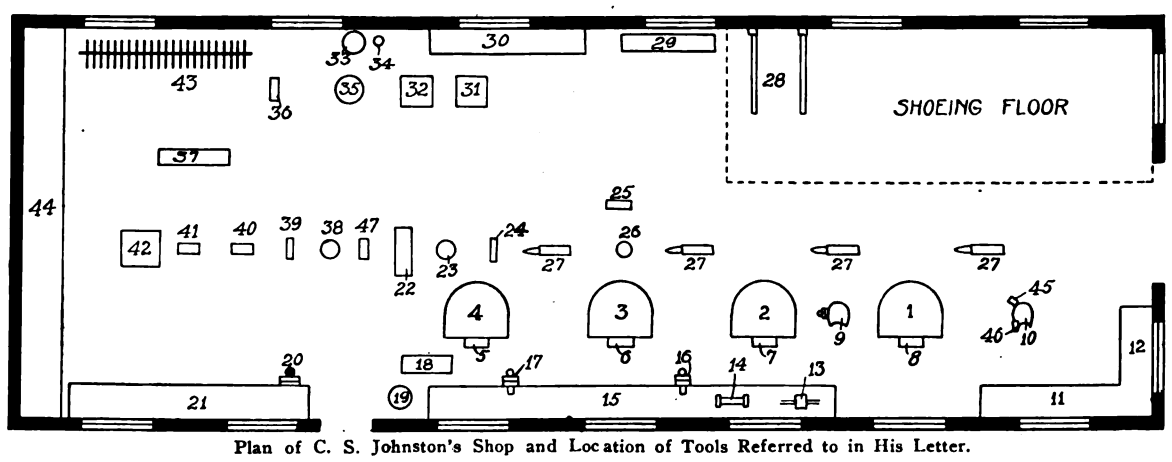
Upon close investigation one will note that the Ford car at the rear of the shop shows clearly through Mr. Correll's body. Perhaps when Mr. Correll writes to us again, he will tell us how he managed to obtain such a result and produce a picture which showed his face and arms clearly but the rest of his body in shadowy outline.

PRIZE PHOTO NO. 10.

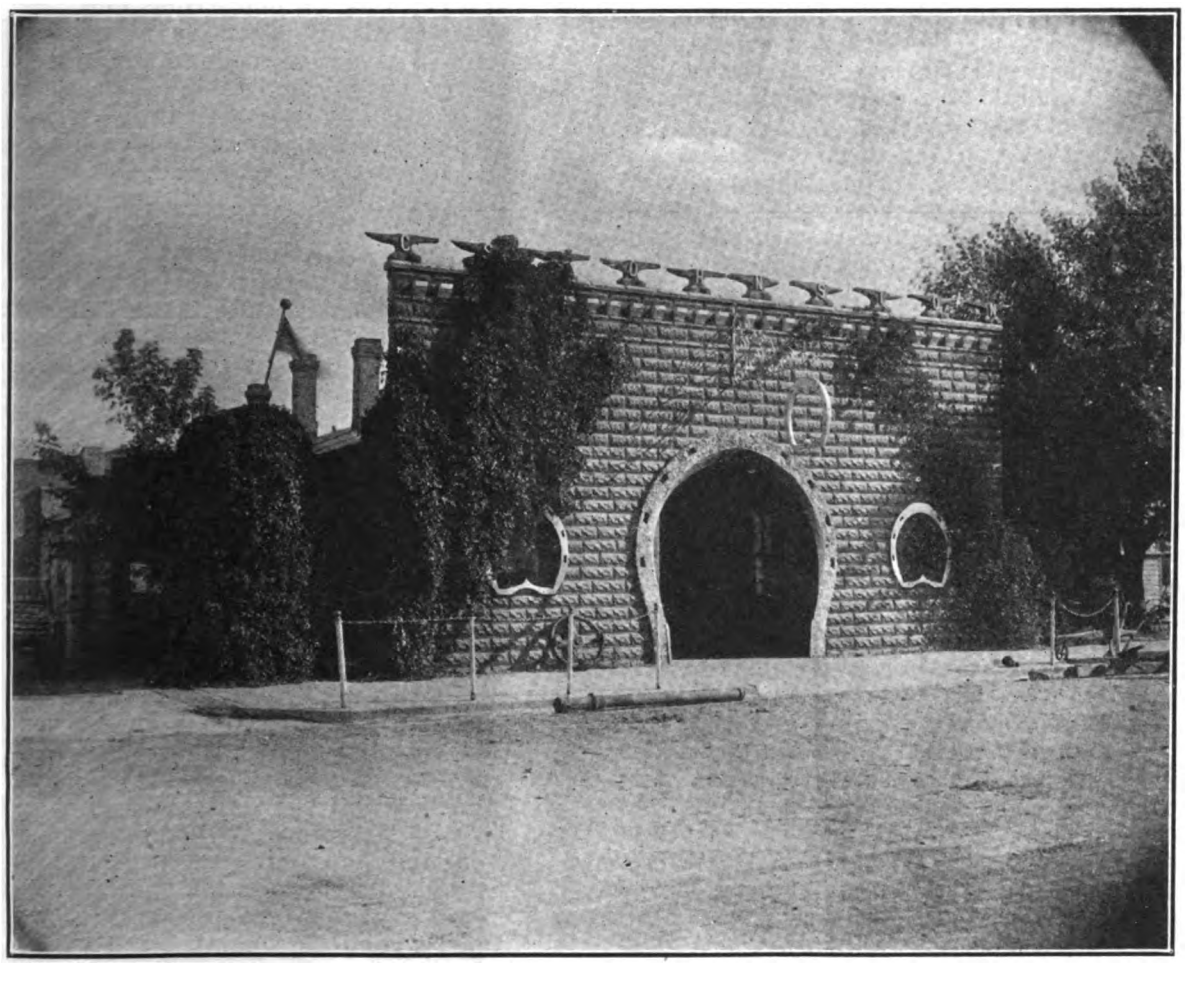
We reproduce herewith a photograph forwarded by C. S. Johnston, of Montana, and with this photograph we have reproduced the plan of the shop. Mr. Johnston gave no details, nor did he tell who designed the building, but we are sure that all the readers will agree that it is one of the most ornate and fitting smith shops that they have ever seen.

Not only is the building itself beautiful, but there seems to have been great care exercised in locating the shrubbery and placing it in the yard. In referring to the sketch of the shop, the following numbers are given on the back of the sketch, and reproduced herewith.

Nos. 1, 2, 3 and 4—Horseshoe-shaped forges.
Nos. 5, 6, 7 and 8—Electric blowers.
Nos. 9 and 10—Horseshoe-shaped vise benches.
Nos. 56 and 46—Vise and shoeing vise.
No. 27—Four anvils.
No. 13—Neverslip automatic power tapping machine (our own invention).
No. 14—Emery stand.
Nos. 16 and 17—Vises.
No. 18—Power bolt tapping machine.
No. 19—Press drill.
No. 20—Wood vise.
No. 21—Woodwork bench.
No. 22—Cold tire setter and power shears.
No. 23—25-lb. trip hammer.
No. 26—50-lb. trip hammer.
No. 25—Tire shrinker.
No. 24—Shears.
No. 38—Drill press.
No. 47—Power hacksaw.
No. 39—Grind stone.
No. 40—Lawn mower sharpener.
No. 41—Spoke turning machine.
No. 43—Iron rack.
No. 36—Shears.
No. 42—Universal wood worker.
No. 44—Wood stock.
No. 35—Welding forge.
No. 32—Welding Table.
No. 31—Welding furnace.
No. 33—Generator.
No. 34—Tank.
No. 30—Welding supplies.
No. 29—Lathe.
No. 28—Barcus shoeing rack.
The shop measures 50 x 100 feet.



Plan of C. S. Johnston's Shop and Location of Tools Referred to in His Letter.



The Ornate Smith Shop of C. S. Johnston.

Fully Warned

Fortune-teller to motorist: "I warn you, a dark man is about to cross your path!"

Motorist: "Better warn the dark man."—*Sydney Bulletin.*

PRICE LISTS WANTED

In order that our readers may keep informed as to prices prevailing in various parts of the country, we have decided to publish a price report, monthly in the BLACKSMITH & WHEELWRIGHT. In order to do this, we must have the co-operation of all our subscribers.

We therefore have reproduced a convenient blank list for the smiths to fill out. It is not necessary for the reader to fill every item, but only such items as are of particular interest to him in his part of the country.

The blank is not complete, by any means, and we suggest that if the smith wishes he may add any items and prices that occur to him.

It is our suggestion that each smith, in renewing his subscription, fill in such items as he can and enclose the blank with the subscription money. Just before publication date we will compile the table from the blanks received and publish it in the next BLACKSMITH & WHEELWRIGHT. Thus you will know whether or not your local dealers are charging fair prices and are giving you fair prices for your work.

This plan has, to our knowledge, never been tried in a trade paper of this kind, but it is our candid opinion that if our subscribers will only co-operate by filling in the blanks as they appear every month, this department will save them hundreds of dollars every year.

For the next few months, we wish that every reader would fill in the blanks so as to "start the ball rolling." We wish that every reader would add items which he thinks are necessary.

Price per lb. received for junk iron.....
Price per lb. received for junk steel.....
Price paid per lb. for square iron bars.....
(Give one or more sizes)
Price paid per lb. for flats.....
Prices received for shoeing No. 1.....
Prices received for shoeing No. 4.....
Prices received for shoeing No. 6.....
Prices received for calks.....
Prices received for resetting.....
Prices received for new tires.....
Prices received for spokes.....
(*Add other items.*)
.....
.....
.....
.....

Digitized by Google

The Pioneer Journal of Its Class in the World.
Member of the Audit Bureau of Circulations.
PUBLISHED MONTHLY BY
M. T. RICHARDSON COMPANY,
71-73 MURRAY STREET, NEW YORK.
POST OFFICE BOX, 654. TELEPHONE—7377-7378 Barclay.
CHICAGO OFFICE, Garland Building, 58 East Washington St.
Entered as second-class matter at the Post Office in New York City.

M. T. RICHARDSON, President and Treasurer
F. R. WHITTEN, Secretary
M. T. RICHARDSON, Editor
FRANK L. AVERY, Managing Editor

F. R. WHITTEN, Advertising Manager
H. F. LUDINGTON, Western Representative
GEO. A. SMITH, Eastern Representative
FRANKLIN MYERS, Art and Copy Dept.

FOREIGN AGENTS:
NEW ZEALAND
MR. R. HILL, Matlock House, Davenport, Auckland, New Zealand.
GREAT BRITAIN
ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.
One Copy, one year, including postage, if paid in advance.....$1.00
One Copy, six months, in advance.....60 cents
Single Number.....10 cents
Canadian subscriptions.....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English Money.
Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

ADVERTISING RATES SUPPLIED ON APPLICATION.

SPECIAL NOTICE

Subscribers failing to receive their magazine regularly will favor us by giving us notification to that effect.

CHANGE OF ADDRESS

Subscribers who desire the address of their paper changed should send us the old as well as the new address.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

Our Editor's Letter

UNTIL the prize photograph contest started, I had no idea that there were so many fine looking blacksmith shops. Somehow or other I had the idea that a smith shop was a combination farmyard and junk-shop.

Perhaps my idea was formed by a shop which I once knew. The smith had a fair sized yard and had built the shop at the rear of it. His front yard was perhaps about a hundred feet square and in all of my life I had never seen such an assortment of farm wagons and farming machinery in one place.

And all of the machinery was old and broken down. Evidently the smith believed in making collections of relics for some of the junk had probably been out in his yard for the past many years.

Such a pile of old stuff had certain effects upon his business and I doubt if he was justified in keeping it. Many of the farmers (in my hearing), often have said, "I'm always afraid to take any of my farming machinery to Jim because he likes to throw it in the junk pile, he doesn't care to fix up old stuff and may say that it is no good."

The farmers were right, too, for Jim was a shirker to a certain extent, he liked to work on new machinery, but when it came to working on a rusty part, then he grew careless and usually tried to persuade the farmer that a new machine or part was necessary.

You know yourself that an attractive and neat place of business has more weight with you than an ill-kept place. A neat store makes you feel that the proprietor is also neat and business-like, and you feel that his prices are just as clean cut and charged upon a practical basis.

If I am to judge by the average photographs entered in the contest, I should say that the smith realizes that a clean shop invites trade and confidence, for if this is true in any other business it surely is just as applicable to blacksmithing.

I feel that the smith should keep a clean shop, just because I know that the average smith is so good natured and clean in his own heart. Daily I receive many letters from various parts of the country and everyone of those letters from blacksmiths shows a willingness to help his brothers in the trade.

You can see this helpful spirit reflected in our "Workshop Experience" department in the suggestions and articles sent us. Each article shows a brotherly spirit.

It only remains for all of us to pull together, not try to play the game all by ourselves, but to unite and by our united efforts climb together to success.

Our Open Market

SOME time ago one of our brothers suggested that a set of price lists published at least once a year might be very helpful for blacksmith readers. Only a few days ago a reader suggested that if the smiths only had an idea as to prices in various parts of the country, they might be able to fix their own prices accordingly.

Farm journals often make a point of publishing farm produce prices and undoubtedly it is this form of co-operation that has put the farmer upon his feet and helped him to obtain a fair price for his commodities.

Upon one of the pages, at a lower corner, in this issue, our readers will find a blank form which every reader is requested to fill out. It will be noted that only general headings are used and the smith is requested to put in the necessary details. For instance, on the line "Square Iron," you may have recently bought some one-inch square stock, if so, simply put the size on the line and the price per pound you paid.

Such a blank will be printed every month and after it is filled in, it may be pasted upon the back of a post card and mailed to the BLACKSMITH & WHEELWRIGHT, 71 Murray St., New York, N. Y.

When we receive the card we will put it with the thousands of others which we receive and in the following month we will publish a list of prices under various headings, showing the prices at various points throughout the country of the different items.

If you wish any particular heading added to the blank, just put the heading on the dotted lines at the bottom, together with your price on that stock or article and this item will be added the following month.

If all of our readers co-operate, this will form the most valuable part of our magazine. You will know whether or not it will pay you to send for iron to Chicago, or if you can obtain a specially high price for junk in a nearby city.

As time goes on, the items on the list will increase in number. You will be able to show your customers how much a certain job might cost in another part of the country, how much your stock costs; in other words, this department will help you to justify your prices when the farmer "kicks."

An Unjustified Attack

IN order that he may clear himself, or try to, in the eyes of the public at large, our Postmaster General, Mr. Burleson, has made a sweeping charge against the magazines and newspapers as a class.

He has claimed that the present antagonism of the Public has been stirred up by the newspapers and magazines. He claims that the publishers are his enemies because of the second-class postal bill for which he was sponsor.

This is not to the point and does not answer the criticisms. True, the publishers have criticized the law which has increased postage, in some cases more than 100%, but this criticism is based upon the fact that some time ago a committee investigated postal costs and found that a reasonable and just rate was being charged at the time.

It is the people as a whole that have been aroused, they have realized the present inefficiencies of the wire systems, the rundown conditions of the telephone service.

Not only has the general public protested but even the employees of the telephone and telegraph systems have raised their voices against Mr. Burleson.

The Democratic party have openly condemned the Postmaster General's autocratic attitude and his general "Public Be-Damned" policy, may have issued the statement that Mr. Burleson's management (or mismanagement) of the telephone and telegraph systems has undoubtedly done more to ruin all chances of Government ownership than anything else that might be done.

Formerly, under private administration, no rates could be raised without the consent of the Interstate Commerce Commission, yet our worthy Postmaster General held himself above all laws and arbitrarily made his own.

Where any constructive criticism was made by individuals in the employ of the telegraph systems, the criticism was ignored and sooner or later the person, who had dared to raise his voice above the others, was placed upon the list of unemployed.

Certain officials of one of the large telegraph systems were driven from their own offices, simply because they tried to protect the public against the raise in rates.

The public are so used to the tardiness of mails that they ceased long ago to complain about the Postal Department. The present agitation is based upon circumstances of later date, the telephone and telegraph service and until Mr. Burleson explains this situation, it is useless for him to try to divert the storm by referring to the old dispute between the publishers and himself.

Capital and Bolshevism

ONE of our subscribers whose letter is printed in another part of this magazine, suggests a thought which might bear considerable elaboration at this time when Bolshevism and Bolshevists are the subjects of much discussion.

Primarily a Bolshevist believes that all personal property, real estate and other wealth should immediately become Nationalized and an even division of money made. One man may work just as hard as he pleases, but at the end of a year or so he will have accumulated nothing, for his earnings will have gone to enrich the nation at large.

Again, a second man not quite so industrious as the one just mentioned, might spend his days in idleness, might make a show of working but in the end accomplish little or nothing. At the end of a year or so he would be just as rich as the industrious one.

In other words, the incentive or reason for exertion will have been removed. Man works because by working he is able to accumulate worldy goods, to dress his family well, to own an automobile or horse, to own his own home or enjoy the theatre and the minute that man finds he cannot gain anything by hard work, then he ceases to work hard.

As a matter of fact, few of our readers could possibly gain by a redistribution of wealth. The national wealth in 1917 amounted to practically $187 per person, not enough to buy much more than a fair wardrobe and hardly enough to fit out a smith shop with even the necessary tools.

Bolshevism is a fine creed for the man who has nothing—absolutely nothing—but is not practical for the man who has anything in the line of worldly goods.

Let us analyze the meaning of Capital. To your banker, Rockefeller or Carnegie represents Capital: to your local wealthy farmer, the banker represents Capital; your local farmer has more actual wealth than you: while to your helper or apprentice you may represent Capital. Your apprentice is probably often asked for money by people in poorer circumstances and it is claimed that even the hobo class has its layers of rich and poor. Therefore, it would seem that riches or capital are only comparative things.

It may be all very well for you to ask for a share of your rich farmer's wealth, or for me to insist upon an equal division with my next door neighbor's riches, but when it comes to dividing our money with someone not so fortunate as we are, then somehow or

Digitized by Google

other the matter doesn't seem quite so satisfactory.

You, brother reader, have earned your money by the sweat of your brow, it is not right that you should be made to share it with someone whose only labor is the spending of the seeds of Bolshevism, a soap box orator, long on theories and promises but short on brains and ability.

You have a horrible example in Russia where Bolshevism is working along its own lines, where long-haired orators feed the public on big words and theories, while stomachs go empty, where everyone takes what they want and murder has ceased to be a crime, where every man is at war with every other man, and women are public property.

Think it over!

What About Your Scrap?

ARE you selling your scrap iron and metal for a fair price or are you letting your local junk dealer make a big profit on it? Unless you know something about scrapping metals, about separating iron, steel and other metals and many other points about scrap, you may be losing a lot of money.

There are many things about scrap metals that might interest the readers of the BLACKSMITH & WHEELWRIGHT, and so we have arranged to publish one or more articles dealing with this subject. Watch our June issue for the first article—written by a man who is on the inside of the metal market.

The Rock Drill Blacksmith

Part IX—How the Butt Weld Is Made and the Type of Furnace Generally Used for Heating

Copyright, J. F. SPRINGER

WHEN welding rock drills, the fire may be damaging because the blast of air is excessive. That is, in the eagerness to obtain the necessary high temperature for welding, the air may be supplied too rapidly. It may, in fact, be supplied so fast that the fire will not use all of the oxygen in the air. This extra oxygen may then be expected to injure the heated steel.

The Oxidizing Flame

It is highly desirable that all blacksmiths and those having control of smiths should understand the evil of what is called an *oxidizing flame*. Its evil effect is not confined to rock drill work, but has especially to do with steel work in general.

The atmosphere around us contains two principal gases—nitrogen and oxygen. The nitrogen is four-fifths of the whole; the oxygen, one-fifth. There is, besides, a great difference between the two. Nitrogen does not appear to be especially harmful to steel at any temperatures likely to be used in ordinary blacksmith work. Oxygen, on the other hand, is very energetic. It is especially so against steel. This fact is made use of in cutting steel by the oxy-acetylene process. There are, in effect, two jets directed against the metal. One jet consists of a mixture of oxygen and acetylene. This oxygen does little or no harm because it is pretty well used up in burning the acetylene. This particular jet creates a heat, and thus enables the cutting to be started and then kept going.

The second jet consists of oxygen alone. It is used at a fairly high pressure. The effect on steel hotter than red is wonderful. It

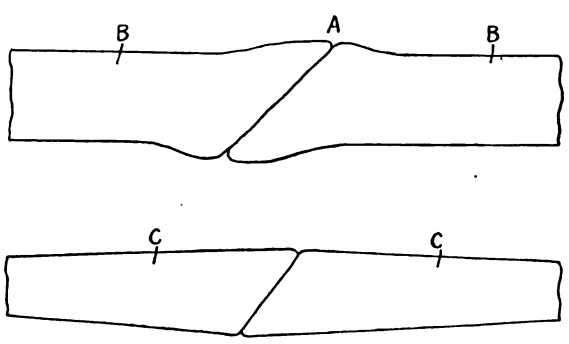


Fig. 1—Making the Butt Weld.

seems to get hold of the metal in some way and burn it. In short, the oxygen jet cuts into the steel in much the same way as a saw cuts into wood. And it operates at a pretty good rate, too. Now, when a blacksmith's air blast furnishes more air than is needed, the remainder will consist in part of oxygen. It won't be at such a pressure as the oxygen jet with the oxy-acetylene cutting apparatus and so will not burn up the metal so fast. But this oxygen will certainly damage the hot steel. And the higher the heat, the more injurious the effects may be expected to be. Scale forms because of the action of the oxygen on the steel. And scale is a great enemy of good welds.

In heating steel for welding, then, let the injurious effects of too much air be kept in

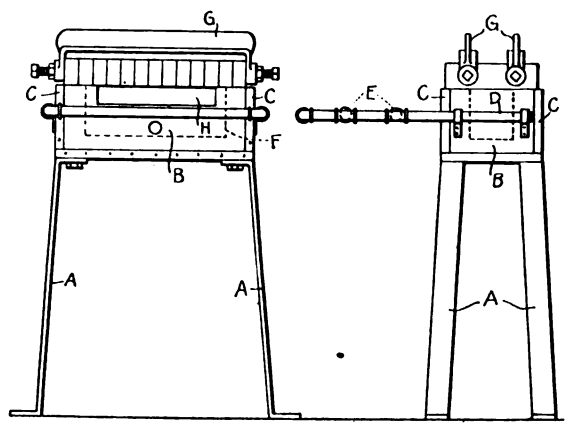


Fig. 2—The Oil Forge.

mind. Push the fire, but with a sharp attention to results.

If the welding job can be done with one heating, all the better. The less the metal has to go back to the fire and be exposed, now to this thing, now to that, the more likely will the weld be a good one.

Strength After Welding

A good many blacksmiths are doubtless under the impression that they can and do make welds of such high quality that the work is as good as new. Hear what some of the authorities say. In "Iron and Steel," a textbook written by O. F. Hudson, p. 149, one finds: "The operation of welding involves the heating of the two ends to be joined to a very high temperature, usually approaching the melting point, and consequently leads to local overheating. The effect of this overheating may be more or less completely removed by hammering during welding and while the metal is cooling, but even if the actual weld is perfect, the metal in its neighborhood nearly always suffers deterioration. Most hand welds show a reduction, frequently to the extent of 40 or 50 per cent of the tensile strength of ductility, or of both."

Prof. Bradley Stoughton, in "Metallurgy of Iron and Steel," second edition, p. 364, says: "In the actual manipulation for welding, the two pieces that are joined together are usually 'upset,' or in some way enlarged in size, so that after the junction the part of the bar right at the weld A, as in Fig. 1, is larger in size than the remainder B. This part is then hammered continuously until the metal is at a red heat, the object being to break up the coarse crystals produced by the high temperature, and by having a low 'finishing temperature,' to obtain a small grain-size.

"With proper welding, this object will be attained so far as the metal immediately adjacent to the weld is concerned, but there is always a spot within six inches or so of the weld which must necessarily have been overheated without subsequently receiving mechanical treatment, i.e., 'hammer refining,' down to the proper finishing temperature. Thus it is that most welded pieces break at a point not far from the junction, and under a strain much less than the original strength of the bar."

This is a very useful passage, suggesting that hammering should be carried on "continuously" and that it should not cease until the metal has dropped to a red heat. It also promises that the small-grain size will be regained in the region of the hammering. But the statement goes on to call attention to parts away from the weld itself, parts that have been highly heated but have not had the hammer applied to them. Here the bad effects of the high welding heat, uncorrected by subsequent hammering, damage the metal, taking away a part of its strength.

The author continues: "Balcksmiths and experienced welders are wont to declare that if a welded bar does not break in the weld itself, then it must be as strong as the original metal. However, this is by no means true. In a welding test carried on with great care in this country by skilful and experienced welders who were placed until their mettle, the strength and elastic limit of the welded bar was seldom as great as the original bar and in some cases was less than half."

It is clear from the foregoing statements that their writers did not view a hand-made weld as necessarily very perfect. The defect might be elsewhere than in the weld itself. Nevertheless, it is a defect due to the welding operation.

It will be useful, then, to recollect that when steel has been highly heated, its restoration will extend no further than the activity of the hammer—unless, indeed, the work is annealed. But let us concentrate our attention just now on the hammering. Prof. Stoughton thinks it is an adequate way of restoring the quality. The thing to consider is how to do this.

The problem is simply this: It is necessary to hammer everything that has gotten above, say, a medium cherry red. It is not only necessary to hammer all this part of the work to the two sides of the weld but to keep the hammering going without a let-up at any point for more than a few moments.

Perhaps the best way to cover this rather hard requirement is first to get rid of the hammering necessary to close the weld and then concentrate attention upon working the metal as it cools. Naturally, if the smith is

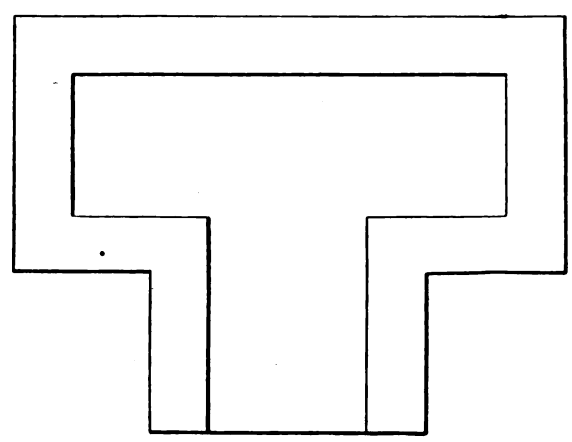


Fig. 3—Plan View of Oil Forge.

to hammer over and over all the highly heated portion of the drill rod, he will be reducing the diameter all the time. In order to provide metal to permit this reduction, the upsetting should be done in such a way as to give the required metal to a sufficient distance away from the joint. That is, the ends to be joined are to be thickened for a generous distance, as at C, Fig. 1.

The hammering is to be done vigorously—not with gentle tappings, but with blows reaching into the interior. Only that part of

Digitized by Google

the interior, in fact, will be restored which feels the hammer and has its grains broken up. The heat does nothing, probably. It is the hammer that must do the work.

The hammering is to be done back and forth, back and forth, round and round, and round, from the medium cherry red, to one side of the weld, over to medium cherry at the other side.

The smith will, perhaps, prefer to work out his own method of keeping the hammering going—that is, he will possibly want to decide himself whether he will work from end to end in a straight line and then turn the welded bar a quarter turn and work from end to end again; or, whether he prefers to keep the bar turning as he goes from medium cherry red to medium cherry red.

The region that the smith should work will grow shorter and shorter as the bar cools. That is, the distance from medium cherry red to medium cherry red will grow less and less. He is to remember to do no hammering on metal that has no color from the heat.

This matter of working over the steel to each side of the weld is something that has probably been neglected pretty much everywhere in the blacksmith shops. The smith doubtless did not understand the necessity to work the steel anywhere else than right in and around the weld. He didn't know perhaps that all heat above a medium cherry red would, especially with drill steel, have the effect of damaging the steel and that working it continuously until it had cooled to medium cherry red was a very good remedy.

An Oil Forge

The illustration, Fig. 2, shows a front and side view of a fuel-oil forge, apparently indorsed by George H. Gilman in the *Engineering & Mining Journal* (May 12, 1917). It is of simple construction and can readily be made by an intelligent blacksmith with ordinary material and tools. The furnace stands on four steel legs A. These should be secured to the floor in order to prevent over turning of the furnace when loaded with drill bits.

The legs support a plate steel box B, 34 inches long, 17 inches wide and 13½ inches high. At the four corners are uprights of 1½ inches angle bar C. These are riveted to the outside of the plates, thus providing a smooth interior. A 1½-inch steel band runs all around the furnace at the bottom. This band is riveted onto the outside of the vertical wall of the forge, and with the angle bars constitutes the stiffening of the whole.

Two brackets are arranged at each end on the outside. In these are supported the end arms D, which extend horizontally to the front. To these are secured two or more rods or tubes E which parallel the front face of the furnace and provide a rest for the shanks of the bits while they are being heated.

This whole arrangement is horizontal. It may conveniently be made of 1½-inch piping and pipe connections. If the bottom does not seem sufficiently stiff for the strain that will come when the legs have been attached at the corners and the loads are added, a rectangular frame may be provided. The legs would be attached to it and likewise the furnace itself. Or—and perhaps this would be better—angle bar could be substituted for the band.

The steel box is lined with firebrick F, on the bottom and sides, leaving a compartment 7½ inches wide. This is the firebox—all but the roof. The latter is also made of firebrick held together by a couple of clamps G.

The roof, or cover, may be lifted on and off. The bits are introduced through an opening H in the front of the furnace, this opening being 3½ by 20½ inches. In the front of the forge, just below this opening, will be seen a round hole half-way between the ends of the steel box. This hole provides for the introduction of the fuel-oil burner, or its supply pipe. The type of burner will, it would seem, necessarily be one supplying its own combustion oxygen, as apparently no other adequate provisions are made for air.

I am not sure that this is the best practical form for a fuel-oil forge. The objections center on the nearness of the burner to the work. Necessarily, it would appear, the highly heated metal is exposed to the bar flames. Such a furnace—that is, one which puts the work and the burner near together—was found to produce bad results upon big chain links at the Boston Navy Yard. The metal there was, presumably, a puddled iron, and not steel. However, I do not see that this makes a great deal of difference.

It was found, though, that by arranging the firebox so that a greater distance was put between burner and work, good results were obtained.

On the whole, then, I think the precise form of the furnace described by Mr. Gilman is best avoided. But this does not mean that this furnace may not be modified so as to overcome the objections. My suggestion of a suitable modification is to be taken for what it is worth. It is this: Arrange a front extension of the firebox so as to set the burner a considerable distance in front of the present firebox. That is, let the whole firebox have the shape of the letter T, as shown in the plan diagram, Fig. 3, of the accompanying figure.

I do not know of this exact scheme having been tried, but it is near enough, in principle, to the Boston Navy Yard improvement to justify some confidence. Of course, the front arm of the T is to be covered with firebrick. If the reader proposes to make use of the suggestion, let him not be afraid to make the front arm good and long. There won't be much loss of heat because of the length. About all the loss there could be would come from heat absorption by the firebox. It is approved practice in burning fuel-oil to give plenty of room for the flames. It is also good practice to get steam boilers a goodly distance from the fire.

The smith may be interested to know why a considerable distance would be advantageous between burner and work. Let me explain a little. When the fuel-oil starts to burn, it is in the shape of a multitude of little globules. The heat causes them to break up into two or three gases. The force with which the oil emerges from the burner carries the globules onward. And whatever draft there is would have some effect.

In short, the globules and the gases into which they turn rush forward at a pretty rapid rate. For the gases to burn, they must not only be hot but must combine with oxygen from the air. Fix the attention on a little particle of some gas from the oil—say, hydrogen. This little particle rushes on, heats up and enters into partnership with some oxygen nearby. When this partnership is entered into, heat results. In fact, it is largely in this way that we get our heat in furnaces.

If the reader has followed what has been said, he should have but little difficulty in understanding that *time is required* for the various events—for the globules to be hurled forth from the burner, for these globules to break up into various gases, and for those bits of gases to find their oxygen partners and go into combination with them. But time means space. It is important in a forge heating steel that all these events should precede the contact with the hot metal.

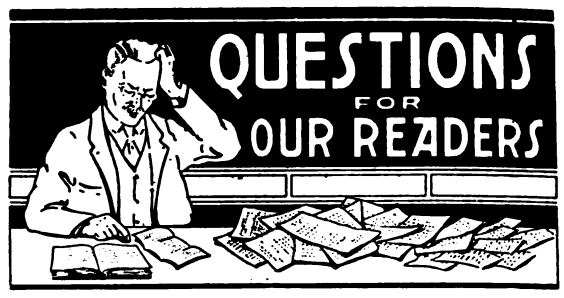
The gases coming from fuel-oil are some of them injurious to hot steel. It is important that these gases shall first find their oxygen partners and go into combustion. They are then comparatively harmless. For example, a bit of carbon striking against hot steel is something that is not wanted. But if the carbon has already found its oxygen and the combustion has already taken place, little or no harm will result. It is in this way that the good results of heating steel far away from the oil burner are to be explained.

(To be continued)

Both Sides Holding Firm

"Why don't you get rid of that mule?"

"Well, suh," answered the negro laborer, "I hates to gib in. If I were to trade off dat mule, he'd rega'd it as a pus'n'l victory. He's been tryin' fo' de las' six weeks to get rid ob me."—*The Eagle Magazine.*



Infected Hoof

From Charles P. Jenkins, Canada.—I would like to know if anyone can tell me how to cure a hoof trouble which has existed about two years. About two years ago this horse picked up a two-inch nail which entered the hoof just under the frog on his front foot.

The resulting hole heals over at times, but soon breaks open again and puss forms. I have poultised the foot for two months at a time and have poured all kinds of oils and liniments into the hole, but cannot heal it or dry it up.

I have never pared or dug out the hole to the bottom. I think that the nail must have entered a bone or some joint about half way between the point of the frog and the back.

Pulling Off Old Tires

From Maskell Ewing, New Jersey.—For some time I have been looking for some kind of an apparatus with which to pull off old tires from three or four-inch rims.

I have found that it is almost impossible to remove these large tires without damaging the rims. Perhaps some of the other readers can help.

Adjusting a Peerless Tire Bender

From Jonathan Vickers, New Mexico.—We have in our shop a Peerless tire bender which we bought in 1906. This machine has a rule on the side marked 1.2.3.4.5 and can be adjusted by moving the role.

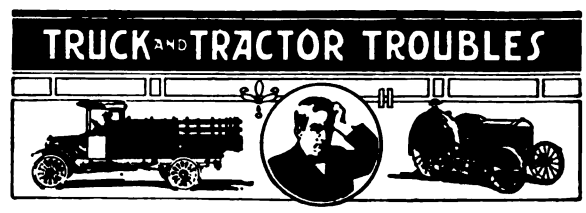
Can any of the readers of the BLACKSMITH & WHEELWRIGHT tell me how to adjust this machine so as to bend a circle of four feet or of three feet six inches, or in fact any particular size that I desire?

Welding Springs

From J. M. Weber, Minnesota.—Will someone tell me the best thing to use in welding springs? (We assume that Mr. Weber would be interested in hearing from smiths who do spring welding as to the entire process, the kind of steel and the methods used. —EDITOR.)

A Kerosene Torch

From C. C. Richter, Iowa.—Will someone kindly send me directions and drawings from which I can construct a kerosene preheating torch in which I can use kerosene under air pressure? (This question was asked in our March number, but as yet we have received no answers, surely someone of our readers have constructed such a device.—EDITOR.)



Automobile Work

From B. W. Benson, Oklahoma.—I notice that you frequently request your readers to tell what they think about automobile work and you often recommend us to take up this branch of the business. In this part of the country, there is not enough automobile work to justify my neglecting the farm work that I have, so that I do not let automobile work interfere with my regular blacksmith line.

I rather feel that the farmer needs the blacksmith oftentimes more than the autoist needs his car, so I always give the farmer the preference, but if a driver comes in with a machine which he uses in his business, I do his work along with my regular line.

I read many interesting letters in the

Digitized by Google

BLACKSMITH AND WHEELWRIGHT. I find some of the suggestions new and some of them old. I began as a blacksmith helper 37 years ago, but did not take charge of the forge for several years. I have worked for several years in a machine shop and foundry, and know something about how steam engines are made; experience which has been of great value to me since. I also worked in a saw mill as an engineer and have set up engines and other machinery, but about 25 years ago my ill health forced me to go West where I took up forge and bench work.

Cleaning Radiators and Lapping Cylinders

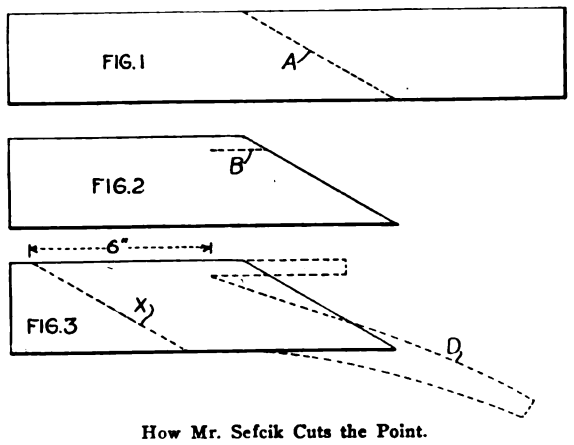
From A. Ingraham, New York.—I have two questions that I would like answered in your magazine. (1) How are automobile radiators cleaned before they are soldered? (2) How are cylinders lapped or enlarged without reboring?



Repairing Plow Points.

From John Sefcik, Kansas.—No one has answered Mr. Max Maser's, of Texas, question quite as fully as I would like to see it answered, so I will tell him how I repair plow points.

I buy hammered lay steel in bars one and three-quarters by three-eighths inches and measuring anywhere from eight to twelve feet in length. I usually cut them in half



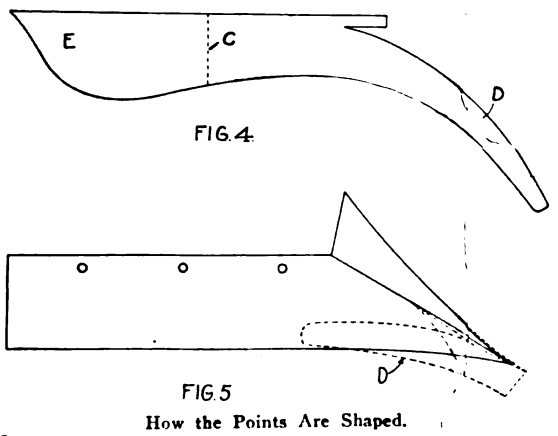
How Mr. Sefcik Cuts the Point.

in a diagonal line as shown at A in figure 1.

Then I take one of the pieces as shown at figure 2 at B and cut a slot about one and one-quarter inches long. Figure 3 shows how the bottom side is worked out and how the whole thing is cut off as shown by the dotted lines at X. I work the part shown by the dotted lines at D before I cut off at the line X. After it is cut out I hammer it into the shape as shown in figure 4.

One should be very careful in making the bend at C. The end E is folded over against D. D is the bottom side. Figure 5 shows how the point is applied to the plow lay. It can be held very easily by a pair of tongs at D. By following these directions you can make very strong and serviceable points and after you have put on a few you will have no trouble.

I make my points during my spare time in



How the Points Are Shaped.

the winter and they come in handy as soon as plowing starts. The winter of 1917 and 1918 I made 80 of these points and in September, 1918, I did not have any on hand at all. I charge $1.50 for each point. If there is any brother smith who has a better way of applying these points I would like to hear about it.

An Answer for Chas. Chism

From George W. Hardy, Idaho.—I notice in the March number of the BLACKSMITH AND WHEELWRIGHT that Charles Chism, of Ohio, wants to know how he can straighten the foot of a horse where the shoe wears rapidly on the outside. I trim the hoof down well on the inside and cut off the heel of a plate, then weld heavy steel calks on the outside of the nail holes.

Then I turn the heel out well to act as a brace, hammer the calks down so that they will not be too high. If the heel needs raising, I swell the inside of the shoe just a little bit. After the shoe is done, I harden the outside by putting it in a dish of salt water and hoof scrapings while it is hot, and then cool it in water in which has been dissolved some salt and potash lye.

I use this same solution for hardening calk and plow shares. After the shoe is done and hardened, it should be set as far as possible on the outside of the hoof, dressing the inside of the hoof down as much as you can. For an extreme case I weld a side brace on the outside of the shoe with a bar across the heel.

I like the BLACKSMITH AND WHEELWRIGHT very much and am greatly interested in the questions and answers from my brother smiths.

Get Good Prices

From Charles Chism, Ohio.—This is a little incident that happened to me last month while I was shoeing a horse for a farmer. The farmer while he was waiting, suggested that all of us blacksmiths must be getting rich because we charged so much for our work nowadays. I asked him what he meant, and he said that the blacksmith in a small village next to this had boasted to him that morning that he had made $41 the previous week—that he had done some work for the farmer and had put on four 3-inch by ½-inch tires.

The shoeing and the tires had brought the blacksmith in altogether $41. I told him that the blacksmith had not even earned his salt, but he couldn't see it until I had explained. I suggested that the smith could obtain at least six dollars in an eight-hour day at any of the mines around this section, for all of the mines need blacksmiths.

I figured stock for the tires must have cost him at least $16, the shoes which he had put on $5, the coal $1, rent $2. The wear and tear of tools and machinery must have cost $2. Adding these items together, one can see that the total figure comes to $26, and if the smith drew a fair salary of $36, the total would be $62 a week that he should have taken in in order to have earned his salary, and yet, the farmer thought that he was making money when he took in only $41.

That is one of the troubles with the blacksmiths today. They are just like this blacksmith in this town. They do not count their time as being worth anything. I am willing to wager that that smith does not take a trade paper, or he wouldn't boast about his $41 a week. When a farmer kicks about my prices, I usually tell him that once upon a time I received six bushels of corn for shoeing a horse, but now I get just enough money to pay for one bushel.

I tell the farmer *he* is the robber, not me. Every blacksmith should keep posted as to prices on farm products in his town, then it is easy enough to handle the farmers. There is one thing in which the farm journals have an advantage over the trade papers. The journals give the farmer the prices on all of his stuff, but the blacksmith is not protected at all.

We don't know what the market price of blacksmith coal should be; we don't know how much our scrap metal is worth; in fact we have no means of finding out the prices on any of our work. I think that the best things the blacksmiths can do would be to send in their price lists and have them published by the BLACKSMITH AND WHEELWRIGHT, then all of us could tear out these price lists and keep them handy. At the time of the Civil War it cost from $3 to $5 to shoe a horse.

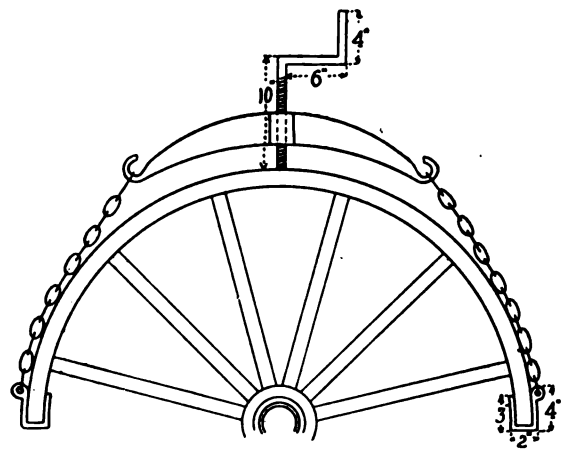
The blacksmiths received that amount of money and yet the cost of living was not as great as it is now. An old blacksmith who I met recently who was living at the time of the Civil War says that he is still shoeing horses for $1.20. Surely, people can't claim that the blacksmiths are profiteers!

Stubborn Rims

From Fred Littlefield, Montana.—I notice in the March issue of the BLACKSMITH AND WHEELWRIGHT that Mr. R. A. Roberts, of Florida, wants to know how stubborn and bent rims can be put on. (Most rims are stubborn, anyhow.)

I found out how to do this work a long time ago and made a rigging just for that purpose and am giving you here a sketch of it. The sketch explains itself. Take a piece of mild steel about 14 inches long, 1 inch in thickness and 1½ inch in width and upset it in the center so that it will offer plenty of body for a ¾-inch crank screw.

Draw the ends down from the center in each direction and bend an open hook at each end. Drill a ⅝-inch hole in the center and tap it out to ¾-inch and make the crank bolt out of ¾-inch stock. It is best to thread this crank up for about 8 inches.



The Clamp for Putting on Stubborn and Bent Rims.

The clamps or hooks on the end of the chain are made of ⅜ by 2-inch stock and made to fit the end of the rim. A piece of 5/16-inch link chain should be welded into each hook and the chain should be long enough for the largest rim usually encountered. Of course the chain is adjustable, so that if the rim is smaller the hooks in the screw clamp can be hooked into center rings. By tightening the screw the most stubborn rim can be removed.

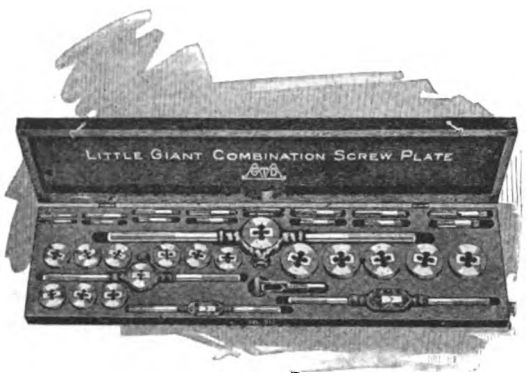
It's Hard to Tell

During the voyage of a great liner, a wag was approached by a fellow passenger, who said:

"We are getting up a tug-of-war between a team of married men and a team of single men. You are married, aren't you?"

"No," replied the wag, "I am only seasick; that is what makes me look like this."—*Boston Post.*

Digitized by Google



How One Dollar May Save You a Hundred

The number of repair jobs you do in a year isn't half as important as the number of satisfied customers you make.

Every time you fail to win a satisfied customer there is a *leak in your profits,* whether you get his money or not.

Good tools are insurance against customer dissatisfaction.

The Dollar you put into

TRADE GTD MARK

Screw Plates

may save you hundreds. They get the hard jobs done right, reduce waste and turn hours into profits.

See that this Trade Mark is on every screw-cutting tool you buy. Our catalog, No. 40, lists sets in over a hundred different styles. A postal brings it.

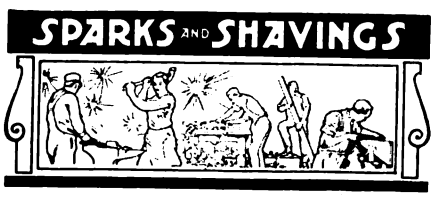
TRADE GTD MARK

GREENFIELD TAP & DIE CORPORATION

Greenfield, Massachusetts, U.S.A.

World's Largest Manufacturers of Screw Cutting Tools

New York 28 Warren St. Chicago 13 South Clinton St. Detroit 74 Congress St. W. Canadian Factory Wells Bros. Co. of Canada Ltd. Galt, Ontario



Hi-Lo Jack

The Rowe Calk & Chain Co., of Plantsville, Conn., are putting on the market a device called the Hi-Lo Jack, which is suitable not only for wagon work, passenger cars and trucks, but is adaptable for railroads and building trades. This device is made in six sizes with capacities from half-ton to 12-tons.

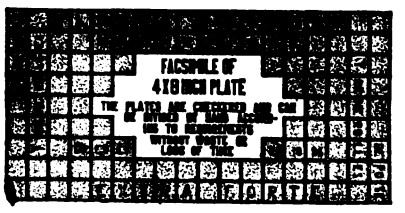
The jack has several features that distinguish it from the ordinary device, the first being its compressibility, that is, it can be closed to within six inches of the ground and at that point will exert a large percentage of lifting power; as the jack extends the lifting power increases, and when fully extended to 17 inches, the power is at its maximum.

It can be seen that this jack has a long lifting range and a low initial lifting point. The device is made from the highest grade of malleable iron, cold-rolled steel and drop forgings. Each jack has a ball-bearing thrust which makes for easy operation.

The load can be raised or lowered a fraction of an inch. The manufacturers claim that they test each jack before it is shipped and each jack is guaranteed to be perfect in every way.

"Laffite Welding Plates"

Your welding problems should be easily answered if you use the Laffitte Welding Plate. The plate is made in two grades, viz., the heavy for material ½-inch in thickness and over, and the light for material under ½-inch in thickness. The plate is 4 x 8 inches and is chequered so



that a piece of any size can be broken off by hand without loss or waste. One plate is sufficient to make from half a dozen to one hundred welds, so that the cost is practically nothing when the saving is taken into account. The chemical action of the plate is said to increase instead of decrease the strength of the weld.

One can weld at a low heat and save 33 per cent in time and fuel. The plates are used in a simple manner, as the two parts to be welded are heated to a cherry red if steel, or a white heat if iron. A piece of Laffitte Plate of sufficient size is then placed between the two parts. They are then pressed together until the plate fuses and hammered lightly and completely in the usual way. The piece may then be reheated to any desired heat without endangering the weld.

A feature of a "Laffitte" plate weld is the fact that a homogeneous weld is secured. It is not merely stuck on but becomes a solid piece, with the strength of the original. In many cases the strength is materially increased as with steel castings. These Laffitte Welding Plates are used extensively by large industrial companies in this country and abroad. The plate welds iron to iron iron to steel, steel to steel, machinery steel, crucible steel, tool steel, and steel castings.

Blacksmiths will find these plates effect great economy in their shop operations. There is no equipment necessary, nor does it require any change in method.

The Laffitte Welding Plates are handled everywhere by all active dealers, and the manufacturer, The Phillips-Laffitte Company, Pennsylvania Building, Philadelphia, Pa., will be glad to furnish samples on request.

Birch Super-Four

During the past few years it has been successfully demonstrated that a large percentage of cars sold in this country find their places in farming communities. Undoubtedly the blacksmith should be able to obtain an agency for automobiles and sell them in his community very readily.

We want to call the attention of our readers to the Birch Motor Cars manufactured by the Birch Motor Cars, De[illegible] Ill. This line of cars is so arranged that they offer ready sale to the largest number of customers for the reason that they are made in four-cylinder and six-cylinder machines, low and high-priced.

The machine has a 114-inch wheel base and a 35-hp. engine. It is equipped with electric lights and self-starter.

The commission, we understand, is very liberal and since the machine sells so easily and the value is so great the blacksmith should be able to sell them as a side line without much effort on his part. We would advise our readers at any rate to write The Birch Motor Cars Co., and get full particulars as well as illustrated literature.

Ends Ford Cranking

Practically the only car on the market that requires hand cranking is the Ford and very frequently if the Ford owner is careless, he is apt to break his wrist or be severely injured when cranking the engine. Then, again, in the rain or mud it is mighty inconvenient to crank the engine.

A remarkable new attachment is being manufactured by the Bear Mfg. Co., 400 Bear Bldg., Rock Island, Ill., which is said to be unfailing in its action—that is, without getting from the seat of the car, the driver can start his engine with this device.

The starting device is said to spin the engine past a number of compression points at every operation. It is very easy to attach, and the blacksmiths in country towns should be able to make considerable money putting them on for the owners in their vicinity.

The device may be obtained free of charge for trial and if it does not work satisfactorily it may be returned, for there is no obligation to purchase if it does not do what is claimed for it.

Important Announcement

On one of our advertising pages our readers will find a short letter from the Columbus Anvil & Forging Co., Columbus, Ohio, in which they tell the smiths throughout the country that they have something important to say in the near future. We certainly were surprised when we found out what they were going to tell you.

They are not going to tell you that they are giving away anvils or forgings or anything like that, but they *are* going to tell you how you can save considerable money. It will be the most important money-saving suggestion that we have encountered in a number of years. Just watch for their advertisement in the next issue.

New Era Springs

Undoubtedly the country blacksmith, at certain times during the year has his hands full repairing springs. Both for automobiles and for wagons.

Satisfaction is not always given when the smith makes the spring or leaf, simply because his experience may not be great enough or the stock of the right kind.

The smith should "get acquainted" with the New Era Spring & Specialty Co., of 1138 Hamilton Avenue, Grand Rapids, Mich., for this firm manufacture a very complete line of springs.

The springs sold by this firm are built to last. The line is so large that a telegram or special delivery letter order can usually be filled within a few hours and the spring shipped to the dealer C.O.D.

The company make a very attractive discount to dealers, and we suggest that our readers, who do spring repairing, write for their lists and prices.

Cylinder Grinders.

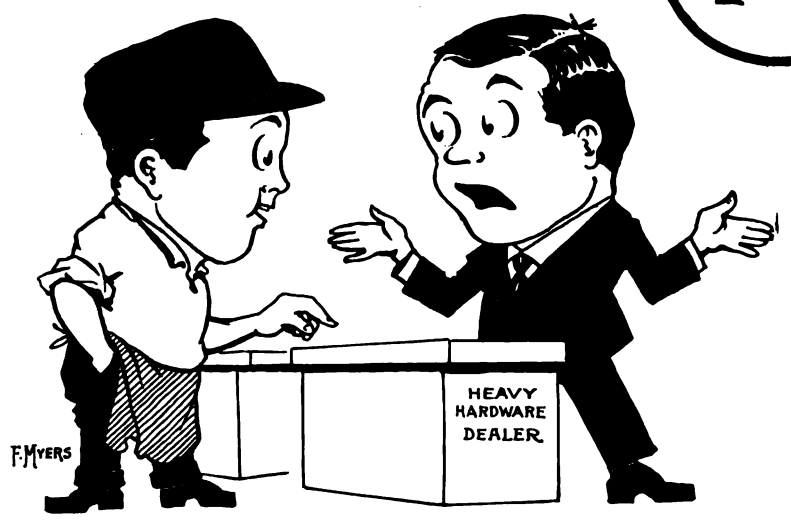
With the ever increasing number of automobiles on the market there is a proportionate growth in the amount of repairs necessary. Automobilists realize that an old car can often be restored to practical operation if the cylinders are reground.

Cylinders and valves are practically the only parts of an engine that really show an appreciable amount of wear. The bearings can usually be replaced at a very low cost. Many cars, the cylinders of which have been scored or badly worn, are thrown into the junk yard, when they could be restored to practical operation.

The Heald Machine Co., of Worcester, Mass., with branches in practically all of the principal cities throughout the country, manufactures a practical cylinder re-grinder that is adaptable to the needs of [illegible] smallest as well as the largest[illegible] care of practically any automobile cylinder [illegible] grinding job which may come into the shop. The grinding bed is adjustable in three directions so that [illegible] engine is squared up on the base, the cylinders can be ground without a new set-up for each cylinder.

Such a machine should pay for itself in a very short time because once the trade knows that the repairman is able to restore engines it will flock to him.

Digitized by Google



Do I Sell American Horse Shoes? Why my good man I sell more of that brand than any other!

A professional blacksmith and his helper, too, can understand and appreciate American Horse Shoes and Calks, for the features are there that talk a live language to them. Long ago we decided that the best **service** we could give would be to put most of it in the shoe. There has never been a time when the function of service in business was developed to such a marked degree — we still put most of our service in the shoe — and we're going to keep right on putting it there.

Building your business, Mr. Heavy Hardware Dealer, is just as essentially a part of our business as is the making of Horse Shoes. As you prosper we also get our share of the world's goods. You choose with confidence the article whose **demonstrated worth** can be identified by the trade mark upon it — it's your guarantee for sales — that "A," and to every one concerned it everlastingly means "service-built in."

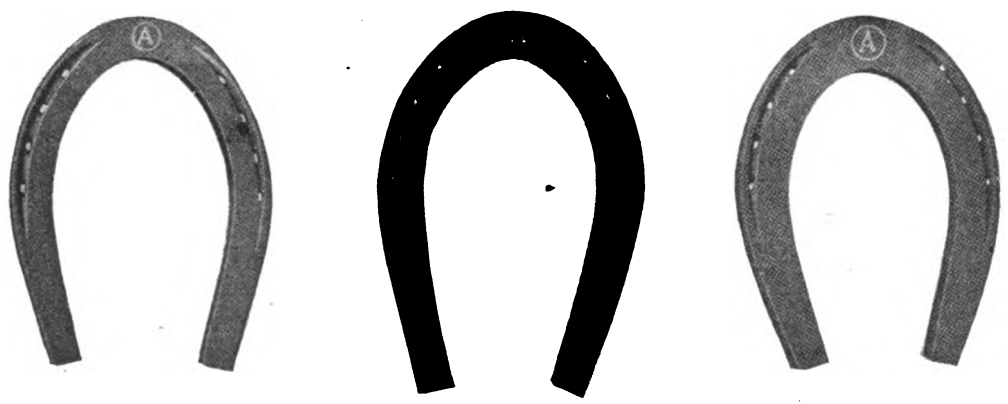
If you are not sure whether you have our catalog or not—make sure! Send for another!

Ⓐ

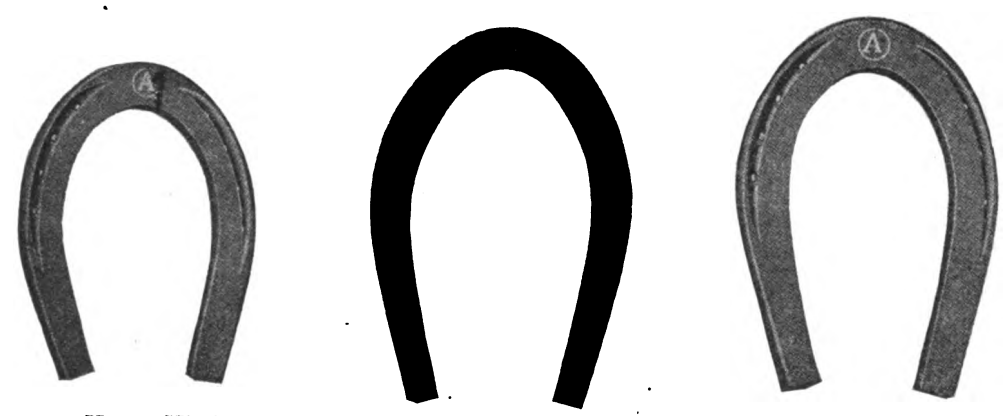
Trade Mark stamped on each shoe.

Red A on each keg and box.

AMERICAN HORSE SHOES



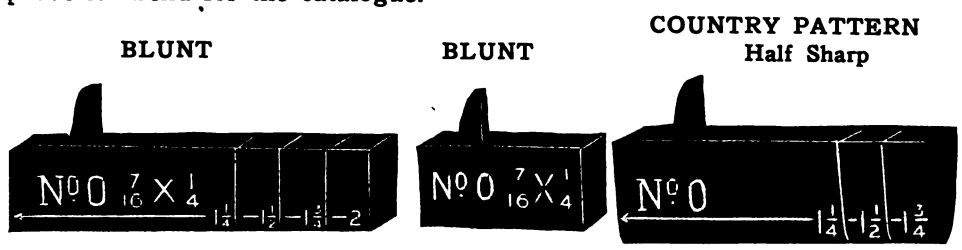
Heavy Front — Light Long Heel Front — Medium Long Heel Front



Heavy Hind — Light Long Heel Hind — Medium Long Heel Hind

American Toe and Heel Calks

American Toe and Heel Calks will stand the keenest competition and reveal the fact that they are MORE than "Just a little better." We want you to prove it—Send for the catalogue.



American Horse Shoe Company

Rolling Mills, Works and Offices

PHILLIPSBURG - - - NEW JERSEY

Digitized by Google

Index to Advertisers

Aetna Nut Co., horseshoe calks.....Front cover
Akron Rubber Mold and Machine Co. tire repair outfits 26
Akron-Selle Co., gears.....Front cover
American Calk Co., calks.....Front cover
American Horse Shoe Co., horseshoes..... 21
Anti-Borax Compound Co., welding compounds .....3rd cover
Armstrong Mfg. Co., bolt dies..... 25
Armstrong-Blum Mfg. Co., punches and shears .....Front cover
Barcus Mfg. Co., horse stocks..... 1
Barnett, G. H., files and rasps.....Front cover
Bauer Engine Co., engines..... 24
Bertschy-Bermo Co., welding plants..... 25
Bicknell Mfg. & Supply Co., punches and shears, spark plugs..... 25
Birch Motor Cars, automobiles..... 23
Bradley, C. C., & Son, shaft coupler..... 26
Brooks, The, Machine Co., welding outfits..... 1
Bryden Horse Shoe Works horseshoes.Front cover
Buffalo Forge Co., blacksmiths' tools..... 7
Burden Iron Works, horseshoes.....3rd cover
Butterfield & Co., taps. dies and screw plates.. 8
Campbell Iron Co., supplies..... 25
Canedy-Otto Mfg. Co., blacksmiths' tools..... 2
Capewell Horse Nail Co., horse nails..Front cover
Champion Blower & Forge Co , blowers..... 3
Champion Shock Absorber Sales Co., Inc., shock absorbers 24
Champion Tool Co., blacksmiths' tools..... 6
Chase, L. C., motor topping.....
Columbus Anvil & Forging Co., anvils..... 25
Columbus Forge & Iron Co., anvil..... 6
Cortland Welding Compound Co., welding compounds 6
Crane Puller Co., pullers..... 8
Cray Bros., blacksmiths' tools..... 27
Crescent Machine Co., woodworking machinery .....4th cover
Diamond Calk Horseshoe Co., horseshoes.... 23
Doxey, N. D. welding compounds 24
Durner, A. E., disc sharpeners..... 26
Eberhard Mfg. Co., iron castings..... 5
Edwards, C. D., Mfg. Co., shears..... 25
Electric Blower Co., blowers..... 27
Electric Wheel Co., wheels..... 25
Empire Mfg. Co., wheels..... 8
Felton, Sibley & Co., paints..... 1
Firestone Tire & Rubber Co., tires.....2nd cover
Fisher & Norris, anvils and vises..... 8
Franklin Steel Works, toe calks.....3rd cover
Giant Grip Horseshoe Co., horseshoes..... 7
Gillette Clipping Machine Co., clipping machines 27
Gogel Mfg. Co., tire heaters..... 24
Greb Co., grip pullers..... 25
Greenfield Tap & Die Corporation, screw plates and blacksmiths' machinery..... 20
Gwilliam Co., ball bearings.....4th cover
Hart Mfg. Co. stocks and dies.....4th cover
Harvey Spring & Forging Co., auto springs, 3rd cover
Hay-Budden Mfg. Co., anvils.....4th cover
Heller Bros., horse rasps, tools, etc..... 8
House Cold Tire Setter Co., tire setters, hollow and spoke augers.....4th cover
Jenner, H. W. T., patents..... 23
Kerrihard Co., hammers.....'.....4th cover
Little Giant Co., hammers..... 26
Linde Air Products Co., oxygen..... 8
L. S. P. Calking Machine Co., calking machines 7
Lucas, J. L., & Son, auto heel rests..Front cover
Macgowan & Finigan Cordage Co., hammers.. 27
Ness, Geo. M., Jr., steel stamps.....Front cover
New Era Spring & Specialty Co., springs..... 24
Nicholson File Co. files and rasps..... 28
Ottawa Mfg. Co., engines..... 25
Palm, Louis F., tire coolers.....4th cover
Parker, C. L., attorney.....4th cover
Parks Ball Bearing Machine Co., woodworking machinery 25
Peck, Stow & Wilcox Co., pincers..... 28
Phillips-Laffitte Co., welding plates..... 24
Phoenix Horseshoe Co., horseshoes and toe calks 4
Porter, H. K., bolt clipper.....4th cover
Prentiss Vise Co., vises.....4th cover
Plymouth Foundry & Machine Co., punches and shears .....4th cover
Rahe Auto and Tractor School, school..... 25
Rosewater Electric Co., blowers.....4th cover
Rowe Calk & Chain Co., horseshoe calks, Front cover
Sheldon Axle & Spring Co., axles..... 2
Sherwood, W. L., woodworking machinery.... 27
Simonsen Iron Works shears.....4th cover
Standard Horse Nail Co., horseshoe nails, 4th cover
Star Mfg. Co., agricultural implements..... 24
Sterling Tire Corp., hoof pads..... 1
Stokes Bros. Mfg. Co., rasps.....Front cover
Thompson Tuyere Iron Co., tuyere iron, 4th cover
Times Square Auto Supply Co., catalogue and reference book .....2nd cover
Union Horse Nail Co., horse nails.....
United States Horseshoe Co., horseshoes.... 24
Universal Wheel Compressor Co., wheel compressors 26
West Tire Setter Co., tire setters, hammers.. 27
Wheel B, Top & Hardware Co., supplies.... 25
Whisler Mfg. Co., nut splitters, jointer heads.. 24
Witte Engine Works, engines..... 25
Young, W. F. Veterinary remedies..... 8

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co..... 24

Anvils
Columbus Anvil & Forging Co..... 25
Columbus Forge & Iron Co..... 6
Fisher & Norris..... 8

Attorneys
Hay-Budden Mfg. Co.....4th cover
Parker, C. L.....4th cover

Auto Heel Rests
Lucas, J. L. & Son.....Front cover

Automobiles
Birch Motor Car Co..... 23

Automobile Springs
Harvey Spring & Forging Co.....3rd cover

Axles
Sheldon Axle & Spring Co..... 2

Ball Bearings
Gwilliam Co. .....4th cover

Blacksmiths' Machinery
Greenfield Tap & Die Corp..... 20

Blacksmiths' Tools
Buffalo Forge Co..... 7
Butterfield & Co..... 8
Canedy-Otto Mfg. Co..... 2
Champion Blower & Forge Co..... 3
Champion Tool Co..... 6
Cray Bros. 27
Heller Bros. Co..... 8
Nicholson File Co..... 28
Peck, Stow & Wilcox Co..... 28

Blowers
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3
Champion Tool Co..... 6
Electric Blower Co..... 27
Rosewater Electric Co.....Fourth cover

Bolt Dies
Armstrong Mfg. Co..... 25

Bolt and Rivet Clippers
Porter, H. K.....4th cover

Calking Machines
L. S. P. Calking Machine Co..... 7

Calks, Horseshoe
Aetna Nut Co.....Front cover
American Calk Co.....Front cover
Diamond Calk Horseshoe Co..... 23
Rowe Calk & Chain Co.....Front cover

Calks, Toe
Franklin Steel Works.....3rd cover

Catalogue and Reference Book
Times Square Auto Supply Co.....2nd cover

Chisels
Champion Tool Co..... 6
Peck, Stow & Wilcox Co..... 28

Clipping Machines
Gillette Clipping Machine Co..... 27

Chucks
Buffalo Forge Co..... 7

Disc Sharpeners
Durner, A. E..... 26
Little Giant Co..... 26

Engines
Bauer Engine Co..... 24
Ottawa Mfg. Co..... 25
Witte Engine Works..... 25

Farriers' Tools
Barnett G. & H., Co.....Front cover
Champion Tool Co..... 6
Heller Bros. Co..... 8
Peck, Stow & Wilcox Co..... 28

Files and Rasps
Barnett G. & H., Co.....Front cover
Nicholson File Co..... 28
Stokes Bros. Mfg. Co.....Front cover

Forges
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3

Gasoline Engines
Witte Engine Works..... 25

Gears
Akron-Selle Co. .....Front cover

Grip Pullers
Greb Co. 25

Hammers
Champion Tool Co..... 6
Kerrihard Co. .....4th cover
Macgowan & Finigan Cordage Co..... 27
Little Giant Co..... 26
Peck, Stow & Wilcox Co..... 28
West Tire Setter Co..... 27

Hollow Augers
House Cold Tire Setter Co.....4th cover

Hoof Nippers
Champion Tool Co..... 6

Hoof Pads
Sterling Tire Corp..... 1

Hoof Parers
Champion Tool Co..... 6

Trucks
Akron-Selle Co.....Front cover

Hoof Shears
Champion Tool Co..... 6

Horseshoes
American Horseshoe Co..... 21
Bryden Horse Shoe Works.....Front cover
Burden Iron Works.....3d cover
Diamond Calk Horseshoe Co..... 23
Giant Grip Horseshoe Co..... 7
Phoenix Horseshoe Co..... 4
Rowe Calk & Chain Co.....Front cover
United States Horseshoe Co..... 24

Horseshoe Calks
Diamond Calk Horseshoe Co..... 23
Rowe Calk & Chain Co.....Front cover

Horseshoe Nails
Capewell Horse Nail Co.....Front cover
Standard Horse Nail Co.....4th cover
Union Horse Nail Co.....

Horse Stocks
Barcus Mfg. Co..... 1

Iron Castings
Eberhard Mfg. Co..... 5

Jack Mfrs.
Rowe Calk & Chain Co.....Front cover

Kerosene Engines
Witte Engine Works..... 25

Lawn Mower Grinders

Motor Topping
Chase, L. C.....

Nut Splitters
Whisler Mfg. Co..... 24

Oxygen
Linde Air Products Co..... 8

Paints and Varnishes
Felton, Sibley & Co..... 1

Patents
Jenner, H. W. T..... 23
Parker, C. L..... 30

Pincers
Peck, Stow & Wilcox Co..... 28

Pullers
Crane Puller Co..... 8

Punches
Champion Blower & Forge Co..... 3

Punches and Shears
Bicknell Mfg. & Supply Co..... 25
Peck, Stow & Wilcox Co..... 28
Plymouth Foundry & Machine Co....4th cover

Schools
Rahe Auto & Tractor School..... 25

Screw Plates
Butterfield & Co..... 8
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3
Greenfield Tap & Die Corp..... 20

Shaft Coupling
Bradley, C. C., & Son..... 26

Shears
Edwards, C. D., Mfg. Co..... 25
Simonsen Iron Works.....4th cover

Shock Absorbers
Champion Shock Absorber Sales Co., Inc.... 24

Spoke Augers
House Cold Tire Setter Co.....4th cover

Springs
New Era Spring & Specialty Co..... 24

Starters

Steel Stamps
Ness, George M., Jr.....Front cover

Stocks and Dies
Butterfield & Co..... 8
Champion Blower & Forge Co..... 3
Hart Mfg. Co.....4th cover

Supplies
Campbell Iron Co..... 25
Wheel B, Top & Hardware Co..... 25

Swages
Champion Blower & Forge Co..... 3

Tires
Firestone Tire & Rubber Co.....2nd cover

Tire Bending Machines
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3

Tire Coolers
Palm, Louis F.....4th cover..

Tire Heaters
Gogel Mfg. Co..... 24

Tire Repair Outfits
Akron Rubber Mold & Machine Co..... 26

Tire Setters
Buffalo Forge Co..... 7
House Cold Tire Setter Co.....4th cover
West Tire Setter Co..... 27

Tire Shrinkers
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3

Tongs
Champion Tool Co..... 6

Tool Grinders
Phoenix Horseshoe Co..... 4

Tuyere Irons
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3
Thompson Tuyere Iron Co.....4th cover

Veterinary Remedies
Young, W. F..... 8

Vises
Butterfield & Co..... 8
Fisher & Norris..... 8
Prentiss Vise Co.....4th cover

Wagons
Akron-Selle Co. .....Front cover

Welding Compounds
Anti-Borax Compound Co.....3rd cover
Cortland Welding Compound Co..... 6
Doxey, N. D..... 24

Welding Outfits
Brooks, The, Machine Co..... 1

Welding Plants
Bertschy Bermo Co..... 25

Welding Plates
Phillips-Laffitte Co. 24

Welding Supplies
Linde Air Products Co..... 8

Wheel Compressors
Universal Wheel Compressor Co..... 26

Wheel Dishers
Crescent Machine Co.....Fourth cover

Wheels
Electric Wheel Co..... 25
Empire Mfg. Co 8

Woodworking Machinery
Buffalo Forge Co..... 7
Crescent Machine Co.....4th cover
Parks Ball Bearing Machine Co..... 25
Sherwood, W. L..... 27

Wrenches
Champion Tool Co..... 6
Peck, Stow & Wilcox Co..... 28

Wrenches (Knife Handle and Pipe)

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1919, OF THE BLACKSMITH AND WHEELWRIGHT, published monthly at New York, N. Y. for April 1, 1919.

State of New York } ss.:
County of New York }

Before me, a notary public in and for the State and county aforesaid, personally appeared F. R. Whitten, who having been duly sworn according to law, deposes and says that he is the business manager of THE BLACKSMITH AND WHEELWRIGHT, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, M. T. Richardson Company, 71 Murray Street, New York City, N. Y.; Editor, F. L. Avery, 71 Murray Street, New York City, N. Y.; Managing Editor M. T. Richardson, 71 Murray Street, New York City, N. Y.; Business Manager, M. T. Richardson, 71 Murray Street, New York City, N. Y., and F. R. Whitten, 41 Pinehurst Avenue, New York City, N. Y.

2. That the owners are: M. T. Richardson Company, 71 Murray Street, New York City, N. Y. Stockholders: M. T. Richardson, 71 Murray Street, New York City, N. Y.; A. J. Richardson, Ridgewood, N. J.; Mrs. A. Louise Giardeau, Jr., Monticello, Fla.; Mrs. Mildred Ulmer, New Rochelle, N. Y.; Mrs. H. L. Johnston, New Rochelle, N. Y.; W. F. Etherington, 341 Fifth Avenue, New York City, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding one per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustee, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds or other securities than as so stated by him.

M. T. RICHARDSON CO., Publishers.
THE BLACKSMITH AND WHEELWRIGHT.
F. R. WHITTEN, Business Manager.

Sworn to and subscribed before me this 24th day of March, 1919.

[SEAL] ROBERT F. W. SCHMIDT,
Notary Public.
(My commission expires March 30, 1919).

Sepco Vulcanizers.

Ever since vulcanizing equipment began to be extensively used, scores of inventors have attempted to solve the problem of temperature control. In the Sepco steam-electric vulcanizer, made by The Steam-Electric Products Company, of Cleveland, temperature variation in the plate is controlled with one or two degrees by an ingenious but remarkably simple pressure gauge which opens and closes the electric circiut as the steam pressure rises or falls one pound.

In the Sepco vulcanizer a seamless steel tube two inches in diameter is the steam generator. An electric heating coil of special alloy, imbedded in an insulating compound, is wound on the outside of the steel tube and furnishes the heat which makes the steam.

The Sepco tube and tread vulcanizer thus obtains steam heat without using gas, gasoline or other fuel. It can be plugged into any electric light socket and so can be installed anywhere without infringement of fire ordinances.

Sixty pounds of steam is obtained in from ten to twelve minutes after the current is turned on and after the desired temperature is attained the current flows only half the time. In actual operation, current flows about one minute and is off one minute, the circuit being controlled automatically.

The Sepco tube vulcanizer is being built now in two sizes; one with four pressure arms and a plate eight by twenty inches, and one with six pressure arms and a plate eight by thirty inches. The heavier of the two machines weighs only 125 pounds complete and only one square yard of floor space is required.

Sepco vulcanizers are constructed of steel throughout. Steel construction insures greatest strength and light weight. It is stated that the tube plates have been tested to pressures of 600 pounds to the square inch without exploding, though no such pressure is ever used in vulcanizing. Because of the automatic control of temperature Sepco machines are safer than old-style vulcanizers even those with thermostat control.

Radiators.

The B. & W. Manufacturing Co., 5237-5257 Ravenswood Ave., Chicago, Ill. manufacture a complete line of radiators in many styles for automobile trucks and tractors. This concern also carry in stock cores to fit all standard makes of radiators. Dealers who have calls for radiators should write the above company for catalog and prices.

Digitized by Google

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

will be inserted under this head at 3 cents a word, including the address, for each insertion, payable in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York
PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT

Patents

PATENTS FOR INVENTIONS.
H. W. T. JENNER, patent attorney and mechanical expert, 622 F Street, Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trademarks registered.

For Sale

FOR SALE
About 100 feet of two-inch internal wire carriage tire made by the Victor Tire & Rubber Co., will be sold cheap to close out. This is new stock. BECK-HAWKEYE TRUCK WKS., Cedar Rapids, Iowa.

FOR SALE
Shop and tools and small stock, or will sell tools and stock and rent shop. Fine location on paved main street next door to $42,000 City Hall. Only one other shop in city of 4,000. Broken leg reason for selling. F. H. BECHTER, Independence, Iowa.

FOR SALE
Blacksmith and wagon shop, stock, tools and machinery. Also three lots and new six room bungalow house. Enough work for two men. Reason for selling: poor health. Address JOSEPH OBETKA, Pittsville, Wisconsin.

FOR SALE
Blacksmith, implement, hardware and garage business. Oil and gas station. All corner property. Ill health reason for selling. Write for particulars, W. J. OTT, Woodlake, Calif.

DOUBLE TREAD TIRES
We carry a full line of new and used tires and tubes. H. GINSBERG & SONS, 236 W. 48th Street, New York City.

FOR SALE
18 x 6 Screw Cutting Lathe.....$250
Double End Floor Stand Emery Grinders.... $20
Milling Machine $125
BICKNELL MFG. & SUPPLY CO., Janesville, Wis.

FOR SALE.
For cash I wish to sell my blacksmithing trade, stock, a lot of tools and machinery. I will have to give up the trade as my eyes will not permit me to work at the fire, and I need the building to enlarge my shoveling board factory. Have a large trade and have employed a good man for 10 years; could keep another helper if I could get one. Please write P. E. Lane, Urbana, Iowa.

FOR SALE
A new and fully equipped blacksmith and horse shoeing shop. The only shoeing shop in town. Work for two men. A rich farming community awaits a real mechanic. Reason for selling: want to retire. Located on the Peoria branch of C. B. & Q. R. R. Address W. H. Power, Gilson, Knox County, Illinois. P. O. Box 67.

FOR QUICK SALE
I offer at great sacrifice one scientific hydraulic cold tire setter No. 2; one L. S. P. calking machine; $125 buys them both. Address L. L. WARREN, Pendleton, Texas.

BLACKSMITH'S BUSINESS FOR SALE
as a going concern. Well equipped shop of stock and tools. In a good farming district. Plenty of work the year round and good prices. Rent building. Reason for selling going to Europe. Address P. DOIG, R. F. D. No. 1, Redwood City, California.

Wanted

WANTED
Good all around blacksmith at once. Young married man preferred. M. W. ABTS, Morrill, Nebr.

WANTED
Married man with some mechanical ability to work at saw mill. Furnished house, garden spot, fuel and can keep chickens and cow. State wages expected. J. Z. ZEHRING, Elk Mountain, S. Dakota.

WANTED
Good all round blacksmith to work by the day, or will sell stock and tools. Will pay $4.50 for a steady job. State capacity and experience. Address E. J. Perron, Ontonagon, Mich.

Miscellaneous

PRINTING FOR BLACKSMITHS
Increase your business by handing out our printed business cards with "The Blacksmith's Ten Commandments" printed on back; 50 for $1.00. NEWS PRINTING CO., Stockton, Ill.

AUTO SUPPLIES
K. W. Coil Points, doz., $2.40; 100 lots, $15.00
Magneto Files, 15c; doz.....$1.50
Speedometer Gears, 15c.; doz.....$1.50
Brake Lining (Durabestos), per foot:

1½x3/16	1¾x3/16	2x3/16	2¼x3/16
35c	40c	45c	50c

Radiator Hose, 3-ft. lengths, per foot:

1"	1¼"	1½"	1¾"	2"	2¼"	2½"
21c	26c	30c	33c	38c	42c	45c

Other sizes in proportion
Ford Hose Connections, doz., 90c.; 100,.....$6.00
Ford Felt Packing, per set.....50c
Superheat Packing, per lb.....$1.00
In packages, 410 sq. in., 1/32 in.....$1.00
In packages, 410 sq. in., 1/16 in.....$1.50
Red Head Spark Plugs, doz.....$4.80
Ford Wrenches, thin, set of four.....50c
Pliers, 6", S. J. Black, 25c,; doz.....$2.50
Pliers, 6" S. J. Nickel, 35c.; doz.....$3.00
These prices for dealers only
BICKNELL MFG. & SUPPLY CO., Janesville, Wis.

Gears

PAIGE-DETROIT
Spiral Bevel Gears and Pinions
New Product. Not factory rejects. Car dealers, garage and repair men should get our prices as they will be of interest to you. Sold in lots of one or more direct from stock.
DAYTON AUTO PARTS COMPANY,
1777 Broadway, New York City

Tires

TIRES --- DOUBLE TREAD
Guaranteed for good service. Big—Strong—Extra Heavy. 30x3 Tire $5.50; 30x3½ $7.00; 33x4 $10.00; 34x4 $10.25; 36x4½ $13.00; 37x5 $14.00. Big saving on other sizes and Tubes also. Trade in your old Tires. 10% deposit required on C. O. D. orders. Send for list now! State size and bead of tire. Orders filled same day received.
M. LIBEN & CO., 205-RK, W. 48th St., N. Y. City

Subscribe for
THE BLACKSMITH AND WHEELWRIGHT



Anthony Pump.

The Anthony Co. of Long Island City, N. Y. manufactures a tire pump which should be of interest to every reader. The "Anthony Tire Pump" as it is known, is made according to the most improved design and of the best materials. It is of the single plunger type and very easy acting. The barrel is made of steel tubing carefully selected for evenness in size.

The barrel cap is a heavy brass casting, while the foot plate is made of gray iron. The piston rod is 7-16 of an inch in diameter and made of cold rolled steel, lathe cut, of great strength so that it will withstand the heaviest usage. The valve is made from a hard drawn brass rod finished all over and carefully tested.

The check is set to be instant in action and perfect in balance so that it will not stick. The tire connection is of improved design of the slip-on lever-locking type. This pump is made in a number of sizes for use on small, medium and large cars.

Tires

Tires

BUY EARLY AND SAVE MONEY
Double Tread Tires and Tubes
GUARANTEED

Come to the Tire Clearing House—here are prices—clear cut and plain as daylight. We buy wholesale the best "try out" Tires—and you get the benefit—you want truthful tires, and truth is never crushed to earth if given a square deal—real truth is puncture proof—

SO ARE OUR TIRES

Size	Plain	Non-Skid	Tubes
28x3	$4.40	$4.95	$2.00
30x3	5.50	6.05	2.00
30x3½	6.60	7.15	2.65
32x3½	7.15	7.70	3.00
34x3½	8.25	8.80	3.00
31x4	7.70	8.25	....
32x4	9.50	10.50	2.75
33x4	9.50	10.50	3.25
34x4	9.80	10.80	3.50
35x4	9.90	11.00	3.50

Get your order in quick for goods listed here—by all means get in touch with us for further information about our special process—it means money in your pocket. Get in right—write to-day—yes—to-day.

Look up rating in Dun's or Bradstreet's.

Size	Plain	Non-Skid	Tubes
36x4	$9.90	$11.00	$3.60
32x4½	9.90	11.00	3.60
34x4½	11.00	12.10	4.00
35x4½	11.00	12.10	4.10
36x4½	11.00	12.10	4 25
37x4½	12.10	13.20	4.35
34x5	11.00	12.10	4.50
35x5	13.20	14.30	5.00
36x5	13.20	14.30	5.00
37x5	13.75	14.85	5.00

For rebuilding your old tires we charge you 60% of the above prices.
We have a special proposition to dealers on Double Tread, new and factory seconds.
With all orders received for tires up to May, we will give a first guaranteed tube for the low price of $1.50.

B. LIBEN & COMPANY
261-A WEST 54th STREET NEW YORK CITY
THE HOME OF DOUBLE TREAD TIRES

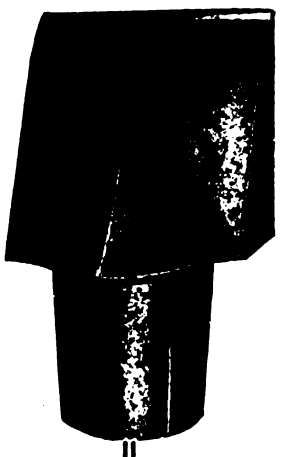
A New Distributor Appointed.

The Braender Rubber & Tire Company have closed their New York branch office at 250 West 54th Street, and have arranged with Ryan & Hughes, Inc., 1698 Broadway to act as distributors for Braender Tires and Tubes in New York City, Brooklyn, Staten Island and Westchester County, New York.

Their export department has been transferred to 315 Fourth Avenue until May 1st after which time it will be permanently located at 32 Broadway, New York City. The trade is requested to note these changes for their future convenience.

Vesta Storage Batteries.

The Vesta Accumulator Company, 2100 Indiana Ave., Chicago, Ill., are carrying on an extensive campaign to introduce 1,000 Vesta Storage Batteries to automobile owners. This battery is well known to the trade, and offers an attractive field for dealers. At the present time the Vesta Accumulator Co. are looking for new dealers in various parts of the country, and our dealer readers should write them for terms.



SIX STYLES OF CALKS
but only
ONE BEST QUALITY
and that—the very best—backed up by fifteen years of scientific study and perfect mechanical equipment.

Diamond Calks

are shaped better—wear longer and fit in the shoe tighter.

They're best by test and there's a calk for every purpose.

MANUFACTURED BY

DIAMOND CALK HORSESHOE CO.
DULUTH, MINN.

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

DON'T REPEAT



The annoyance caused car users of hobbling home on a busted spring. For 8 years the New Era "Better" Springs have *stopped the breakage.* Scientifically heat treated—close fit—easy riding—graphited between leaves for two years' lubrication. New Era "Better" Springs don't squeak. Guaranteed from end to end against breakage or sagging—a new one instantly for the asking. Don't pay fancy spring prices—New Era lists on 250 live sellers—low as car factory springs (that did break) at better dealers' discount—freight allowance—quick service—positive fit.

See New Era list in jobbers Catalog or wire collect for spring needed—it will be rushed C. O. D.—fair discount. Better Ford front and rear springs—get the New Era habit.

New Era Spring & Specialty Co.

1138 HAMILTON AVE., GRAND RAPIDS, MICH.

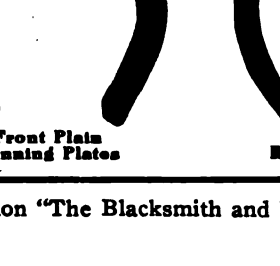
"Better" Spring Bumpers—Strapless Tire Carriers—All trade satisfying—Want information?

STAR STEEL SHAPES

ARE A GUARANTEE OF QUALITY

PLOWSHARES	SHOVEL POINTS
LISTERSHARES	DRILL POINTS
MOLDBOARDS	PLOW POINTS
SUBSOILERS	SEEDER POINTS
LANDSIDE POINTS	LANDSIDE PLATES
CULTIVATOR SHOVELS	





Made from Soft Center, Solid Cast or Crucible Steel.

BEST MATERIAL AND WORKMANSHIP.

STAR MANUFACTURING CO.

CARPENTERSVILLE, ILL.

LAFFITTE WELDING PLATES

FOR WELDING IRON *and* STEEL AT LOW HEAT

THE Laffitte Welding Plate is a scientific chemical welding compound, made in the form of a plate and will weld hard steel, tool steel, cast steel, malleable iron, steel castings, etc.

You save one-third in time, fuel and labor, there is no waste with the plate as with powders.

One to one hundred welds from a plate.

By its use you can lower your cost, improve your work and do what you cannot do now.

No change in equipment is necessary.

No loss in strength of steel due to burning.

The chemical action of the plate increases the strength at the point of weld.

A weld once made with Laffitte will never be returned broken in the weld.

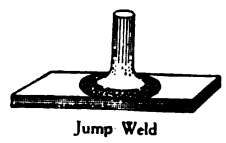
The cost of the plate is nothing when the results and saving are taken into consideration.

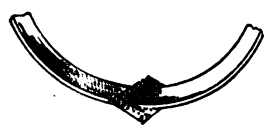
Made in two grades—i. e., heavy for material ½-inch and over in thickness; light for material under ½-inch in thickness.

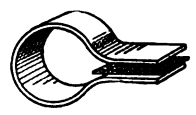
For sale by all active dealers.

Samples free on request.

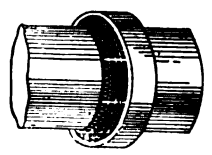
The Phillips—Laffitte Co.
Pennsylvania Bldg., Philadelphia, Pa.

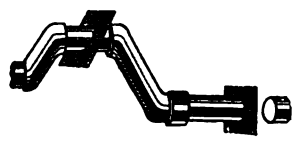

Jump Weld


Welding a Tire—No Riveting


Welding Spring Steel


Welding Broken Wagon Axle

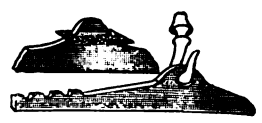

Welding Collar on a Round

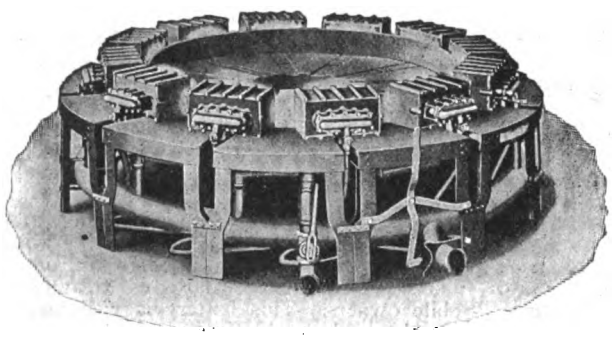

Repairing and Lengthening Auto Crank Shaft


Welding Corner of Angle

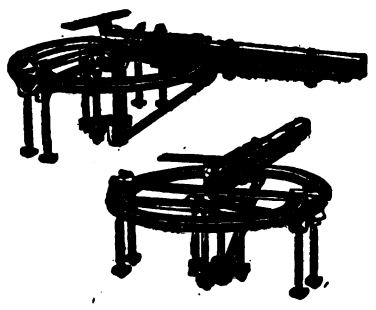

Cleft Weld to Lengthen Rigid Frames


Welding two High-Carbon Chisels


Repairing Steel Castings by Butt Welding







TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas, Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.

OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.

Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

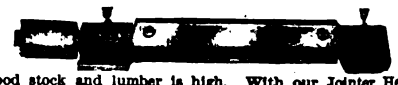
THE COCEL MFG. CO., TOLEDO, OHIO.

BAUER KEROSENE ENGINES

Write for Free Catalog before you arrange to try any engine. Sizes 2, 3, 4, 7, 9, 12, 15 and 18 H-P. Low Prices. Cash or Terms. 60 Days Trial. 5-year Guarantee.
BAUER ENGINE CO.
910 Bauer Block, Kansas City, Mo.

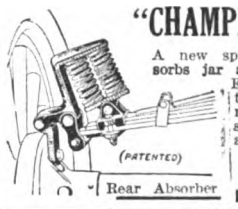


THE WOOD WORKER'S FRIEND



Wood stock and lumber is high. With our Jointer Heads you can buy rough lumber of any kind and dress it to suit your job. Saves time, money and lumber. Would this be any object to you? If so, get circulars and prices. Sold on 30 days' trial. Manufactured by

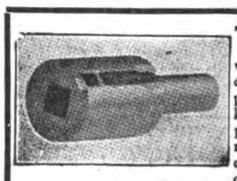
Whisler Mfg. Co. **Gibson, Iowa**



"CHAMPION" SHOCK ABSORBERS for FORD CARS

A new spring suspension which absorbs jar and rebound. A wonderful E-Z ride suspension. (E-Z to attach.) Guaranteed by manufacturers. Exclusive sales; big profit for dealers, agents and owners.

Champion Shock Absorber Sales Co., Inc.
Indianapolis, Ind., Mfrs., Dept. B



THE only successful Chuck to hold square taper shank wood bits and drills so you can use them in your drill press. See the spring. It keeps the drills from dropping out of the chuck. Made right. Priced right. If your dealers won't supply you we can.

WHISLER MFG. CO., Gibson, Iowa



SAMPLE OF WELDING COMPOUND FREE

BLACKSMITHS!

Let me send you a trial package free and you will use no other. **Anchor Welding Compound** has no equal for strength. It welds the hardest steel. No hammer needed. Good for both big and little jobs. Try it.

Write to-day and mention The Blacksmith and Wheelwright.

N. D. DOXEY, ELMIRA, N. Y.

"Brock Pattern" Hand Made Racing Plates

Extra Light, Light, Medium and Heavy weights; in sizes 0-4 inc.

Just What You Need for Trotters, Pacers and Runners

Write for our No. 17 Catalog (free); showing sizes, weights and measurements.

For our regular line of U. S. Horse and Mule Shoes, ask for No. 16 Catalog; showing sizes, weights and measurements of over 500 patterns and sizes.

United States Horse Shoe Co., Erie, Pa.

SUBSCRIBE FOR The Blacksmith and Wheelwright

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

Columbus, Ohio.

Mr. Smith,
Everywhere.

If you will watch this space, we will tell you some mighty interesting things, facts you will want to know.

Yours truly,

THE COLUMBUS ANVIL & FORGING CO.

LOWER PRICES ON

Wheels

GET OUR NEW CATALOGUE, No. 61

WHEEL TOP & HDW. CO.

Dept. W2 **Cincinnati, O.**

Learn Auto and Tractor Business



$100 To $400 A Month

GREATER opportunities than ever due to increased production of Autos, Trucks, and Tractors. Big demand for Repairmen, Garage Foremen, Drivers and Tractor Operators. Thousands of our graduates making big money.

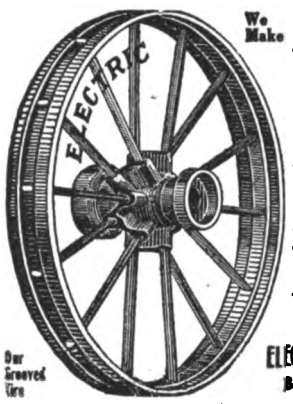
Learn in 6 to 8 Weeks

Immense additional equipment from our former Military Division. Same practical method as used to train soldier mechanics for U. S. Army in 60-day courses.

Free Now. Write today, giving age and occupation for **7-Day Trial Offer** and 68-page Opportunity Book.



Rahe Auto & Tractor School
3164 Oak St., Kansas City, Mo.

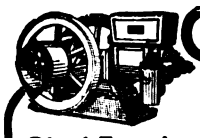


We Make **STEEL WHEELS**
To Fit Any Axle
Plain or Grooved Tire

Steel or Hickory Axles
Any Size
A Full Line of Wood and Steel Farm Trucks
With Steel or Wood Wheels

Write for Large Catalog and Prices

ELECTRIC WHEEL CO.
Box N, Quincy, Ill.



OTTAWA KEROSENE ENGINES

Start Easy in any weather. Pull steady. Carry big overload. All sizes and styles, 1½ H-P. to 22 H-P. **90 Days' Trial. Money Back Guarantee.** Prompt shipment.

Low Prices Write for present money saving prices and **Free Book**, telling all you want to know about engines. Write today.

OTTAWA MFG. CO. 519 King Street, OTTAWA, KANS.

Campbell Iron Company

WHOLESALE SUPPLIES

Still carry a complete stock of Wagon, Blacksmith Materials, Farrier Supplies, as well as Tools, Hardware Specialties and Duplicate Parts for Fords. *Write for General Catalogue.*

817 Cass Avenue **St. Louis, Mo.**

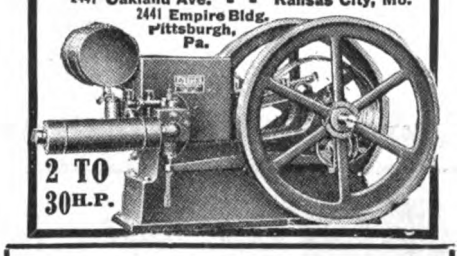
Get a WITTE BIG CUT IN ENGINE PRICES



No Cut In Quality

I have made a big smashing reduction in engine prices—for quick shipment—all styles—all sizes—2 to 30 H. P.—Kerosene or Gasoline--Stationary, Portable or Saw-rig --Buy on your own terms. I guarantee safe delivery, make **immediate shipment**---guarantee every part of your engine against defects as long as you use it--no "strings"--no time limit. Write me at once for prices on this special factory direct offer. Book Free.--Ed. H. Witte, Pres.

WITTE ENGINE WORKS
2441 Oakland Ave. - - Kansas City, Mo.
2441 Empire Bldg. Pittsburgh, Pa.



Edwards Shears

For twenty-four years the **Two Leading Low Priced Shears** in the U. S., representing the **Greatest Value** for the **Least Money.**

No. 5, weighs 200 lbs., cuts 4x½ inch soft steel.
No. 10, weighs 430 lbs., cuts 4x¾ inch soft steel.

At their price you should have had one long ago. **Order one** from the first iron man that calls on you. **They All Sell Them.**

Write for descriptive circular and prices.

C. D. EDWARDS MFG. CO.
Albert Lea, Minn.



BICKNELL'S DRILL PRESS VISE



Drill Vise

Holds Rounds, Squares and Flats

Saves its cost every year in drills alone.
Base, bed and jaws fully machined.
Swivels to any position on Drill Table, or can be used as a Bench Vise.

For sale by the jobbing trade.
Write for circular.

BICKNELL MFG. & SUPPLY CO., JANESVILLE, WIS.

THE ARMSTRONG MFG. COMPANY

BRIDGEPORT CONN., U.S.A. **NEW YORK OFFICE 248 CANAL STREET**

like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



"Makers of the Genuine ARMSTRONG Stocks and Dies."

ROBERGE'S GREAT BOOK

"THE FOOT OF THE HORSE"
By DAVID ROBERGE

The author of this book for many years enjoyed the entire confidence of Robert Bonner, who, in his day, owned many of the fastest trotters the world has ever seen. Bonner and Roberge worked together in shoeing the former's horses. Many believe that David Roberge was the ablest horseshoer this country has ever seen. His book is filled with plates and illustrations showing proper methods of shoeing horses for every kind of lameness. We have sold large numbers of these books and they have always given entire satisfaction. The work represents the life experience of its author. Sent to any address, postage prepaid, on receipt of price, **$5.00.** Address
M. T. RICHARDSON CO., Publishers, 71-73 Murray Street, New York.

WELDING PLANTS, $25.00 to $300.00

Designed for all purposes. Small cash payment; balance, three to six months. Every mechanic and shop should have one.

BERTSCHY-BERMO CO. **OMAHA, U. S. A.**

Advertising Rates in The Blacksmith and Wheelwright made known on application.

PARKS WAGON SHOP SPECIAL



You may think you don't need this practical woodworker in your shop. Take advantage of our trial offer, and be convinced how much it will save you. **Machines sent on trial anywhere in United States and Canada.**

Machine is a combination of Circular, Rip and Cross Cut Saws,
22" Band Saw,
12" Jointer,
Rim Rounder,
Felloe Borer,
Spoke Tenoner,

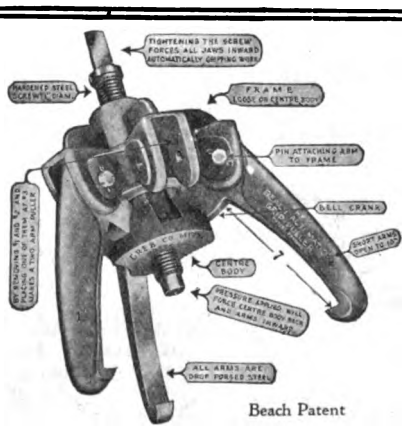
All ready for instant use. No Changing.

Light size takes 2 to 3 H. P., heavy size 3 to 4 H. P.

Write for catalog and full information about how a woodworker should be arranged to be convenient to operate.

Parks Ball Bearing Machine Co.
North Side Station
Cincinnati, O.

GREB AUTOMATIC GRIP PULLER



Beach Patent

Make Your Gear and Wheel Pulling Show a Profit.

A Powerful automatic one-man Puller, which adjusts to work instantly. Combination of two or three arms. Two complete sets of three arms.

Senior Size for heavy work, Capacity 1 to 18 in.
Junior Size for small work, Capacity 1 to 7 in.

Ten Days' Trial

If your jobber does not have them, we will send you one. Try it ten days. If not satisfactory, return it to us and we will refund your money.

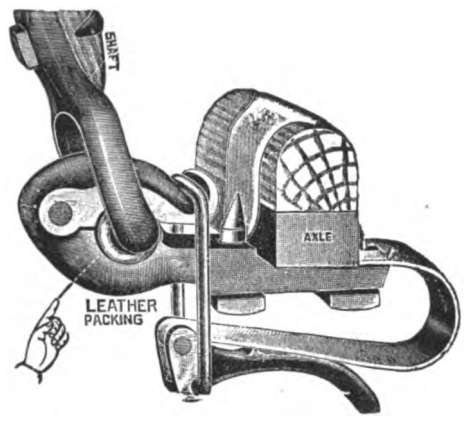
We also make the Greb Rim Tool and Grebford Extension.

10 DAYS TRIAL

THE GREB COMPANY, 219 State St., Boston, Mass.

Digitized by Google

BRADLEY

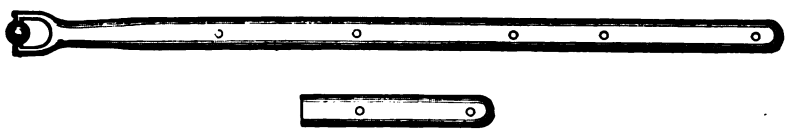


Ball-Bearing

Carriage Couplers and Long Shaft Irons

BEAR IN MIND

That we furnish both "Ball Bearing" and "Holdfast" in short or stub lengths and in full length Shaft Irons to your pattern.



These are made from Round Bevel Edge Steel, 1-1/8x9/32 inches or 1-1/8x5/16 inches. Any length desired—T pieces welded or not. Irons punched and bent to pattern.

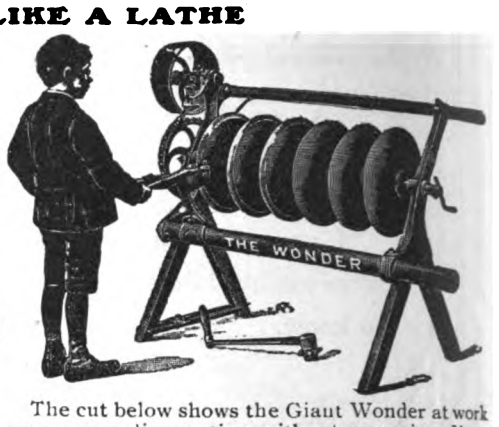
Let Us Quote You on Your Requirements

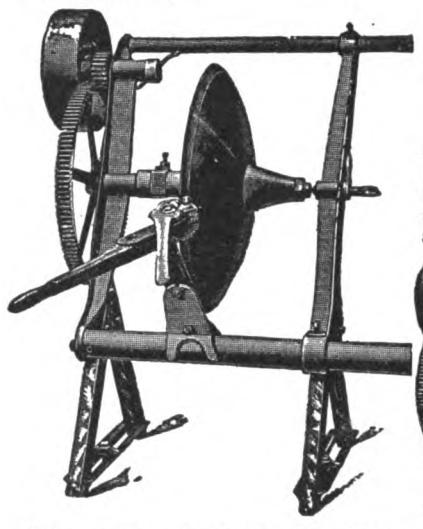
C. C. BRADLEY & SON, Inc.
SYRACUSE, N. Y.

THE WONDER DISC SHARPENERS

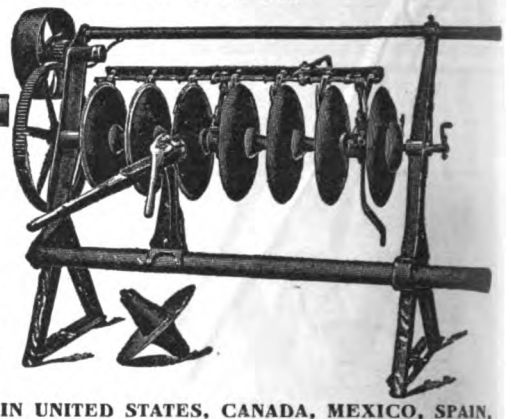
BUILT LIKE A LATHE

This cut shows the Little Wonder at work on a whole section of discs. This machine is especially adapted for sharpening disc harrows. While the Little Wonder is being successfully used to sharpen plow discs of 22 inches or less, we would recommend the Giant Wonder where disc plows are used extensively.





The cut below shows the Giant Wonder at work on a seven-disc section without removing discs, thereby saving one-half the time and labor, as in many cases you can sharpen a whole section of discs while your competitor is taking his off the shaft the old fashioned way.



The above cut shows the Giant Wonder at work on disc plows. Will sharpen any size from 12 to 32 inches in diameter.

FOR SALE BY LEADING JOBBERS IN UNITED STATES, CANADA, MEXICO, SPAIN, AUSTRALIA, ARGENTINE REPUBLIC, SOUTH AFRICA AND FIJI ISLANDS.

A. E. DURNER, Manufacturer
EVANSVILLE, WIS., and BRANDON, MAN., CAN.

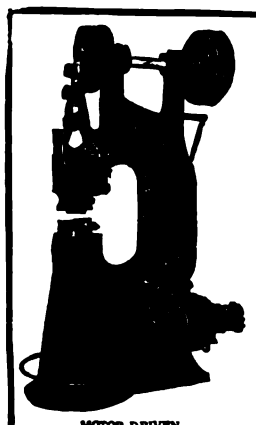
ADDRESS ALL INQUIRIES TO

A. E. DURNER; Head Office, Evansville, Wis.

Both size machines are equipped regular, long enough to take in 8 disc section. Special length furnished for 10 and 12 disc section at small cost.

I hold the original patent on this style sharpener I could build them cheaper, but I won't. I would build them better, but I can't. Write for testimonials from your neighbor. Did you ever buy a cheap machine that gave satisfaction?

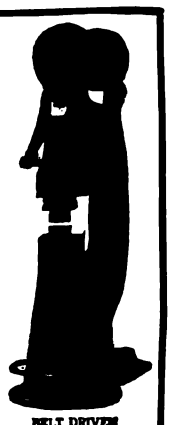
THINK ABOUT IT, THEN BUY A WONDER.


MOTOR DRIVEN

Little Giant Power Hammers

25, 50, 100, 250 and 500 lb. Models.

BELT OR MOTOR DRIVEN.


BELT DRIVEN

The Boys in Khaki and Sailor Blue Will Be the Farmers of the Future.

Their war equipment has been the most modern, and when they return home the old out-of-date methods will no longer satisfy them.

They will insist on their farm equipment being kept in first class repair and they will take their work to the blacksmith who has up-to-date shop equipment.

No blacksmith shop is modern unless it has a Little Giant Power Hammer. Either of our models will pay for itself in a few months on our easy payment terms, and continue to repay for itself for many years after.

The first Little Giant Power Hammer made 26 years ago and every one since sold,—some 8,000 in all,—are still in use. There is no wear-out to them.

Average annual repair sales on all Little Giant Power Hammers in use, large and small, from oldest to latest, is 48¢ each or less than 2/5 of 1% of original cost to user.

Any Belt Driven Little Giant Power Hammer can be quickly changed to a Motor Driven Outfit. Ask your power plant superintendent for current, voltage, phase and cycles of motor required. Send this information to us and we will quote prices.

Little Giant Power Hammers are guaranteed FOREVER against defective material and workmanship, and are shipped on 30 days' trial.

Write Your Jobber, or Direct To Us

Little Giant Company, Established 1876.

103 Rock Street, MANKATO, MINN., U. S. A.

DON'T TAKE A BACK SEAT

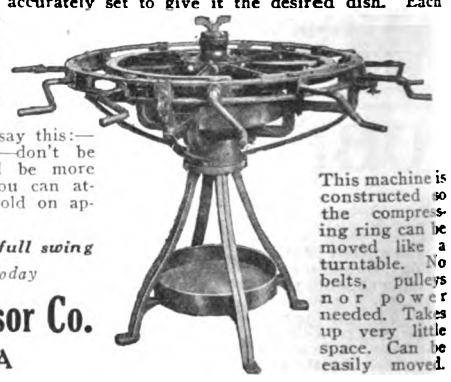
FOR ANYBODY!—GET THIS MONEY MAKER

UNIVERSAL WHEEL COMPRESSOR

The primary objects of this invention are to provide a mechanism which is adjustable for all types of auto and truck wheels, and is so constructed that repair work may be done speedily and with ease. The wheel can be accurately set to give it the desired dish. Each spoke can be pressed individually, and rim can be pressed on in a few minutes without use of ordinary clamps, which cause a lot of trouble and loss of time.

Wheels of any size can be repaired. Wire wheels can be trued up and new spokes put in them as well as in wooden wheels.

First, last and all the time we want to say this:—Just put the Compressor in your shop—don't be afraid you won't do business—there will be more business this Spring and Summer than you can attend to. Don't hold back—machines are sold on approval—that's proof enough.



This machine is constructed so the compressing ring can be moved like a turntable. No belts, pulleys nor power needed. Takes up very little space. Can be easily moved.

Hurry—the big season's now getting in full swing

Don't Put it Off—Write to Us Today

Universal Wheel Compressor Co.
CEDAR RAPIDS, IOWA

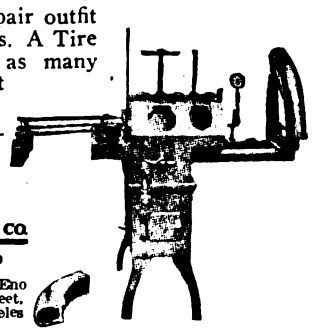
Make Auto Profits

Blacksmith Shops should make profits from the millions of automobiles that ply our highways and streets.

The demand for tire repairing and tire retreading is enormous. The high price of tires is increasing the demand for repairing every day—and the profits in this work is far greater than horseshoeing profits ever were

Every blacksmith shop should have a tire repair outfit for casing and inner tube punctures and blow-outs. A Tire Retreading Outfit is also a good investment, as many motorists who have worn out their tires want new treads put on.

We make a complete line of tire repair equipment. Write in for full particulars.



Send Coupon for Free Booklet

B&W

Please send free booklet.

Name.....

Address.....

THE AKRON RUBBER MOLD & MACHINE CO.
937 Sweitzer Ave., Akron, Ohio

Pacific Coast Distributors: Geo. W. Eno Rubber Company, 1159-63 Post Street, San Francisco; 1026 South Los Angeles Street, Los Angeles.

Digitized by Google

The Discovery of Fire Enahled Mankind to Sit Up Late at Night

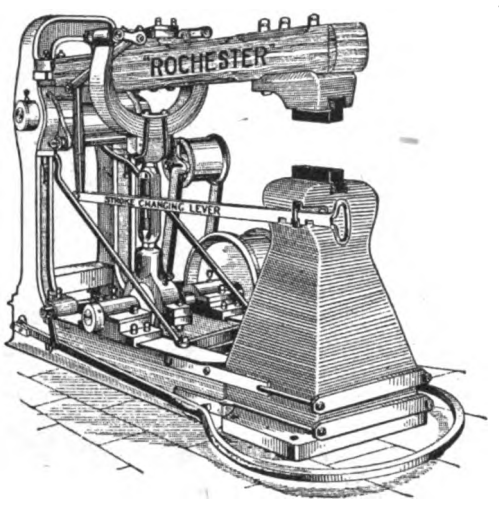
YOUR DISCOVERY
of the Rochester Helve Hammer

Enables Your Mechanics to do Quicker and Superior Work.

Adjustable for length of stroke while running.

Long stroke provides for handling larger work than other hammers of the same head sizes and the springy forging blows delivered by the solid hickory helves combine advantages of forging and drop hammers.

6 SIZES
2 Styles of Frames



Send for the West Tire Setter Book

SEND A CARD TO THIS ADDRESS FOR OUR CATALOGUE AND PRICES

WEST TIRE SETTER CO.
ROCHESTER, NEW YORK



Free 448 PAGES OF BARGAINS
POST PAID

WE WANT TO SEND YOU THIS 448 PAGE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

Tells how you can work up a profitable auto supply and repair business.

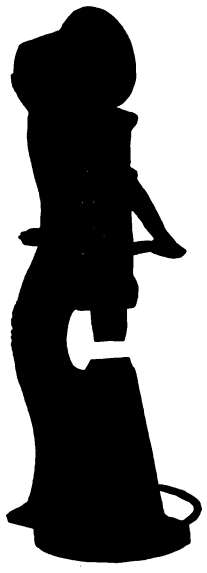
Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories
1117 W. 11th Street, Cleveland, Ohio, U. S. A.

The Perfect Power Hammer



Note the difference in construction over other makes:

Extra Long Guides, insuring a direct movement of the ram without any side motion, which causes guides and springs to break on other Hammers.

The only Hammer made with a disk attachment with special anvil for sharpening harrow and plow disks.

A recently invented **Friction Clutch** fitted with **Ball Bearings,** absolutely controls the operation of the Hammer by foot pressure from the lightest tap to the heaviest blow. This ease of operation makes the Hammer particularly well adapted for plow work, as you can get as light a stroke as you desire.

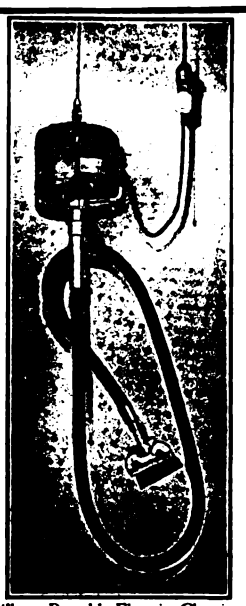
Will ship to any responsible party on approval. If not as represented, no sale.

Made in two sizes:

3 inch square, 40 lb. ram—shipping weight, 1,150 lbs.
4 " " 80 " " " " 1,800 "

Write any jobber for prices, or

Macgowan & Finigan Cordage Co.,
204 North Third St., ST. LOUIS, MO.



Gillette Portable Electric Clipping, Shearing and Grooming Machine for Direct or Alternating Currents.

"Gillette" Clipping, Grooming and Sheep Shearing Machines

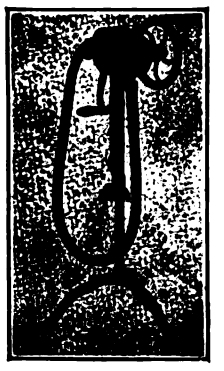
Experience of a quarter-century in making flexible shaft Hand and Power Machines for Clipping Horses, Mules, Dogs, Cows and for shearing Sheep, Etc., has given us an expert knowledge of this art.

"GILLETTE" Clipping machines and parts are guaranteed as to materials and workmanship.

"GILLETTE" cutters are unexcelled and can be used on any stated make of flexible shaft clipping machine. Efficiency is our aim.

Grinding and repairing is our specialty.

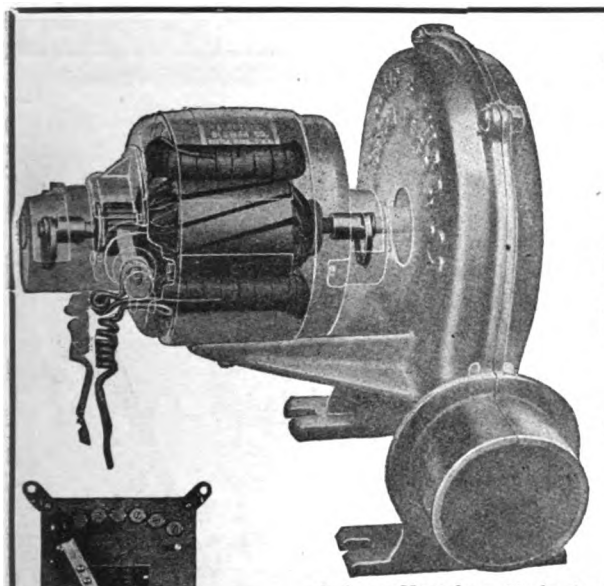
Renewal and repair parts carried on hand.



Gillette Model "1918" Ball Bearing Hand Power Clipping Machine.

Gillette Clipping Machine Co.
129-131 West 31st Street
NEW YORK, N. Y.

Illustrated Price List Free.
Order Direct or Through Your Dealer



"ONE FIRE" MARVEL

A. C. or D. C.
or
UNIVERSAL MOTORS

Extra Large Ring Oil Bearings

Case Hardened Armature Shaft

$38.00 Net

Order a Marvel on 30 days' trial through your Dealer, or your Electric Light Company

Electric Blower Co., 352 Atlantic Avenue BOSTON, MASS.



This Is the No. 88 Wagon Makers's Outfit, 9 In. Jointer Head and 4 In. Pole Rounding Head.

DO IT NOW!

What? Write for 1919 catalogue No. 15, this contains valuable information for the wood worker and illustrates and describes a line of medium priced wood working machines within the reach of the small as well as the large shops.

Complete Jointers, 6 in., 9 in., and 18 in. sizes, heavy iron and steel construction. Quick, easy adjustable features.

Little Shaver 5 in. Bench Jointer. Price only.....**$30.00**

Cutter Heads, circular, square and slotted, for wood frame jointers, prices from **$10.00** up.

Combined outfits, Jointer Head and Saw Arbor all on same shaft. Combined 9 in. Jointer Head and 4 in. Pole rounding head. Also, we make Saw Arbors, Emery Stands, Buffing Stands, Countershafts. Address

W. L. Sherwood **Kirksville, Mo.**

940 Pages instead of 824 — **NINTH EDITION** — 3362 Illustrations instead of 2000

$4.46 prepaid DYKE'S AUTO ENCYCLOPEDIA $4.46 prepaid

Entirely re-written, hundreds of illustrations and many new subjects added. Practically a new book. A non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 50 Instructions—Simplified and Practical.

3362 Illustrations—the kind you understand at a glance.

2 Supplements, part printed in two colors, treating on the construction, operation, repairing and adjusting of the FORD and PACKARD—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.

778 illustrations and 279 pages on Electric Ignition, Electric Starters and Generators, etc.

81 pages and 79 illustrations on the Delco system alone.

60 pages and 254 illustrations on Adjustments, Tests, etc., of leading Electric Systems.

154 pages and 1189 illustrations on Repairing.

Oxy-Acetylene welding. Axle, Differential and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.

27 pages and 180 illustrations on Tires and Tire Repairing.

44 pages and 119 illustrations on Carburetion.

89 pages and 291 illustrations on Engines and Parts.

16 pages on Digest of Troubles.

6000 lines to the Index. This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. Index begins on colored paper, easy to refer to.

Dictionary is also included, which gives the meaning of motoring terms.

Inserts: There are five—printed in colors. New features you never before saw or heard of in one of the inserts.

Additions to the Ninth Edition:
TRUCKS, TRACTORS, MOTORCYCLES, AIRPLANES and LIBERTY ENGINE

HOW TO BECOME AN EXPERT AUTOMOBILE MECHANICIAN

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion subject so thoroughly, you can adjust any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

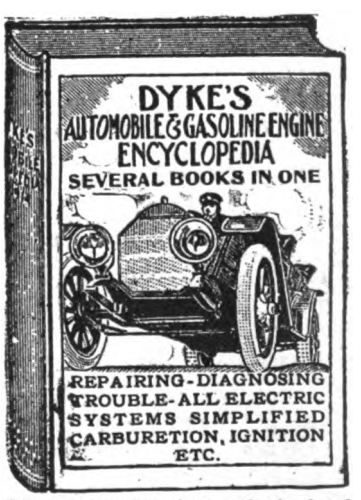
You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical Automobile book in America. Price $4.46, prepaid.

Address all orders to

THE BLACKSMITH & WHEELWRIGHT
73 MURRAY STREET NEW YORK

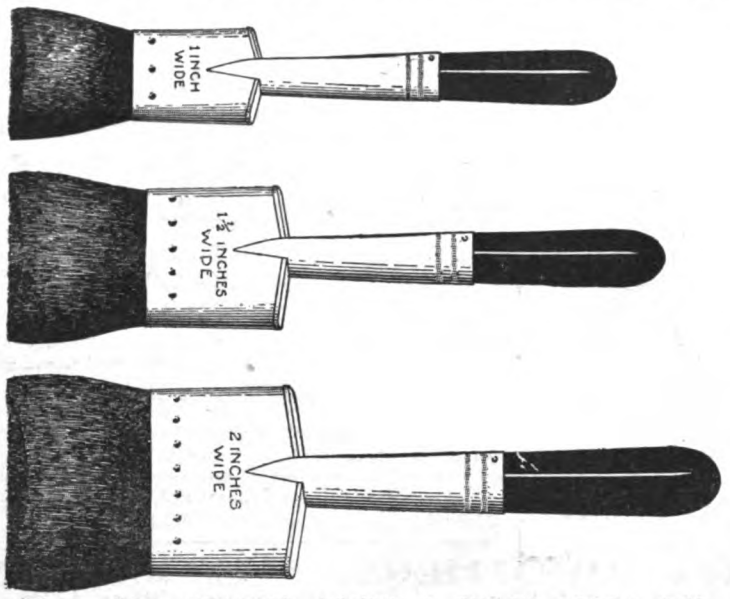


It's worth ten times its cost if only placed on the shelf and used as a reference.

Digitized by Google

IMPORTANT POINTS ABOUT PAINT AND VARNISH BRUSHES

A Set of Three Brushes and the Blacksmith and Wheelwright for One Year for $2.00.



Showing Brushes One-Half Actual Size.

Did it ever occur to you that there was much difference between a good paint or varnish brush and a poor one? Probably not. To most people a brush is just a brush. Yet an analysis shows that there is an almost measureless difference between a good brush and poor one.

For instance, a properly made Flowing Fitch brush is hermetically sealed, so as to keep the paint, or whatever may be used, from getting into the brush at the top and loosening the hairs. All such properly made brushes are solidly set in glue cement inside a leak-proof ferrule, and a whole row of neatly clinched nails are driven in at the end of the ferrule to give added security, and a guarantee that the hairs will not pull out.

A Fitch brush is *smooth, soft,* and *flowing,* and does not "mush" up or get flabby like a cheap brush, but holds its springiness. The trouble with cheap brushes is that the ferrule is nothing more than a single band of tin, open at the top, with a couple of nails jabbed through. When you use such a brush the cheap hair will pull out and scatter all over your work, because it is not held securely enough to stand the drag of the brush in painting or varnishing.

A brush may be washed with gasoline or kerosene oil, but to clean it thoroughly turpentine should be used. No brush used for painting should be used for varnishing.

We have recently made arrangements with one of the best manufacturers of these properly made brushes in New York to offer a set of Three in connection with a subscription to the BLACKSMITH AND WHEELWRIGHT for a year **for an even $2.00.** These brushes sell at retail for **$1.40.** It will be seen, therefore, that there is a substantial advantage in sending to us for the BLACKSMITH AND WHEELWRIGHT for a year, and for a set of these brushes.

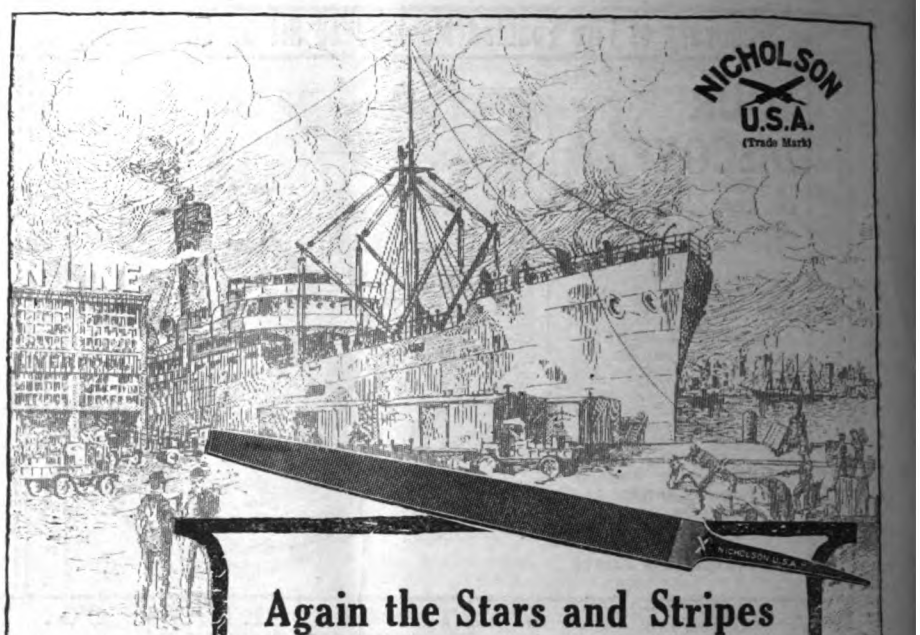
Present subscribers can have their subscriptions extended for a year, and secure a set of brushes, on the same terms. These brushes are guaranteed in every respect, and though they cost more than cheap brushes would cost, they are far cheaper in the end, because of their lasting qualities and the good work that can be done with them. No man can afford to waste expensive paint and varnish on any vehicle by using a cheap and poorly constructed brush, such as is usually to be found wherever brushes are sold. The ordinary dealer in brushes himself as a rule has very little knowledge of the quality of the brushes he sells.

Remit by check or money order, and your name will be entered as a subscriber to the BLACKSMITH AND WHEELWRIGHT for a year, and a set of these brushes, which are just the right size and shape (see illustration, which is exactly one-half the actual size of the brushes), will be sent to you, postage prepaid.

Address all orders to the

M. T. RICHARDSON COMPANY, Publishers

71-73 MURRAY STREET, NEW YORK



Again the Stars and Stripes shall Appear on Seven Seas

The NICHOLSON FILE COMPANY, file makers of the world, was born as the wastage of civil strife rang the death knell of Young America's sailing fleet. Through the lapse of fruitful years, this House has grown. And now

Nicholson Files

are helping to speed a new American Merchant Marine down hundreds of busy ways — ships of steel to carry America's goods and the American Flag into far-flung ports of trade—the FILES that CUT the FASTEST and SMOOTHEST.



Write for our catalogue and for File Filosophy—a fifty years' education in Files and Filing in an hour's reading.

NICHOLSON FILE COMPANY

Providence, R. I.

U. S. A.

THE SCREW-CUTTING LATHE

How to select, set up, adjust and operate

By JAMES F. HOBART, M. E.

THIS book is a concise and exhaustive treatise on everything pertaining to the SCREW-CUTTING LATHE, including costs, erection, operation and adaptability. It is written by one who thoroughly understands his subject in all its details, and is so copiously illustrated that everything in it will be readily understood.

It will be found invaluable to those desiring to know just how a Screw-Cutting Lathe should be run.

There are ***92 illustrations,*** and the book is substantially bound in cloth. ***Price, $2.00.*** A copy will be sent postage prepaid to any address on receipt of price.

M. T. RICHARDSON CO.

PUBLISHERS

71-73 Murray St., New York

PEXTO

BLACKSMITHS' TOOLS

Built to Bite

Here's a real Nipper—PEXTO No. 22, with wide, powerful jaws and clean-cutting edges. With heavy shoulders and a husky rivet. A Nipper forged from finest steel by America's century-old tool maker.

You'll find Pexto Quality in all the other Pexto Blacksmiths' and Farriers' Tools. Ask your dealer.



The Peck, Stow & Wilcox Co.

Mfrs. Mechanics' Hand Tools, Tinsmiths' and Sheet Metal Workers' Tools and Machines, Builders' and General Hardware.

Southington, Conn. Cleveland O.

Address correspondence to 209 W. Center St., Southington, Ct.

100% American For 100 Years

(Founded 1819)

Digitized by Google

THE NEW YORK PUBLIC LIBRARY

ESTABLISHED 1880

The Pioneer Journal of its Class

THE BLACKSMITH & WHEELWRIGHT

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U. S. Patent Office.

Entered as Second-class Matter March 4, 1880, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Published Monthly.

Vol. LXXIX. No. 6 NEW YORK, JUNE, 1919 TERMS: One Dollar a Year. Foreign, $1.50. (6s. 3d.)

The Nail Which Leads in Quality—

in service—in volume of sales. The nail which drives easiest, holds best, is the safest and yields most for the money invested —THE CAPEWELL.



Horseshoers find it more satisfactory to themselves and their customers to use Capewell nails.

Consequently, the vast majority of shoers in this Country use this brand, and have done so for years.

The nail which is most perfect in form and finest in finish—"The Capewell" appeals to the expert everywhere.

Not the cheapest nail regardless of quality but the world's best nail at a fair price.

The Capewell Horse Nail Co.

HARTFORD, CONN., U. S. A.

Largest Makers of Horse Nails in the World



CHASE DREDNAUT Motor Topping

"Defies Time and the Elements"

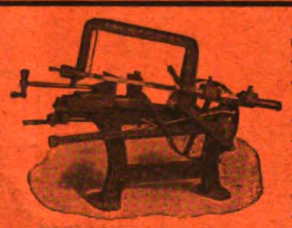
Write for Particulars — L. C. CHASE & CO., BOSTON — NEW YORK DETROIT SAN FRANCISCO CHICAGO — Write for Samples



SUREGRIP CALKS

American Calk Co.

DETROIT, - - - MICH.



Saw Those HeavyBars ON A MARVEL Power Hack Saw

Machine stops when work is cut off. Requires very little power.

Price is Low. Write Us.

Ask for reply by return mail.

ARMSTRONG-BLUM MFG. CO.

340 N. Francisco Ave., Chicago, Ill., U. S. A.

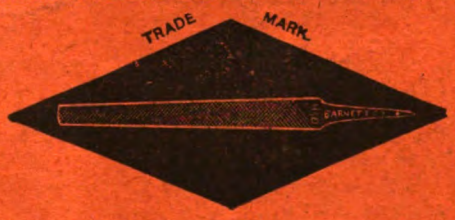
THE TEETH IN

BLACK DIAMOND RASPS

ARE MINGLED

So as to Cut Clean and Free and Leave no Furrows in the Work

Twelve Medals of Award by Jurors



At International Expositions

C. & H. BARNETT COMPANY

Black Diamond File Works, PHILADELPHIA, PA.

Owned and Operated by NICHOLSON FILE CO.

Copy of Catalog sent Free to any interested file users upon application.



Auto Heel Rest

Made in 4 Sizes of Frosted Aluminum ½ in., 1 in., 1½ in., 2 in. Ask your Dealer, or sent post paid, 75c.

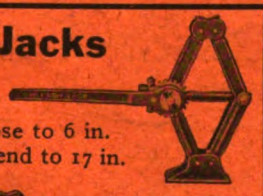
The "Ford" Heel Rest

Size, 7½ x 4½ x ¼ Made of frosted aluminum, used on mat or floor board. Sold by all dealers, or sent post-paid, $1.00.

Made only by J. L. LUCAS & SON, Inc. Bridgeport, Conn.

Hi-Lo-Jacks

Six Sizes



Close to 6 in. Extend to 17 in.



Capacities ½ to 12 tons

Made by

The RoweCalk & Chain Co.

Plantsville, Conn.

AETNA STEEL TOE CALKS

Made by THE AETNA NUT CO., Southington, Conn.

BLACK HORSE BRAND

BEST SHAPE
BEST SPUR
TO DRIVE
BEST STEEL



TOE AND HEEL CALKS

SOLD BY ALL DEALERS

Stokes Bros.' Improved Horse Rasps

Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A

The Campbell Iron Company

WHOLESALE SUPPLIES

Still carry a stock of Wagon, Blacksmith Materials, Farrier Supplies, as well as Tools, Hardware Specialties and Duplicate Parts for Fords.

Write for General Catalogue.

817 Cass Avenue St. Louis, Mo.

STEEL STAMPS

BURNING BRANDS
RUBBER STAMPS
STENCILS

GEO. M. NESS, JR.

61 FULTON ST. NEW YORK

Send for price list.

Digitized by Google

IF YOU SEE THE Ⓐ THE SHOE'S O. K.



There is a distinctiveness about

AMERICAN HORSE and MULE SHOES

that sets them above the ordinary. It is embodied in the shoes —not merely in words.

We have steadfastly adhered to an ideal which subordinates everything to the prime question of QUALITY. With this spirit guiding the work of every member of our organization, it is but a natural sequence that our product has taken first place in the line.

It is our faith in the inherent desire of the Blacksmith to have the best—the very best, that is responsible for American Horse Shoe superiority.

Blacksmiths today base their selection on such definite knowledge as this:

The heels of all horse shoes, unless upset with a good deal of extra work, have generally been too light for hard usage. We have solved this problem by rolling a heavy Heel on all American A shoes.

The weight is the same as before; exactly the same number of shoes to the keg; only, by our exclusive patented process, we put the extra metal where it is most needed.

The "A" Heavy Heel is not only an improvement—it is an idea that expresses the fact that "service is built in."

We would rather you had two catalogs than only one placed where you can't find it. Write for another.

AMERICAN HORSE SHOE COMPANY

Rolling Mills, Works and Offices

PHILLIPSBURGH - NEW JERSEY

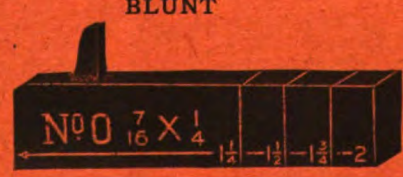
American Toe and Heel Calks

Ⓐ

Trade Mark stamped on each shoe

American Toe and Heel Calks will stand the keenest competition and reveal the fact that they are MORE than "Just a little better." We want you to prove it—Send for the catalogue.

BLUNT



BLUNT



COUNTRY PATTERN
Half Sharp



Ⓐ

Red A on each keg and box

Digitized by Google

"F-S" PAINTS



"F-S" Products Stand the Most Rigid Inspection.

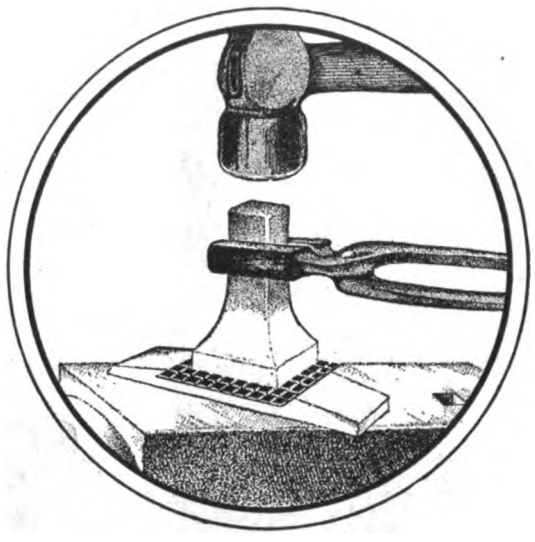
Your good work will stand even higher at inspection when you use "F-S" Superfine Coach Colors on your carriage, coach and automobile bodies. The best of material is used as in all "F-S" products—ground in gold-size Japan.

FELTON, SIBLEY & CO., Inc.

Manufacturers of Colors, Paints, Varnishes since 1863

136-140 North Fourth Street, Philadelphia

(147)



LAFFITTE WELDING PLATES

Our product is to-day an economical necessity in every well regulated shop, and are used in every part of the civilized world.

Let us send you samples, and try them out, there are endless economies you can effect, the cost is insignificant compared with the results.

Dealers throughout the country carry LAFFITTE in stock, if yours does not, let us know, he soon will.

Laffitte has had many imitators, but never a competitor.

The Phillips-Laffitte Company

Pennsylvania Building **Philadelphia, Pa.**

YOU CAN WELD STEEL AS EASILY AS IRON



Especially adapted for welding tires, axles, springs and all lap welding.

Either of these compounds will weld steel at the lowest possible heat that steel can be welded. Also protects steel at high heat.

Owing to our improved process of manufacturing, these compounds do not boil off and waste in the fire but adhere to the metal when applied.

FOR SALE BY ALL LEADING DEALERS IN BLACKSMITH SUPPLIES IN UNITED STATES AND CANADA

Large Free Samples Sent upon Request

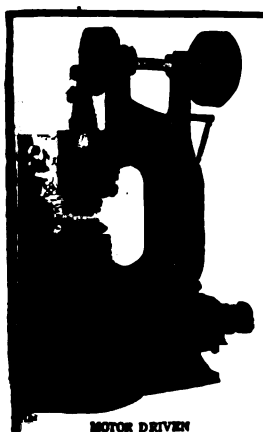
CORTLAND WELDING COMPOUND CO.

CORTLAND, N. Y.



PREPARED ESPECIALLY FOR WELDING
FAR SUPERIOR TO COMMON BORAX

A flux which causes the steel to weld like iron. Not necessary to apply between the lap, but may be applied to the outer surface of the work, the same as borax. Has no equal for plow work. Just the thing for welding toe-calks so they can't knock off.



MOTOR DRIVEN

Little Giant Power Hammers

25, 50, 100, 250 and 500 lb. Models.

BELT OR MOTOR DRIVEN.

The Boys in Khaki and Sailor Blue Will Be the Farmers of the Future.

Their war equipment has been the most modern, and when they return home the old out-of-date methods will no longer satisfy them.

They will insist on their farm equipment being kept in first class repair and they will take their work to the blacksmith who has up-to-date shop equipment.

No blacksmith shop is modern unless it has a Little Giant Power Hammer. Either of our models will pay for itself in a few months on our easy payment terms, and continue to repay for itself for many years after.



BELT DRIVEN

The first Little Giant Power Hammer made 26 years ago and every one since sold,—some 8,000 in all,—are still in use. There is no wear-out to them.

Average annual repair sales on all Little Giant Power Hammers in use, large and small, from oldest to latest, is 48¢ each or less than 2/5 of 1% of original cost to user.

Any Belt Driven Little Giant Power Hammer can be quickly changed to a Motor Driven Outfit. Ask your power plant superintendent for current, voltage, phase and cycles of motor required. Send this information to us and we will quote prices.

Little Giant Power Hammers are guaranteed FOREVER against defective material and workmanship, and are shipped on 30 days' trial.

Write Your Jobber, or Direct To Us

Little Giant Company, **103 Rock Street,**

Established 1876. MANKATO, MINN., U. S. A.



NEW ERA "Better" Springs Stop Breakage

THE reason is: Scientific control of heat treatment, under a new method that tempers the leaves evenly over their entire length, provides greater strength with resiliency.

New Era "Better" Springs are graphited between the leaves for two years lubrication—they never squeak—they last long—they fit closely. They are guaranteed against sagging or breakage. They are priced low—offered to dealers at a good discount—sell readily, because they so surely satisfy.

For eight years they have made good on cars of all makes. Order direct through your jobber.

"BETTER" SPRING BUMPERS—STRAPLESS TIRE CARRIERS

All trade satisfying—May we inform you farther?

NEW ERA SPRING & SPECIALTY CO.

1111 Hamilton Ave. Grand Rapids, Mich.

Digitized by Google

JUSTRITE

PLOW BLADE SHARPENER

First Class, Quick, Up-to-the-Minute Service

That's what folks want now-a-days.
You'll find all the old style methods fast going to the junk heap out in the back yard.
Life is too short to hand-hammer and power-hammer your sharpening jobs.
For smashing big profits—quickly made—JUSTRITE will give you the money winning surprise of your life.

The plow lay is simply worked back and forth across the Justrite anvil and the roller AUTOMATICALLY works the blade down to a clean, sharp, smooth edge—without battering or nicks. This ROLL is what makes the Justrite the most modern and the most profitable method of sharpening implements.

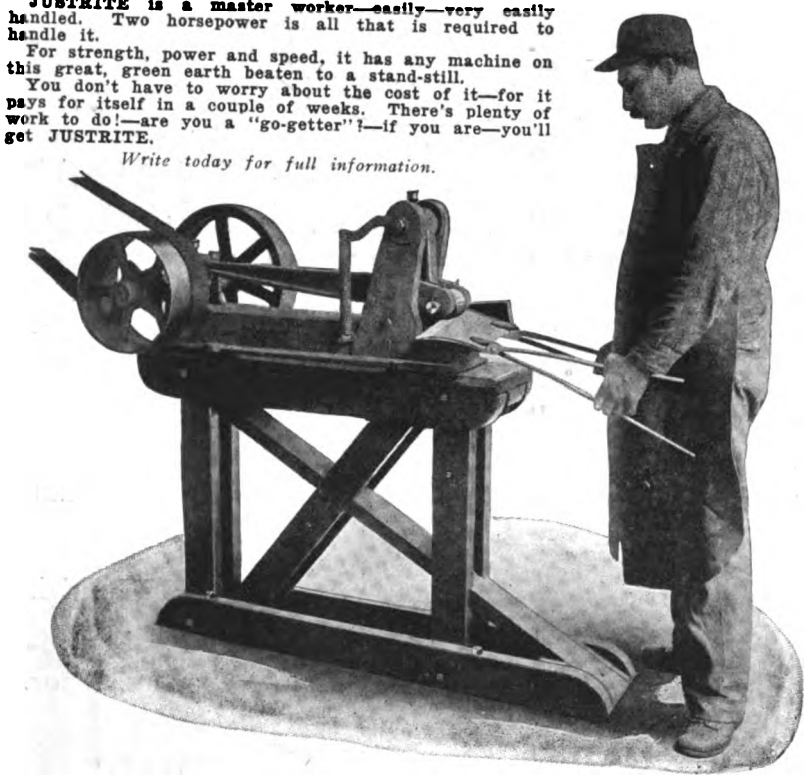
Its scoop is broad and it handles plow blades, road scrapers, drag teeth, drill shoes, cultivator shovels, corn knives—in fact, anything needing to be drawn down to a fine, clean edge.

JUSTRITE is a master worker—easily—very easily handled. Two horsepower is all that is required to handle it.

For strength, power and speed, it has any machine on this great, green earth beaten to a stand-still.

You don't have to worry about the cost of it—for it pays for itself in a couple of weeks. There's plenty of work to do!—are you a "go-getter"?—if you are—you'll get JUSTRITE.

Write today for full information.



STRITE GOVERNOR PULLEY COMPANY
307-309 SOUTH THIRD STREET MINNEAPOLIS, MINNESOTA

H-B Tempering Process

Hits the nail on the head, where practically all Blacksmiths fall down,—Tempering of Steel.

Write for particulars. We can convince you.

You cannot afford to be without this invention. Once tried, always used.

Manufactured by the
H-B TEMPERING PROCESS CO.
CLEARBROOK, MINN.

"It's a Kerrihard"

—nothing more need be said.

Every shop man knows you have chosen wisely—that the Kerrihard is the master of any hammering situation. It will make and hold friends for you by always returning greater service than is expected for the expenditure.



THE KERRIHARD POWER HAMMER

does the work of four men.

Write for full particulars.

THE KERRIHARD CO., Kerrihard Sta., Red Oak, Ia., U.S.A.

Columbus, Ohio.

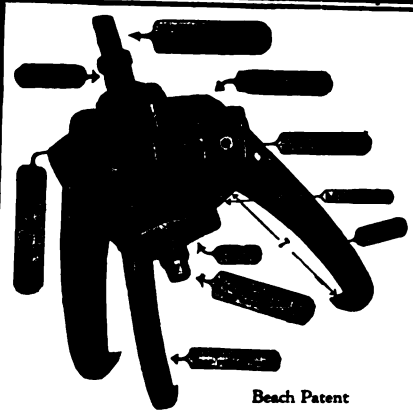
Mr. Smith,
Everywhere.

If you will watch this space, we will tell you some mighty interesting things, facts you will want to know.

Yours truly,

THE COLUMBUS ANVIL & FORGING CO.

GREB AUTOMATIC GRIP PULLER



Beach Patent

Make Your Gear and Wheel Pulling Show a Profit.

A Powerful automatic one-man Puller, which adjusts to work instantly. Combination of two or three arms. Two complete sets of three arms.

Senior Size for heavy work, Capacity 1 to 18 in.
Junior Size for small work, Capacity 1 to 7 in.

Ten Days' Trial

If your jobber does not have them, we will send you one. Try it ten days. If not satisfactory, return it to us and we will refund your money.

We also make the Greb Rim Tool and Grebford Extension.

10 DAYS TRIAL

THE GREB COMPANY, 219 State St., Boston, Mass.

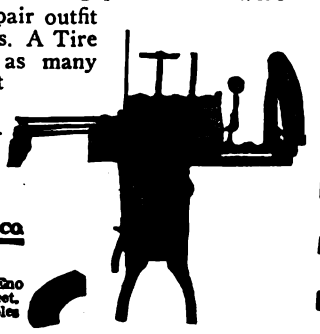
Make Auto Profits

Blacksmith Shops should make profits from the millions of automobiles that ply our highways and streets.

The demand for tire repairing and tire retreading is enormous. The high price of tires is increasing the demand for repairing every day—and the profits in this work is far greater than horseshoeing profits ever were.

Every blacksmith shop should have a tire repair outfit for casing and inner tube punctures and blow-outs. A Tire Retreading Outfit is also a good investment, as many motorists who have worn out their tires want new treads put on.

We make a complete line of tire repair equipment. Write in for full particulars.



B&W

Please send free booklet.

Name.....

Address.....

Send Coupon for Free Booklet

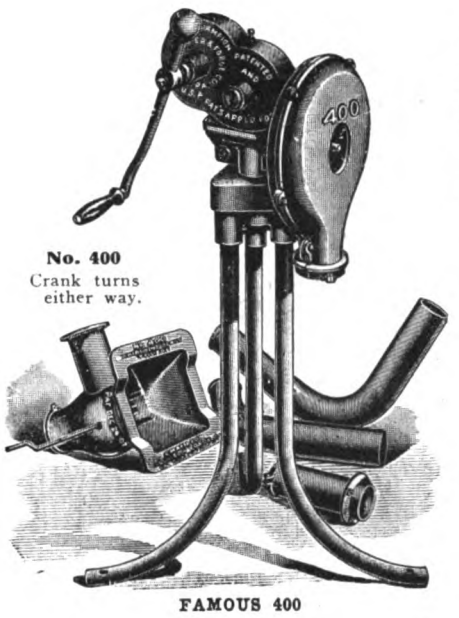
THE AKRON RUBBER MOLD & MACHINE CO.
937 Sweitzer Ave., Akron, Ohio

Pacific Coast Distributors: Geo. W. Eno Rubber Company, 1159-63 Post Street, San Francisco; 1026 South Los Angeles Street, Los Angeles.

Digitized by Google

WORK WITH THE FAMOUS CHAMPION BLACKSMITH TOOLS



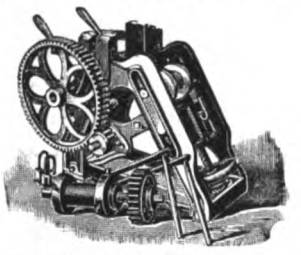


No. 400
Crank turns either way.

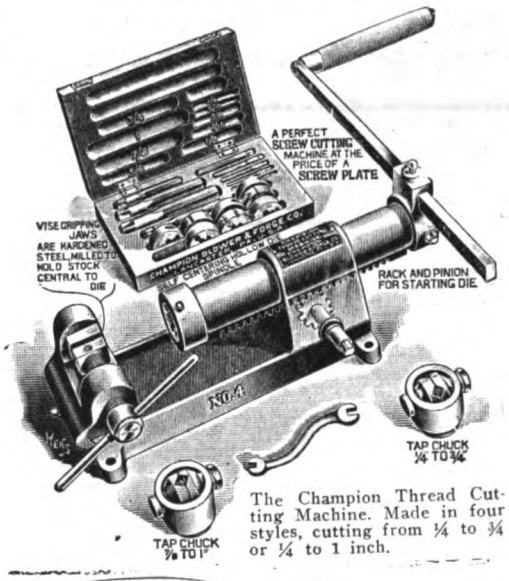
FAMOUS 400

Don't Fail to Get Our 1918 Catalog

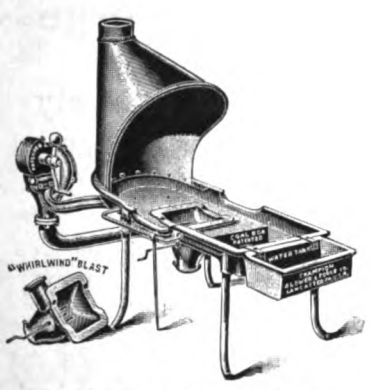
Before purchasing a Hand Blower Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



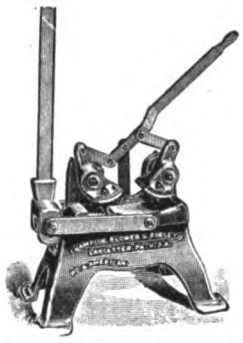
The Champion "Columbian" Tire Bender. Made in 3 sizes.



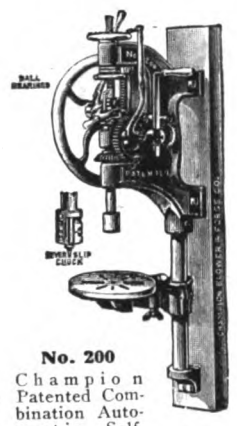
The Champion Thread Cutting Machine. Made in four styles, cutting from ¼ to ¾ or ¼ to 1 inch.



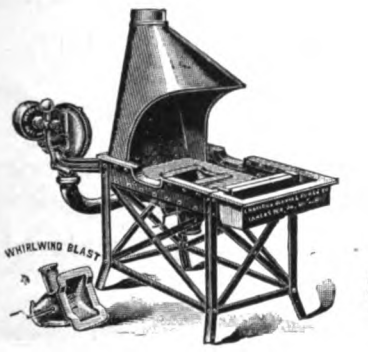
No. 433. Cast Iron Blacksmith's Forge.



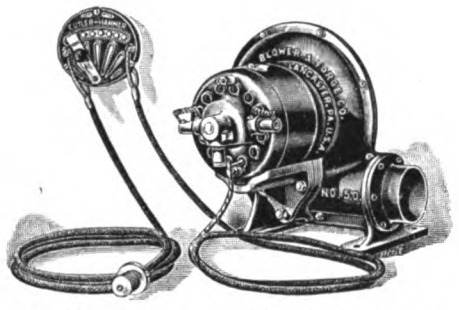
No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



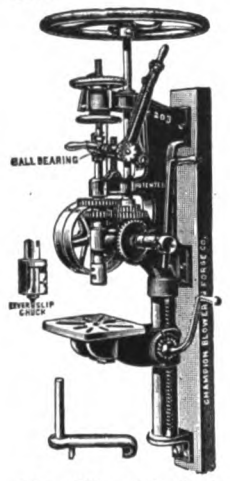
No. 200
Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



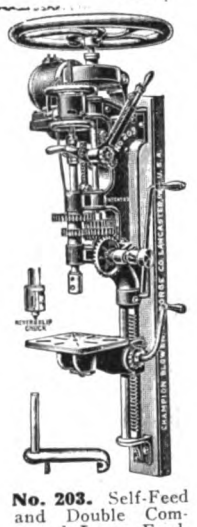
No. 408. Steel Blacksmith's Forge.



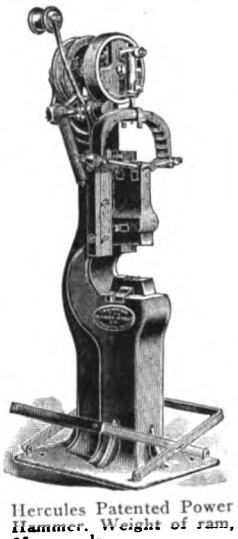
No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower.



No. 203. Self-Feed and Double Compound Lever Feed Drill.



No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.



Hercules Patented Power Hammer. Weight of ram, 65 pounds.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

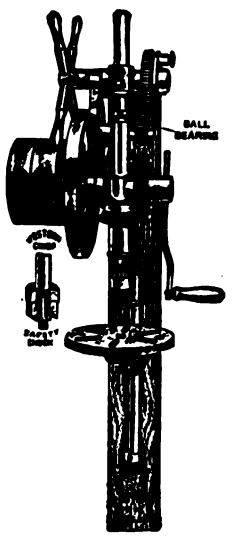
Digitized by Google

The Better Your Equipment The Bigger Your Profits

Buy CANEDY-OTTO

AND INCREASE YOUR INCOME

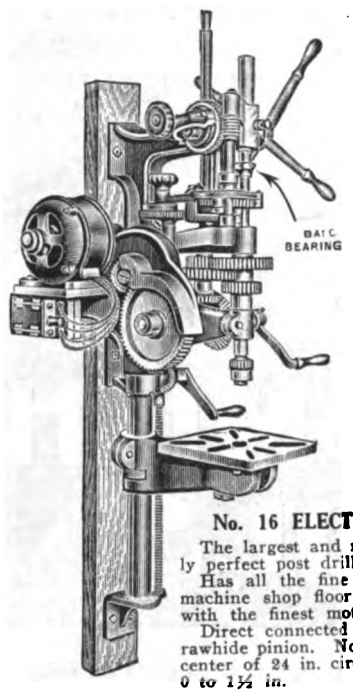
Once Tried, Always Used : There's a Reason—Quality



No. 19 DRILL

A low-priced combined hand and power self-feed drill.

Drills to center of 16½ in. circle.



No. 16 ELECTRIC DRILL

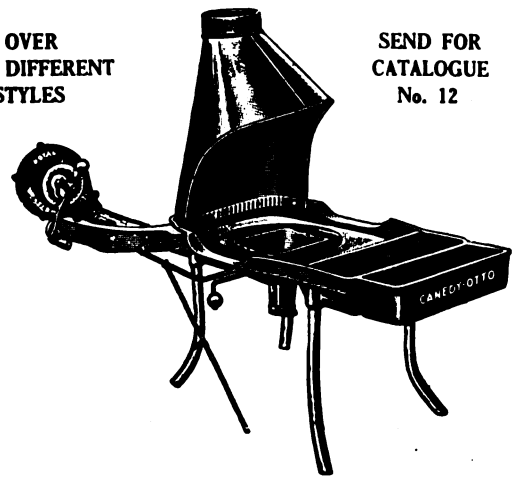
The largest and most mechanically perfect post drill manufactured.

Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.

Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1½ in.

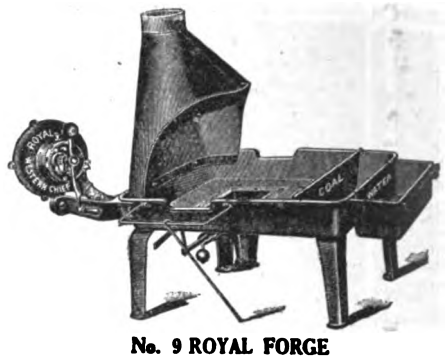
OVER 200 DIFFERENT STYLES

SEND FOR CATALOGUE No. 12



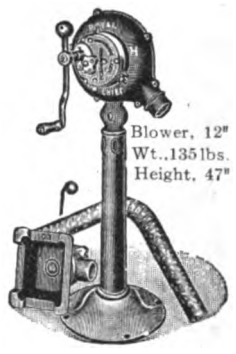
No. 100 ROYAL FORGE

The most popular forge ever made.
Fan, 12 in. Hearth, 31½x46½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x50 in. Blower, 12 in.



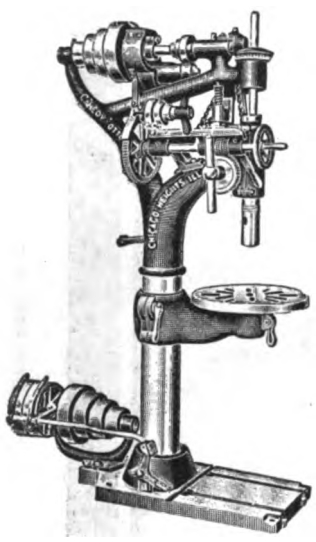
Blower, 12"
Wt., 135 lbs.
Height, 47"

ROYAL BLOWER

(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.

Fire pot is 8x9 in. inside.



No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.

All machines are tested before leaving the factory, and guaranteed in every respect.

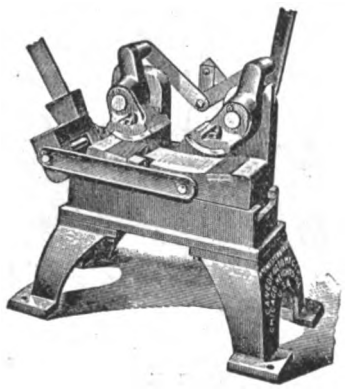
Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

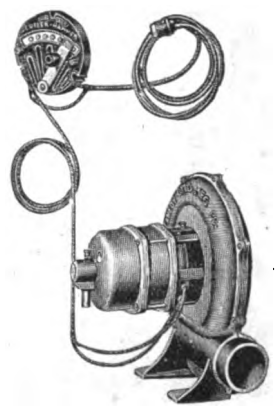
Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS



No. 1½ SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



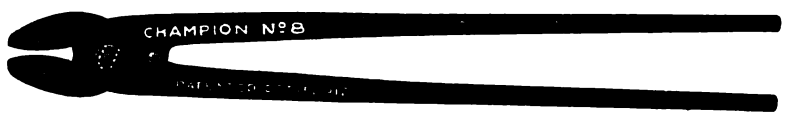
No. 8 ELECTRIC BLOWER

The best outfit money can buy.

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge

Nothing to get out of order.



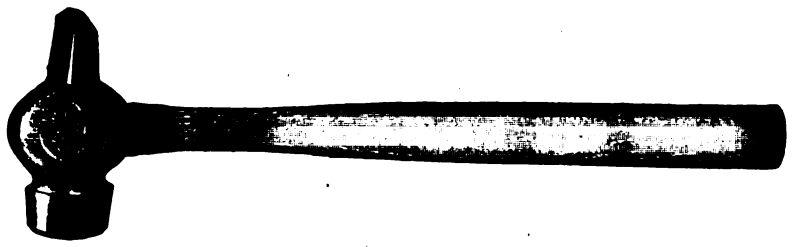
Will hold securely any size of shoe.

No. 8 16 Inches Long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

Weights, 1¾ to 3 lbs.

This Hammer is the most popular Sharpening Hammer on the market.

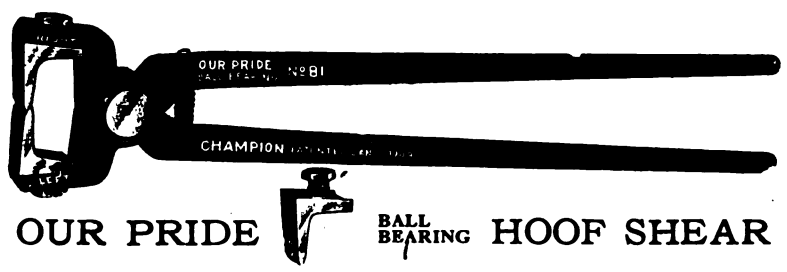


Corrugated Pein.

IT GIVES RESULTS

No. 12 ELECTRIC SHARPENING HAMMER

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.



OUR PRIDE BALL BEARING HOOF SHEAR

Blades easily replaced when worn out.

All parts interchangeable.

Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY - Meadville, Pa., U. S. A.

THE LIVINGSTON CO., 131 E. 23d Street, NEW YORK, Eastern Representatives

Digitized by Google

UNIFORMITY

SHELDON
AXLES AND SPRINGS

HAVE LONG BEEN

INTERNATIONALLY FAMOUS

For Their Superiority In

DESIGN, MATERIALS and WORKMANSHIP

REASON:

Sheldon Took Guesswork Out of Axle and Spring Manufacturing

which means

UNIFORMITY OF PRODUCT

Sheldon Axle & Spring Co., Wilkes-Barre, Pa.

PHOENIX HORSE SHOES

Constant Demand is the Best Proof of Their Superiority.
Practical to the Highest Degree. Made of Unexcelled Material.

BULL DOG CALKS

Hold Firmly to the Shoe. Never Jump Out When Set. Easy to Drive in Shoe.
Perfect in Every Detail.

FOR SALE BY ALL DEALERS. WRITE FOR SAMPLES.

WE ARE THE LARGEST HORSE SHOE MANUFACTURERS IN THE WORLD.





PHOENIX
Horse Shoe Company
CHICAGO, ILLINOIS
ROLLING MILLS and FACTORIES { **JOLIET, ILLINOIS** / **POUGHKEEPSIE, N. Y.**

Digitized by Google

Extract from page 324 of the June, 1917, issue of The Horseshoers' Journal

Horseshoeing business in Albany opened very quietly this spring. In fact, we still feel the harmful effect that the drive calks has done the business, but strikes in the building line has also effected trade, a large number of horses owned by contractors are remaining unshod, and are still carrying their winter shoes of drive calk variety. (to May 10th) CHAS. W. KIRK.

ARE YOU *in this boat?*



John Wiseman Says to Bill from Missouri:

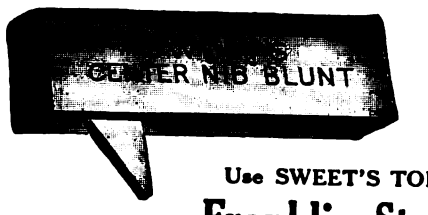


"It's time for a lot of you fellows to wake up. Ram your hand down into your pocket and see if the cash jingles with the merry sound as of yore.

"If not, why not?"

"There's a Reason, of course. And that reason is that you've been using calks that the owner can replace himself. Naturally his horses come less frequently to your shop. You have less business—less cash to jingle in your jeans.

"Do you get the idea?"



Every set of welded calks you put on helps to keep your shop full because the horses must be brought to you to have the worn calks replaced. And the users are satisfied users, too.

Use SWEET'S TOE CALKS—"The Cold Cut Dreadnaught."

Franklin Steel Works, JOLIET, ILL. CAMBRIDGE, MASS. HAMILTON, ONTARIO

No. 2.

BROOKS WELDING AND CUTTING APPARATUS

The Most Important Part of the Tool Equipment in All Metal Working Shops for Both Repairing and Manufacturing

The Brooks flash-back safety valve eliminates all chances of bursting the dry pipe. This is the greatest safety device ever put on an Acetylene Generator. It opens and releases the force the same as the exhaust valve on a gas engine.

The Brooks Machine Co. manufactures welding and cutting torches, automatic acetylene pressure generators, both portable and stationary. Complete equipment to take care of all kinds of welding and cutting. Tell us the nature and quality of your work, we will advise you fully as to the size and kind of equipment to meet your requirements best.

All products manufactured by the Brooks Machine Co. are guaranteed for one year against defective workmanship and to be made of first-class material and to do all we claim for them.

Brooks Portable Automatic Acetylene Generators
25 and 50 lb. Carbide Capacity, with Welding Equipment



Brooks Universal Welding and Cutting Torch

Ten Welding and Three Cutting Tips.

Torch made in lengths of 20 inches over all. With it, either welding or cutting can be done by simply changing tips. This Torch is adapted to all classes of welding and cutting of metals within range of the Oxy-Acetylene welding or cutting process.

Brooks Commercial Welding Torch

Eight Welding Tips and One Extra Extension. Larger Tips Furnished on Request.

Torch made up to 21 inches over all. It can be lengthened or shortened, according to the requirements of the work, by changing blow pipes. One extra blow pipe is furnished regularly which makes the torch 28 inches long. On request, pipes of any length may be furnished.

By taking off the tip elbow head and screwing the welding tip on direct to the short extension, it can be converted into a straight torch, which is often convenient.

The Brooks Commercial Torch will handle all welding work within the limit of the process. This Torch is especially well adapted for pipe line, boiler and machine shop welding.

WRITE TO US TODAY

THE BROOKS MACHINE CO., 219-229 W. Lewis St., Wichita, Kansas

PARKS WAGON SHOP SPECIAL



You may think you don't need this practical woodworker in your shop. Take advantage of our trial offer, and be convinced how much it will save you. **Machines sent on trial anywhere in United States and Canada.**

Machine is a combination of Circular, Rip and Cross Cut Saws,
22" Band Saw,
12" Jointer,
Rim Rounder,
Felloe Borer,
Spoke Tenoner,
All ready for instant use.
No Changing.

Light size takes 2 to 3 H. P., heavy size 3 to 4 H. P.

Write for catalog and full information about how a woodworker should be arranged to be convenient to operate.

Parks Ball Bearing Machine Co.
North Side Station
Cincinnati, O.



CRESCENT Wood Working Machines

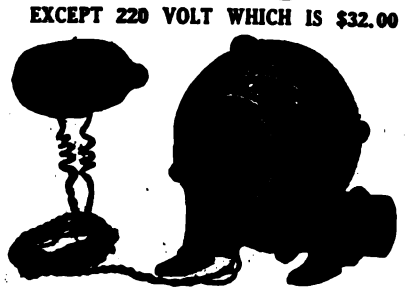
will always satisfy those particular users who want the highest quality at reasonable price.

Send today for catalog of band saws, saw tables, shapers, jointers, variety wood workers, planers, planers and matchers, swing saws, cut off table, disk grinder, borers, hollow chisel mortiser, Universal wood workers.

THE CRESCENT MACHINE CO.
203 Main Street
LEETONIA, OHIO, U.S.A.

The ROTO ELECTRIC BLOWER ONLY $30.00

EXCEPT 220 VOLT WHICH IS $32.00



Write for information about our special cash price of Twenty-Nine Dollars

SAVE TIME! SAVE MONEY!

Are you still blowing your forge by hand? Do you know this time is WASTED? Install a ROTO Electric Blower and SAVE this time. It is the greatest *time and labor saver* you can put in your shop. It will let you do *twice* the work, do it *better—quicker—cheaper.* You will then say, like hundreds of our customers,

I wouldn't sell my ROTO for $100.00 if I couldn't get another.

Buy direct and *save the middleman's profits* of $10 to $20. The ROTO is used in several departments of the U. S. Government. You can rely on it. Write for more information or, better yet, mail the coupon today and try this blower in your own shop. If not satisfied, send it back at our expense. That's fair isn't it?

Send the Coupon—Do it Now

THE ROSEWATER ELECTRIC CO.
5516 KINSMAN ROAD, CLEVELAND, OHIO

Send me by.....An AIR COOLED ROTO BLOWER with one year's guarantee, complete with cord, plug and Speed Regulator. I will return it to you at the end of 30 days, if it does not give me entire satisfaction, and if I keep it, I will pay you $30.00 for the 110 Volt, or $32.00 for the 220 Volt Blower at the end of 30 days.

Name.....Address.....

Current.....Voltage.....Cycles.....

Your Electric Light or Power Company Will Give You This Information.

PLYMOUTH COMBINED HAND POWER PUNCH AND SHEAR

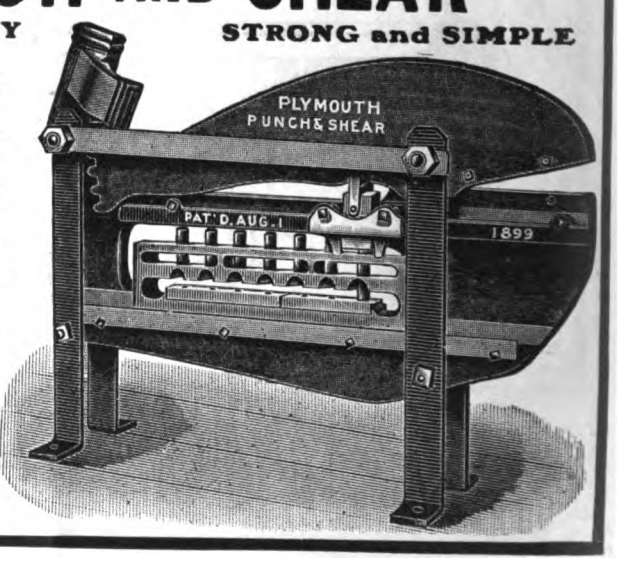
ALWAYS READY **STRONG and SIMPLE**

No lost or misplaced Punches — always in the machine.

Punch Rack shifted to position for use of any punch in a moment without the need of a wrench or any other tool.

Seven different size punches with every machine, ¼, 5/16, ⅜, ½, ⅝, ¾, and ⅞.

Will punch ½ in. hole in ½ in. iron or its equivalent. Shears 4x½ or 3x⅝ or 1 in. Round Iron

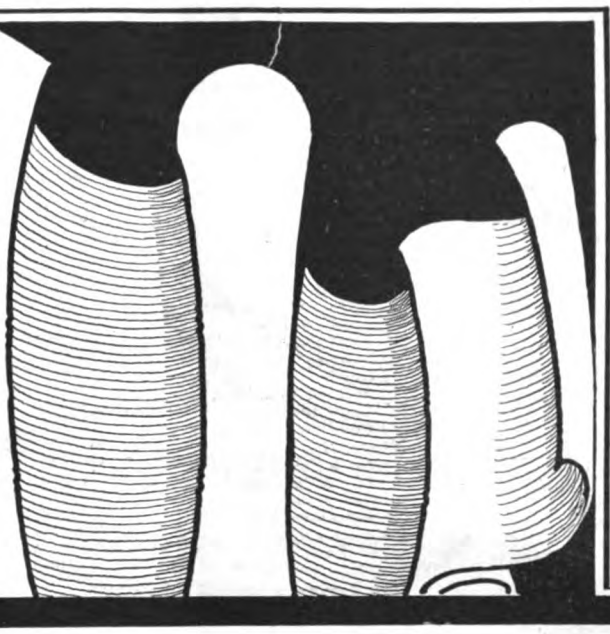


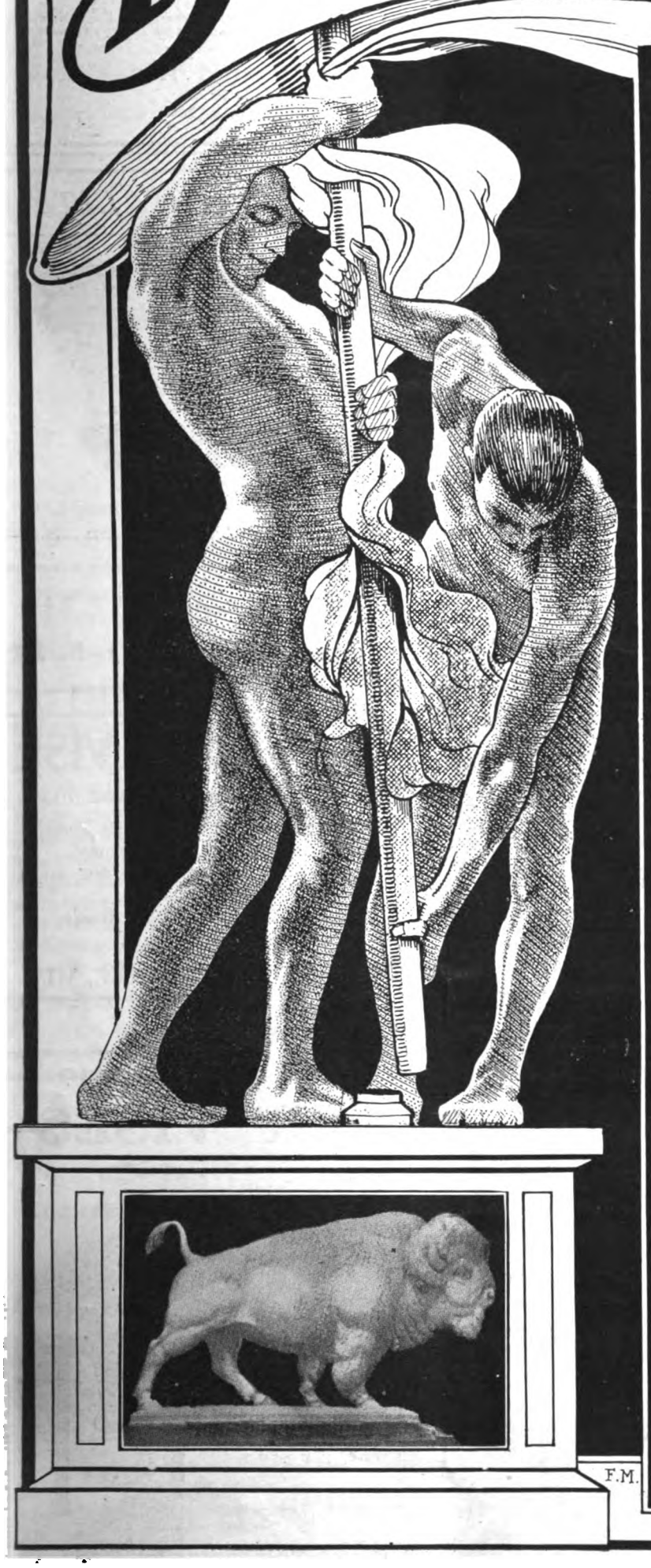
Manufactured By
PLYMOUTH FOUNDRY & MACHINE CO.
PLYMOUTH, WISCONSIN

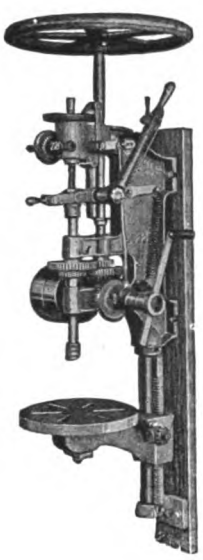
For sale by all Heavy Hardware Jobbers and Blacksmiths' Supply Houses.

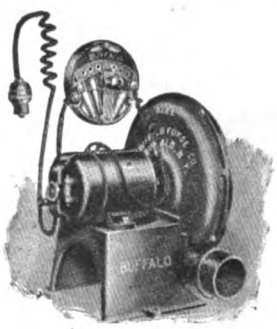
Digitized by Google

"Buffalo" TOOLS











MODERN SHOP EFFICIENCY

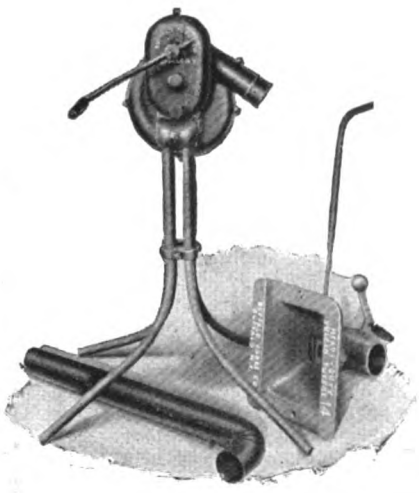
BLACKSMITHS AND GARAGEMEN are determined to have the best that may be had in Blacksmith Shop Equipment.

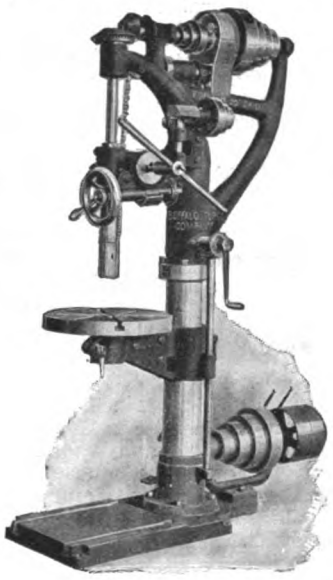
The work of the modern shop demands modern efficient tools—tools that will stand up under severe service.

Forges; electric blowers; drills—floor and post type; shears—for cutting angles, bars and sheets—and of every size from the little bench type hand power shear to the heaviest power shear made—these are the tools you should know about.

Buffalo Forge Company, Buffalo, N. Y.

WRITE DEPT. 6 FOR CATALOG





Digitized by Google

LINDE OXYGEN

From Coast to Coast 65 Producing Plants and Distributing Stations provide an unlimited supply of Linde Oxygen for users everywhere.

LINDE SERVICE means no investment except for oxygen actually received—no expensive overhead or upkeep charges.

Linde Oxygen may be obtained from any of the following Linde Plants and Distributing Stations where a large suppply of charged 100 to 200 cu. ft. cylinders is kept on hand constantly to insure immediate shipments.

Mail or telephone your order to THE LINDE AIR PRODUCTS CO., at the nearest point. Shipments will be made on day order is received.

PRODUCING PLANTS AND WAREHOUSES

Alabama
*Birmingham
10th Ave. & 28th St.
California
*Emeryville, Oakland
*Los Angeles
1405 Mission Road
Colorado
*Denver
S. B'way & Exposition Ave.
Connecticut
Hartford
1095 Main Street
District of Columbia
Washington
9th & Maryland Ave., S. W.
Georgia
*Alanta
Plyant St. & Southern R. R.
Savannah
OgeecheeCanal,So.of BaySt.
Illinois
*Chicago
3633 Wall Street
East St. Louis
6th & Walnut Ave.
Peoria
721-731 So. Washington St.
Indiana
*East Chicago
S.E.Cor. Kennedy& 145th St.
Fort Wayne
414 E. Columbia Street
*Indianapolis
2819 Roosevelt Ave.
Iowa
Davenport
118 Harrison Street
Des Moines
117 W. 5th Street
Kansas
Wichita
Rock Island Ave. & 2nd St.
Kentucky
Louisville
126 East Main St.
Louisiana
New Orleans
831 Fulton Street
Maryland
*Baltimore
25th & Montebello Ave.
Massachusetts
Cambridge
25 Waverly Street
Springfield
Napier Street
*Worcester
961 Southbridge St.
Michigan
*Detroit
St. Aubin Ave. & Newton St.
Grand Rapids
Pearl Street by the Bridge
Minnesota
Duluth
Seventh Ave., West
*Minneapolis
1809 Hennepin Ave.
Missouri
*North Kansas City
14th & Charlotte St.
*St. Louis
4218 Forest Park Blvd.
Nebraska
Omaha
1007 Jones Street
New Jersey
*Elizabeth
Linden Ave.
Newark
354 Plane Street
New York
Albany
Montgomery & Colonie Sts.
*Brooklyn
475 Driggs Ave.
*Buffalo
Broadway and Ideal Sts.
*Utica
Walnut & Schuyler Sts.
Ohio
*Cleveland
802 East 72nd Street
*Cincinnati
Stanton & Mellish Aves.
Columbus
310 Dublin Ave.
Dayton
521 E. First Street
Lima
338 East High Street
(Star) * Designates Plants.
Ohio
Toledo
441 South Erie Street
*Youngstown
601-621 Jones Street
Oklahoma
Oklahoma City
27 E. Grand Ave.
Tulsa
1 North Boulder St
Oregon
Portland
15th & Hoyt Streets
Pennsylvania
Allentown
211 Gordon Street
Erie
1502 Sassafras Street
*Norristown
*No. Philadelphia
13th & Cambria Streets
Pittsburgh
16th & Pike Streets
*Trafford
Tennessee
Chattanooga
212-238 King Street
Memphis
203 Washington St.
Texas
*Dallas
Harwood and Coombs St.
Houston
Cedar and Baker Sts.
San Antonio
512 Dolorosa St.
Utah
Salt Lake City
112 West Second St., South
Virginia
*Norfolk
92nd St. and Colonial Ave.
Richmond
1709 E. Carey Street
Washington
*Seattle
Henrietta St. & 8th Ave., So.
Spokane
121-123 S. Madison St.
Wisconsin
Manitowoc
810 Quay Street
*Milwaukee
36th St. & National Ave.

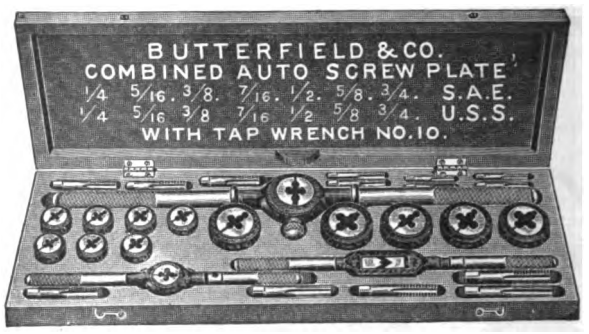
Other Plants and Distributing Stations are planned for other industrial centers throughout the country and will be established as fast as and wherever the local demand for oxygen warrants.

THE LINDE AIR PRODUCTS COMPANY

Largest Producers of Pure Oxygen in America

Forty-Second St. Building **NEW YORK**

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.

New York Store: 126 Chambers Street

THE HORSE RASP OF QUALITY



Ask Your Dealer for the *Improved*

HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, **"Slim," "Light," "Slim Light"** and **"Fine Cut."** Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial.

New catalogue mailed free on application.

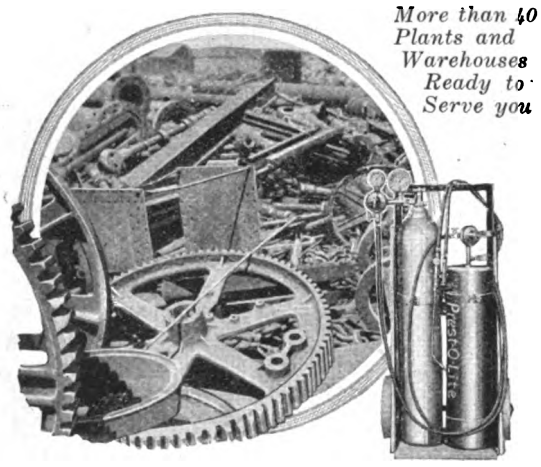
HELLER BROTHERS CO., *Established in 1836,* **Newark, N. J.**

Prest-O-Lite Service Never Depreciates

PREST-O-LITE Service never wears out or grows obsolete and you never can outgrow it.

Of what other manufacturing facility is this true?

Once you subscribe to PREST-O-LITE Service it is yours *for life*—a definite, permanent, transferable right which fits the varying requirements of your business perfectly—as flexible as a sectional bookcase.



More than 40 Plants and Warehouses Ready to Serve you

Prest-O-Lite

DISSOLVED ACETYLENE

The Universal Gas with the Universal Service

Physically, a self-contained all-purpose unit of ideal form—portable, sturdy, accessible anywhere.

Technically, the one component gas which satisfactorily, simply, and economically performs all heating operations, from the heaviest welding and cutting to the lightest soldering and brazing.

Legally, a clean-cut, life-long obligation which the Company is bound to fulfill. Your rights are transferable any time, to anyone without notice to us.

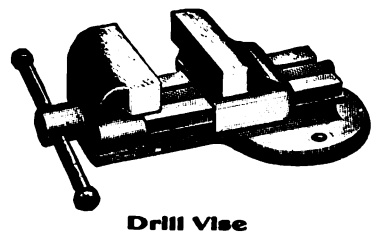
Thanks to PREST-O-LITE's part in the war, our subscribers may draw upon a plant and cylinder equipment not equalled for size and quality anywhere in the world.

Better write us about it—there are ample facilities right near you.

THE PREST-O-LITE CO., Inc., General Offices, 30 E. 42nd St., New York
Kohl Building, San Francisco

126

BICKNELL'S DRILL PRESS VISE



Drill Vise

Holds Rounds, Squares and Flats

Saves its cost every year in drills alone.
Base, bed and jaws fully machined.
Swivels to any position on Drill Table, or can be used as a Bench Vise.

For sale by the jobbing trade.

Write for circular.

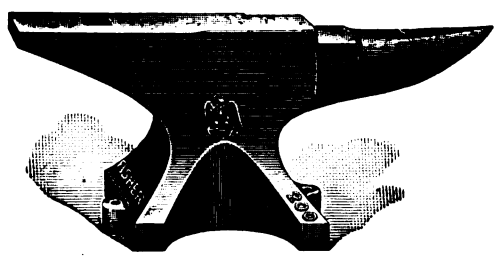
BICKNELL MFG. & SUPPLY CO., JANESVILLE, WIS.

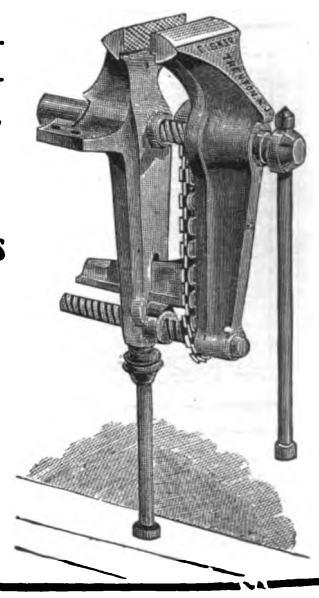
1843 EAGLE ANVILS 1919 AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE
BLACKSMITH AND WHEELWRIGHT

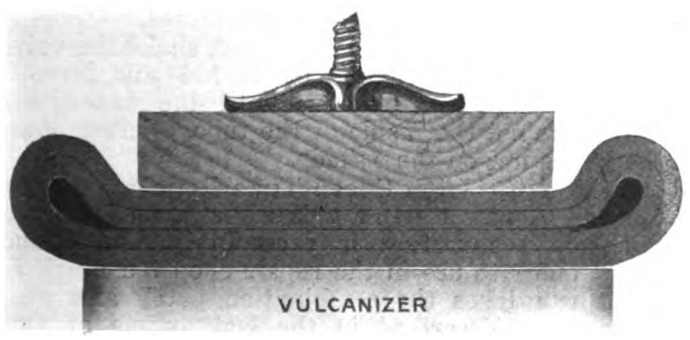
Vol. LXXIX. No. 6 NEW YORK, JUNE, 1919 TERMS ONE DOLLAR A YEAR

The Care and Repair of Tires

Part 3.—Repairing Large Tube Cuts, Splicing Over Mandrels, the Acid Cure and Vulcanizing

Copyright: M. E. FABER

THE average repair shop is or should be prepared to repair tubes and casings in a more comprehensive manner than the motorist will care to undertake, and for the benefit of those repairmen who are interested in making better repairs we will endeavor to describe the approved methods of mending the common types of tube injuries.



Cross Section Showing Vulcanizer and Clamp in Place on a Tube Which is Being Repaired.

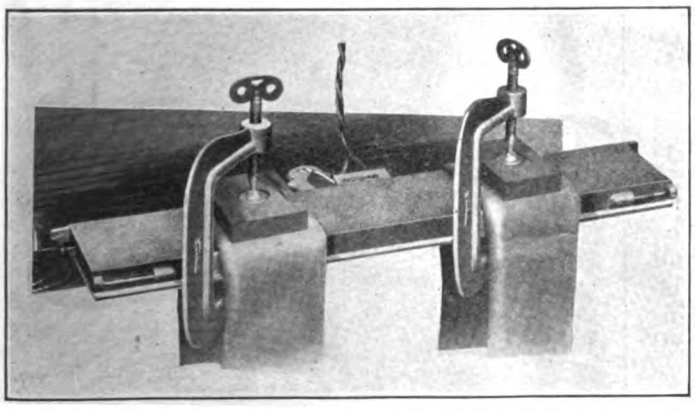
In the previous articles of this series we have learned that rubber possesses the property of changing from a plastic, sticky condition to a permanently resilient state upon the application of heat.

Furthermore, if *uncured* rubber be held in close contact with *cured* rubber while the proper degree of heat is applied, the new rubber will unite perfectly with the old. The process is somewhat similar to the welding of metals.

In repairing tubes, then, we literally weld a piece of new rubber into a hole or cut and thereby make a repair that is permanent because it is an integral part of the tube.

The apparatus used for tube repairing is simply a flat plate heated to the proper temperature by steam or electricity.

The source of heat has nothing at all to do with the process of vulcanizing but it is vitally important that the correct temperature be maintained, either by watching and regulating the heat, or in the better class of vulcanizers, by means of automatic control.



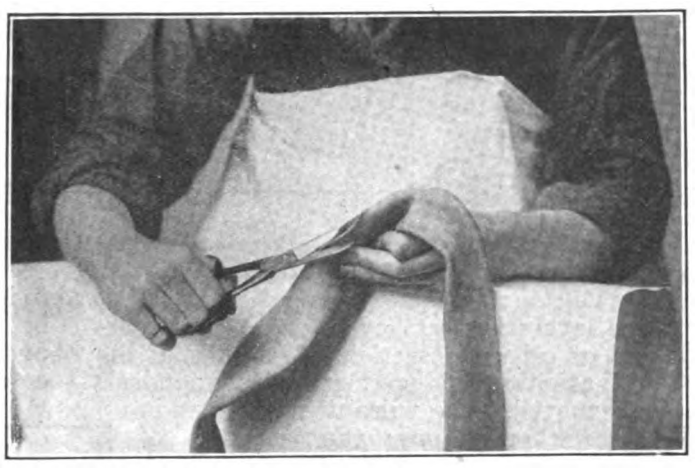
Method of Clamping Tubes on Standard Make of Electric Vulcanizer. The Plate is Electrically Heated.

A safe vulcanizing temperature is 265° F. Higher temperatures vulcanize more quickly but there is danger of injuring a tube if it is accidentally left on the vulcanizer too long. 265° is about the temperature of steam at 40 lbs. and when a steam vulcanizer is used the operator may ascertain the temperature by reading the steam pressure which is indicated on the gauge.

Moisture is absolutely detrimental to a repair and there is no such thing as "moist heat" as the heat from a steam vulcanizer is sometimes called by repairmen who think that because a vulcanizing plate has steam behind it the *kind* of heat is changed in some mysterious way.

Too high a temperature will overcure or burn a tube regardless of whether there is steam in connection with the vulcanizer or not. The correct temperature will vulcanize perfectly regardless of the heating medium that is used.

In vulcanizing tubes the repair is prepared in one of the ways described later. A piece of waxed paper is laid over the repair and the repair placed on the flat tube plate. (The waxed paper is merely to keep the sticky new rubber from adhering to the hot vulcanizer). Then a block of wood of suitable size is placed over the tube and a clamp is applied so as to give a good firm pressure. We illustrate several types of vulcanizers to show the method of clamping.



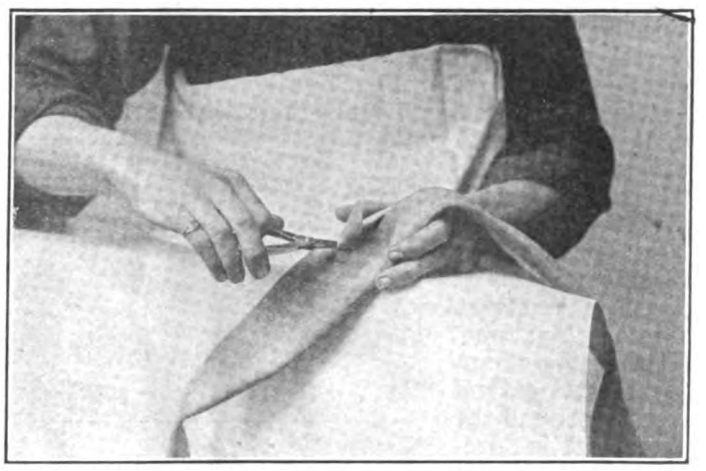
First Step in Tube Repair: Trim the Edges of the Tube.

The tube is left on the vulcanizer for a length of time depending on the size and thickness of the repair, and when removed and cooled is ready for use. If repairs are properly prepared there is no danger of the sides of the tube sticking together because the inside of the tube is covered with bloom, or free sulphur, that will not incorporate into the repair.

In the case of large repairs it is well to avoid the chance of such trouble by placing a piece of paper inside of the tube to prevent the repair from touching the opposite side. The paper can do no harm if left inside.

Preparation of Puncture Repair.

Clean the tube thoroughly with clean high-test gasoline and coarse sandpaper or a rasp for at least an inch all around the puncture; then wipe off the dust with waste or a cloth moistened with gasoline. (The success of repairs is largely dependent on cleanliness. Ordinary commercial gasoline as sold today has a certain amount of oil in it and consequently may even hinder a repair from sticking as it ought to. If you cannot get gasoline that is clean and free from grease, do your cleaning with sandpaper and let it go at that).



Next Insert the Patch with Pincers, Not with the Hands.

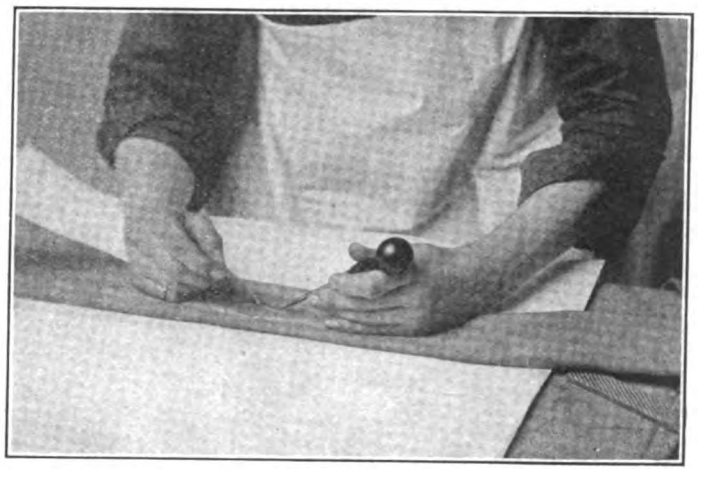
If gasoline is used, let it evaporate and then apply vulcanizing cement to the edges of the hole and spread a thin layer around the hole to cover a space as large as a dollar. When this has dried for ten or fifteen minutes apply a second coat of cement and let it dry thoroughly.

If the hole is only a very small one, push a little piece of the raw rubber into it and then take another piece as large as a quarter and place it over the puncture. Cover with waxed paper and put on the vulcanizer for fifteen minutes at a temperature of 265° F.

Larger Cuts and Tears in Tubes.

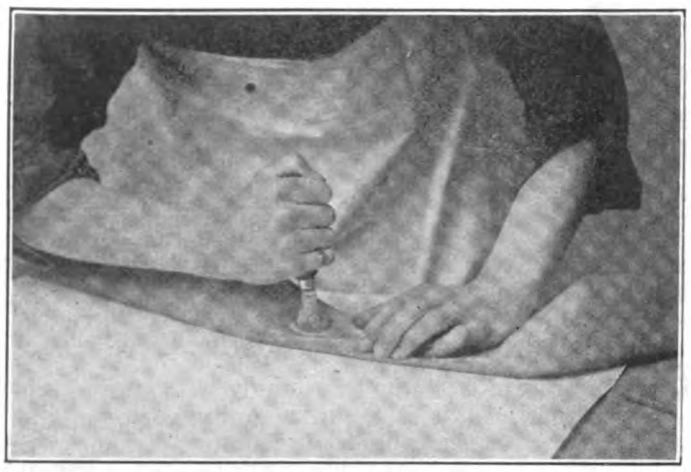
Trim the ragged edges of the rubber with shears so as to leave a slit in the tube about a quarter of an inch wide. Wash and clean the tube inside and out for an inch or more around the cut, using clean gasoline. Roughen with a rasp. Coat the entire cleaned surface with two layers of cement, letting each dry separately.

Insert into the tube an inside patch of one-side-cured rubber by folding and setting in place with pliers as illustrated. The uncured side of this patch comes next to the hole in the tube and the cured side prevents the repair from adhering to the opposite side of the tube.



Fill the Cavity with Strips of Pure Rubber.

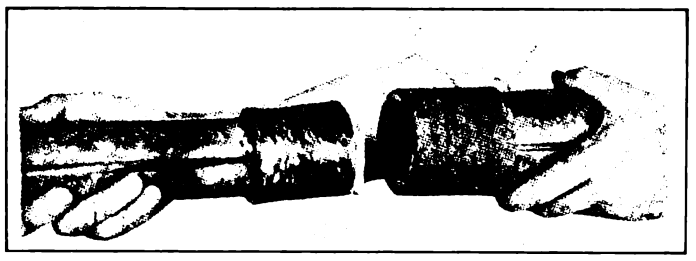
Digitized by Google



Before Vulcanizing Roll the Outside Patch with a stitcher.

Then fill the cavity with strips of raw rubber, pressing each down firmly so that the edges of the raw rubber are stuck to the edges of the tube all the way around, and finally roll the repair lengthwise and crosswise with a stitcher, which is a small toothed wheel that insures all of the repair being firmly united to the tube.

There is practically no limit either in length or area to the size of repair that can be made by this method and the finished repair will be at least as strong as the original tube. If the repair happens to extend partly around the tube, it is prepared all at once although the vulcanizing process may require two or three settings in order to get all of the repair into contact with the vulcanizer.



How the Tube is Rolled Over the Splicing Mandrels.

When a tube has been so badly blown out that a patch is impossible, it may be repaired by splicing in a new section. This must be done carefully so as not to twist the tube or change its length. The section to be inserted is taken from an old tube of the same size, and should be cut five inches longer than the piece which was removed so that two and one-half inches will be left at each end for the joint.

Bevel the edges of the tube and section by cutting with a sharp knife or by placing over a piece of board and grinding on an emery wheel. Clean the ends of the tube on the outside for three inches and clean the ends of the new section for an equal distance on the inside.

For ease in putting the splice together splicing mandrels are generally used. These consist of a pair of sheet metal tubes about eight inches long which are split down one side. One of these tubes is about one-fourth inch smaller in diameter than the other.

Put one end of the tube through the smaller mandrel and turn it back over the mandrel for five inches; then turn it forward again half that distance, thus making a double fold. Put one end of the new section through the larger mandrel and simply turn it back two and a half inches.

After the tube and section are on the mandrels, the method of joining will depend on whether the repairman prefers to use acid-cure cement or whether he prefers to vulcanize. The latter method is preferable because, although it takes a little longer, it makes a repair that will not loosen in case a puncture makes it necessary to again vulcanize the tire at a point that will bring the splice in contact with a heated vulcanizer.

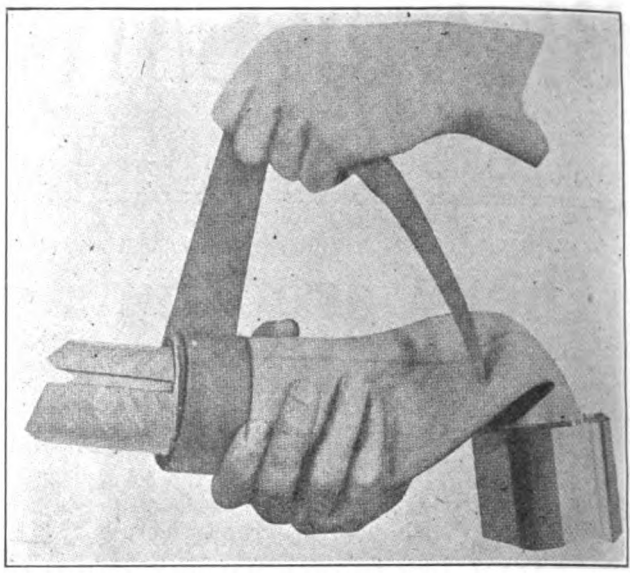
If acid-cure is used proceed as follows. Apply two coats of acid-cure cement to the cleaned surfaces of the tube and section. Give them plenty of time to dry. Bring the two mandrels together and apply the acid to the cemented ends with a wide brush. Then quickly transfer the end of the section from the end of the tube on the large mandrel onto the end of the tube on the small mandrel. Immediately wrap the joint with strips of old inner tube to give the necessary pressure while the acid is working on the cement. Twenty minutes is sufficient. Then straighten the tube out and remove the mandrels by pulling the tube through the slits in the sides of them.

If the splice is to be cured on the vulcanizer, ordinary vulcanizing cement is used and at least three layers are applied to the cleaned surfaces of tube and section. The ends of the splice are brought together and the mandrels removed. The vulcanizing is done in three operations; the last two of fifteen minutes each. A block is used, as shown, to prevent pinching edges of the tube, and after the first part of the cure is done the tube is turned one-third of the way around so that the vulcanizer bears on a different place.

Another method of getting the ends of the tube together neatly is to insert into the tube a bottle or tin can and after the ends are in place this object is removed by cutting a slit in the tube and later vulcanizing it shut again.

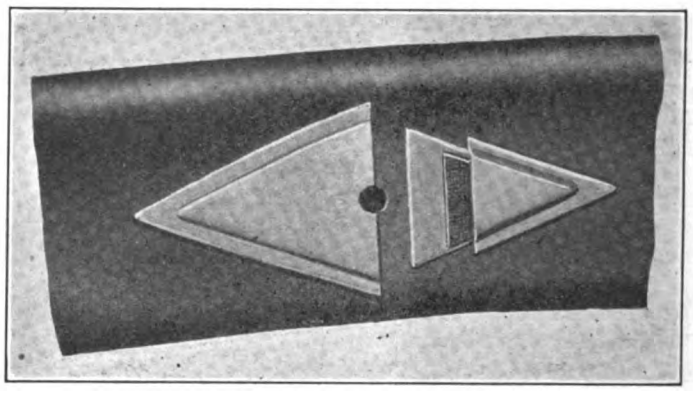
Select a good place on the tube and clean a place about 2½ x 4 inches and in the center cut a hole about one-fourth inch in diameter. Remove the nut from the metal valve stem and push the stem through the hole in the tube, allowing it to remain clear inside and away from the patch until after vulcanizing.

Cement the cleaned surface around the hole in the usual manner. Cut an oval or diamond-shaped piece of thin raw rubber about 2 x 3 inches. Make a hole in the center to correspond with the hole in the tube and roll it down on the tube so that the holes register. Cover this rubber with a piece of fabric of the same size and shape. Then cover the fabric with a layer of thin raw rubber one-quarter inch larger than the fabric. Holes should be cut in the fabric and in the last layer of rubber to match the hole in the tube. Place a wad of paper in the holes and vulcanize forty minutes.



When the Tube is Transferred to the Mandrel, Wrap it Firmly with Strips Cut from an Old Inner Tube. (Acid Curing.)

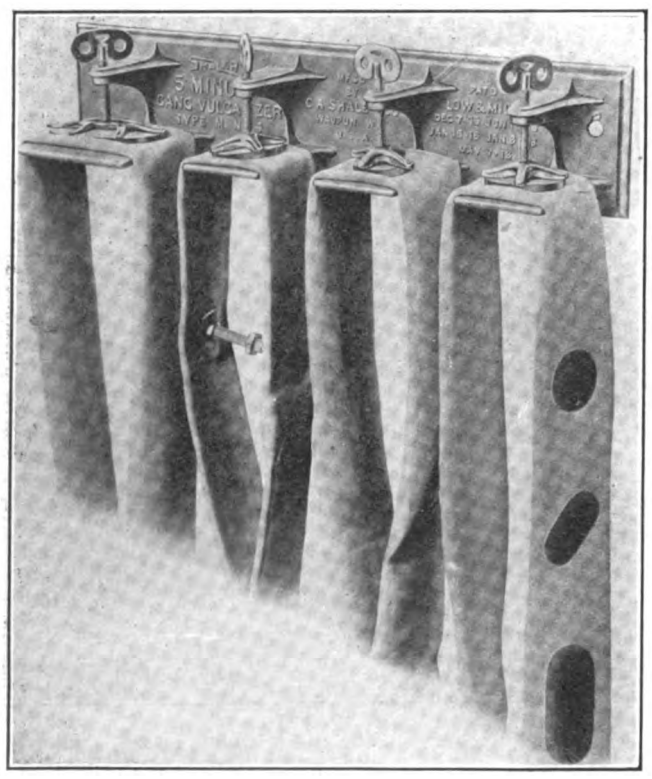
When the patch has cured, shake the valve stem to the vicinity of the hole and force it through the opening until the base rests against the inside of the tube. Screw down the nut on the outside.



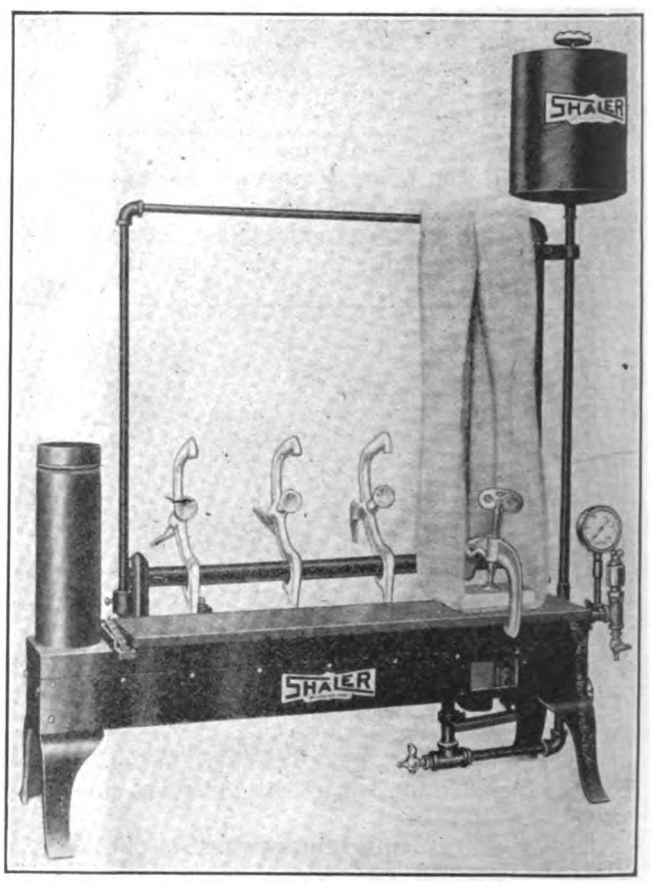
Method of Building Seat for a Valve Stem.

High Speed Tube Repairs.

A new type of vulcanizer recently placed on the market is exceedingly simple and quick to use in the repair shop inasmuch as it utilizes the combination patch and heat units described in the last article of this series. These units are furnished in several sizes so that with them it is possible to make in five minutes a perfect and permanent repair to any small tube puncture or cut. This style of vulcanizer, on account of its quickness of operation, and the elimination of waiting for it to heat is very popular both for the shop that only desires to cater to the tube-repair trade, and for use as an auxiliary to the fully equipped shop.



The 5-Minute Type of Repair Shop Vulcanizer.



Simple Type of Tube Vulcanizer, Steam Heated. The illustration Shows the Method of Clamping Tube to the Plate.

Digitized by Google

(Editor's Note: This is the third of a series of articles prepared by Mr. M. E. Faber of the C. A. Shaler Company. The first article was published in the April number. It is our intention to give in these articles complete directions for repairing every kind of tire and to make the series the most comprehensive work of its kind ever published. In itself, it will be worth the subscription price.) (To be continued)

Practical Horse Shoeing

Part 2—More About the Horse's Foot the Muscles, Joints and Tendons

IN the preceding article, a great deal was said about the various bones of the horse's foot, and in this something is to be said concerning the muscles and ligaments. The reader may wonder at all this, when what he really is seeking is information valuable to one engaged in actual horseshoeing. The answer to this interrogative state of mind is that all this information about bones, muscles and tendons has a very pertinent bearing on the shoeing of the horse. Something was said last month on this point. And I propose to add to it now. If the reader is once convinced that he needs the information in order properly to understand his work, he will surely be ready to go to work and learn it. So then, it will be well worth while to dwell a little on the necessity for this preparatory knowledge on the part of the practical shoer of horses.

The horse's foot, as it is easy to note by observation, swings back and forth at the lower end of the leg. In fact, it swings through quite an arc. It is the same with the human foot and the human hand. There are similar situations elsewhere in the human body—as at the shoulder, at the thigh, at the elbow, at the knee. Machinery built by men is often furnished with a joint permitting a bending action to take place.

Among the mechanical arrangements, both in one's body and in mechanical contrivances, is what is known as the ball-and-socket joint. One has such a joint at the shoulder and another at the thigh. A ball-and-socket joint is a hingeing device where one part of the hinge resembles more or less the *exterior* of a spherical surface while the co-acting part of the hinge is more or less like the *interior* of a spherical surface. That is, one is round and convex, while the other is round and concave. The one rounded surface fits into the other. When the bending movement occurs, one surface slips on the other—or each slips past the other.

Now in the horse's foot and also in other parts of his body, there is something that resembles this ball-and-socket action. So also in the human body. In short, there are multitudes of instances in the bodies of men and animals where there is a joint which seems to be modeled on the standard ball-and-socket joint. Sometimes, the joint will be practically identical with it.

An instance of this is the joint where the thigh bone operates hinge-like in a cavity of the pelvis. The end of the thigh bone is round like a ball or an apple. This is the convex, spherical surface. The hole in the big bone, in which hole it works, is also rounded, but it is hollow. This is the concave spherical surface. The two surfaces co-operate, the one with the other. At one's wrist the situation is more complicated because there are more than two bones to be taken into account. So, with the joint where the horse's foot turns on the end of the leg. There is the ball-and-socket movement, but there are complications because of the presence of several bones instead of just two.

But let us continue, for the present, to regard this joint of the horse as substantially a ball-and-socket affair—or, more simply still, as a simple hinge where a rounded convex part turns in a rounded concave part.

Now the movements of a human or animal joint are usually effected by pulls. That is to say, one tendon is pulled and the hinge or joint is operated in the direction of closing it. Another tendon is pulled, and the hinge opens more or less. The one bone is pulled, now forward, now backward. Note that it is a *pull*, whether the object in view is to open or to close the hinge.

I do not know that in the machines made by men there is any large percentage of cases where a joint is operated by two pulls, one to open and the other to shut. But in the world of living mechanisms made by the Creator, the two pulls are quite common. In the ordinary mechanical world, one may illustrate the hinge-like movement as effected by two pulls by the following examples:

(1) A rudder on a row boat may be so arranged that it is controlled by a horizontal double-arm secured to the rudder post. The person who operates the double-arm, and consequently the rudder on its hinge-like joint, holds two strings, one of which is secured to the outer end of one arm and the other of which is secured to the outer end of the other arm. He pulls on one string and lets the other out. This swings the rudder one way. Then he pulls on the other string and releases the first. This operates to swing the rudder the other way. The person sits in the rear end of the boat facing the bow and operates the rudder by pulling with one or the other string and releasing the other. Here is a case of two pulls.

(2) There is a toy wagon on which a boy may coast downhill. He guides with two strings, pulling now on one, now on the other.

In a piece of machinery, when a part is to be made to rotate on another part, after the manner of a hinge, a wire rope is sometimes used to effect the movement by a pull. Take an ordinary contractors' derrick as an example. The vertical stick is the mast. There is pivoted against the lower end of the mast a second stick. This is the boom. A wire rope is properly attached at or near the outer end of the boom. This rope runs over a small wheel set in the top of the mast. By pulling on this wire rope, the outer end of the boom is lifted.

The wire rope is generally operated by a hoisting engine. This is not important, just now. What is important is to note exactly how the boom is forced to fold up as if it were the fore-arm of a man. The joint is at the point where the lower end of the boom is pivoted against the mast. This is the hinge-like joint. The boom is operated, in so far as a movement tending to close up the hinge is concerned, by the *pull* on the wire rope. This is the kind of thing that goes on in animals and men when a tendon attached to a bone is pulled. The bone is made to turn on its hinge.

Now with the derrick-boom, it is not usual to use two wire ropes, one to lift and the other to lower the boom. The lifting rope is sufficient, as the boom will drop back of its own weight when the boom-lifting rope is relaxed. Still, one can readily imagine a second rope arranged to pull the boom down. When this is the case, gravity being left out of consideration, the boom would be raised by pulling on one rope and releasing the other, and lowered by releasing the first and pulling on the second.

Now, with animals and men, there is something very much like this. Instead of ropes, there are tendons. Instead of hoisting engines, there are muscles. That is to say, a muscle pulls on a tendon and the tendon on the bone. The bone moves, turning on its hinge or pivot—that is, its joint. Another muscle relaxes when the first one pulls. This results in the second tendon also relaxing. The result is that the pull on the bone is permitted to move it, this permission being given by the second muscle and tendon. To swing the bone back, it is only necessary for the second muscle and its tendon to pull, and the first muscle and its tendon to relax.

Now the horse's foot has not simply one joint of the ball-and-socket or hinge-like type, but several. That makes it complicated. But there is simplicity in this. There is, in each case that the horseshoer need be bothered about, this double-pull action. The movements are effected by muscles and tendons. Always, it is a case of *pull*—practically never a case of *push*.

The scientists who treat of anatomy use long words for *front* and *back*. It will be as well to learn them now as later. For *front*, the word *anterior* is employed; and for back or rear, the word *posterior*. An anterior muscle or part is one located on the front, and a posterior muscle or part is one located on the back or rear. Further, the scientist has another word for a joint. He often or generally prefers to call it an *articulation*.

Thus, there are three articulations in the foot of the horse. There is the *fetlock* joint, the *coronary* joint and the *pedal* joint. They are all more or less similar to a hinge or a ball-and-socket joint. The fetlock is an out-and-out hinge.

Now, if I have succeeded in making clear the matter of the folding action, to and fro, as a result of two pulls and two relaxations, the reader will be prepared to understand something of the difficulties imposed by movements and conditions that are not normal.

For example, consider a case where the horse is standing at rest. The condition at each of the three joints or articulations of the foot is to be considered to be substantially as follows: The anterior or forward muscle (located further up the leg) is under a certain tension and the posterior or rear muscle is also under a certain tension. If the horse

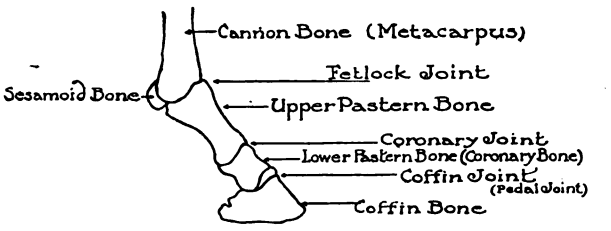


Diagram of Bones and Joints.

is standing so that these joints are fully at ease, then one may say that for each joint the anterior and the posterior muscles and tendons are both at a precisely normal tension—at least for standing. But, suppose that for some reason or other the bones of the several joints are not exactly in positions that will produce the precisely normal tensions. And yet the horse must stand and sustain his own weight. What is the result? Some of the muscles will be under strain or be otherwise put into an abnormal condition.

Now the cause which brought about these abnormal conditions amongst the muscles, ligaments and tendons may be simply a pebble under the horse's foot and so located as to prevent the right and usual placing of that foot. Or, the cause may be an imperfectly trimmed horny wall. It may have been surfaced by the horseshoer in such way that his foot is thrown out of normal position. The result may be just the same as with the pebble; only, when the horse moves on, if the trouble was due to faulty horseshoeing, there will probably be a continuance of trouble, but, if the trouble was simply due to a pebble on the ground, it will be over with, most likely, when the horse goes ahead.

The horse cannot speak and tell us what is wrong. He may indicate in some way that there is trouble. The doctor with a human patient is able to put questions and get answers and in this way get a line on the trouble. But the veterinary surgeon or the horseshoer is cut off from this. He will have to understand the construction of the horse and his behavior sufficiently well to study it out himself.

Similar remarks apply to the horse's foot when he is in motion. There are certain *normal* stretchings, and pulls, etc., of the several muscles, ligaments and tendons on the one hand and certain *abnormal* stretchings, and pulls, etc., on the other. A shoe

Digitized by Google

wrongly set or a hoof wrongly leveled for the shoe may cause these abnormal occurrences to take place over and over again as the horse moves along.

If the reader wishes to get a line on what happens when the foot is required to act in an abnormal position, let him try running, or trotting, or walking, or even standing, with his feet misplaced. That is, for example, let him slant the bottoms of his feet so that the toes are slightly elevated, or the heels slightly elevated; and then let him stand, walk, trot or run. He will find out how it feels.

The horse cannot correct the difficulty, nor can he tell us about it clearly. At the same time, his behavior does change. He stands a trifle peculiarly, seeks to throw his weight in some unusual manner, or sets his hoofs queerly—or, if we fail to note these indications, he may even "go lame."

One object that the reader should have in view when studying the bones and the muscles, ligaments, tendons, etc., is to learn how to tell when all is well, when something is wrong, and what the something is. People who have given the subject a good deal of attention are convinced that a good deal of trouble with a horse's foot comes from the shoeing in some way.

The horny wall of the hoof has been leveled wrong, the shoe itself has been misplaced, the nails have not all of them followed a proper course, or some other wrong condition is present. The effect on the horse remains unnoticed, perhaps because the horseshoer is ignorant of matters he should know. The thing is a little matter at the moment; but, as time goes on, the continued repetition of the small trouble has its effect on the horse. The only wise thing for the horseshoer to do is to learn all he possibly can about the construction and mode of action of the horse's foot, and what are the effects of errors in shoeing. He will then be in better shape to note when the horse places his foot wrong or when there is a slightly wrong posture of his body, etc.

No Muscles in the Foot Itself

The foot of the horse contains no actual muscles. These are located higher up. In the foreleg, the muscles are above the knee; and, in the hindleg, above the hock. While such muscles are not in the foot, they are still the engines, as it were, which operate it. It is their pulls which compel the bones of the foot to perform their movements at the various joints.

The Ligaments and Tendons

While the muscular apparatus of a horse's limbs are more spectacular than some other parts, because of their evident connection with his movements, yet there are other things to which we must also give attention. It is very necessary that the various bones be kept in place. There are many occasional movements when there is a tendency to move a bone out of its place and break up a joint. The muscles control the to-and-fro movements of the foot bones through the agency of their tendons, as the cords which connect muscles and bones are called.

But it would be almost too much to expect the muscular effort exerted through the tendons to be sufficient to hold the various bones in place. There is a special type of tissue, called *ligaments*, which performs this duty. That is to say, they act as guides and restraints whose function it to hold the bones in place and yet not prevent the hinge-like movements imposed by the muscles and tendons. A ligament may act like a cup or a container, holding its bones inside it but nevertheless permitting certain slight movements.

Others are more like bands. They extend from one bone to its companion and prevent the two from coming apart. A little consideration will, perhaps, convince the reader that the function of the ligaments is very important indeed. They must allow so much, but no more. They must be strong to do such work successfully, and they are strong. But that doesn't mean that they are ready and able to withstand all kinds of misuse.

Such misuse may come from the foot resting on the ground wrongly, or striking the ground wrongly when the horse is moving. Naturally, it is the weight of the horse and the force with which his foot strikes the ground that make the misplacement of his foot of importance. Even then, unless the misplacement is very considerable, the wrong placings of the foot would probably not be very important as a general thing, if they are not repeated. But where the ligaments are forced to some unusual duty over and over again, they are apt to suffer, and the horse "goes lame" or contracts some disease. Here again the horseshoer may be the real cause back of ligament trouble, because he has so placed the shoe that the horse sets his foot wrong, whether at rest or in motion.

The error in setting his foot that is imposed on the horse by the faulty shoeing may be small. It is, however, not the single occurrence that is so much to be feared as the constant repetition. Perhaps trouble from strained ligaments are more frequent than trouble from wrongly stressed muscles and tendons. At any rate, it is important that the horseshoer inform himself as much as possible about these important parts of a horse's foot.

As already said, there are three joints in a horse's foot. The fetlock is the one which is practically a perfect hinge. The others vary a trifle from this precise form or limitation. Each of the three joints, or articulations, has a *capsular* ligament. This type of ligament envelops more or less completely the bones of the joint after the manner of a sheath. Each capsular ligament consists of two layers of tissue. The exterior layer is strong, firm and fibrous, while the inner one is soft and delicate. This soft and delicate tissue is in contact with the bones of the joint. This inner layer of the capsular ligament supplies lubricant to the articulation. It secures this lubricant from the activities of the living body and holds it in readiness for the use of the joint. The lubricant is sticky and is not unlike mucous. It has a yellow-white or a yellow-red color and resembles the white of an egg. It is called *joint oil or synovia.*

The actual surfaces of the bones, where the joints are, have a covering of cartilage, which is a kind of leather-like material. One's ear is of this kind of tissue. This cartilage covering of the convex and concave surfaces is smooth and also elastic, but it requires lubricant. This the inner layer of the capsular ligament supplies.

There are other types of ligament. Thus, there is the lateral or side ligment which binds bone to bone as a band extending from one to the other. The lateral and other ligaments of the foot in general are fibrous and have a glistening, whitish appearance. They are tremendously strong. In fact, they do not often break, for the reason that they are generally stronger than the bone tissue.

The three foot joints are such that there is but little side motion permissible—in the case of the fetlock joint, practically none at all. The opening out of the bones of the joint is termed *extension;* the movement tending to close them, *flexion.* The muscles and tendons operate to produce these flexions and extensions. The various ligaments permit them, but otherwise, for the most part, resist other movements.

The Fetlock Joint

At the fetlock joint, several bones are concerned. The cannon bone (metacarpus) provides the upper surface of this joint. It supplies, in fact, two convex surfaces with a slight ridge between. This little ridge extends lengthwise of the horse, as a little thought prepares one to understand.

The fetlock joint turning like a hinge in the direction of the length of the horse will naturally require any ridge in the very joint itself to lie in the same direction. So then, the bottom end of the cannon bone has two convex surfaces with a ridge between lying in the direction in which the horse moves. A scientific word for these surfaces is *condyles.* These surfaces co-act with three bones underneath. One is the *upper pastern* bone. This bone was marked A in the two illustrations in the May issue. Back of this bone and underneath the cannon bone are two *sesamoid* bones. These three bones supply a kind of socket for the convexities of the lower end of the cannon bone. All four bones unite to make the fetlock joint.

A little consideration will, perhaps, make it clear that the number of parts here tends to create a complex situation which may result in trouble, if ill-attended to by people having to do with the horse. Nature provides a complex joint probably because of complex requirements. She provides smooth surfaces possessing elasticity and she provides a lubricating oil. She also furnishes eight or nine distinct ligaments to keep the four bones in position.

Thus, there is at the fetlock joint, a capsular ligament which envelops all the four bones. It covers the ends of the two big bones entirely—that is, the ends of the cannon and upper pastern bones. The two sesamoid bones are held in the same capsule, only the ligament here covers only the borders of the joint surfaces. Then, there are two side bands—*lateral ligaments*—which join the two big bones on the sides. That is, these ligaments join the cannon bone and the upper pastern bone, one on the left side and one on the right. When the hinge action comes into play, there is simply a movement of the bones between the two bands. These two bands are also attached, one to each, to the sesamoid bones.

The sesamoid bones have lateral ligaments. There is also a special ligament which binds the two bones very firmly together. There are a number of other ligaments. But I will not now confuse the reader with an account of them, preferring rather to take them up, if necessary, at a point in this series of articles when they have an immediate bearing upon the matters in hand.

For the present, let it suffice us that we know that there is a capsular ligament enveloping all four bones of the fetlock joint, that there is a special ligament holding the two small sesamoid bones together, that there are certain lateral ligaments, and that in addition to the foregoing there are a number of others. Nature has done her part in locking the four bones together in such way as to permit the proper motions but nevertheless to hold all the parts together in proper position.

(*To be continued*)

A Lover of the Horse

Evangeline Booth, the gifted Commander of the Salvation Army, in the *Rider and Driver,* pays a beautiful tribute to the horse. "The horseless age which was predicted when the motor came," she says, "has not arrived, and never will." She continues:

"From the very beginning of all things, through the march of the centuries in every sphere of life, the horse has occupied a significant place.

"In sport, in art, in literature, in war, in peace, in commerce, in romance, in tragedy, in drudgery, in love, in religion, in life and in death, this reliable, courageous, ever-ready for command, servant of man has proved himself a most potent factor.

"His fleet hoofs have flashed light from the pebbled path of every poet; his arched neck and tossing mane have taxed the skill of the ablest sculptor's chisel; his attractive figure has made realistic the story of every class of literature—historic, fiction, fact, and biblical; the delight of childhood, the willing slave of man, the sure trust of old age, this faithful ally through all time has plowed the fields, and hauled the loads, and penetrated the wilderness, and waded the rivers, and with blood-stained flanks has carried the warriors in battle, and tossing snowy mane has borne the victor home through triumphant arch.

"And a thousand times ten thousand when worn by toils and lack of food to a mere skeleton, that faithful friend has pressed on with his task with a patience, perseverance, and a sweetness of temper that one could almost call divine."—(Quoted from *Our Dumb Animals.*)

Digitized by Google

In Little Old St. Louis

Suggestions for the Smith Who Does Horseshoeing and Needs a System

By JAMES F. HOBART

IT sure is a delight to go into a clean shop; one where is not a speck of dirt to be seen on walls, ceilings or windows. Where the walls are all neatly whitewashed and all the old shoes neatly packed away and all new stock as well displayed as though it were in a hardware store.

That's the way the writer found things when he walked into the shop of Mr. H. W. Jurczye, in "Little Old Saint Louis." The living rooms were overhead, but as Mr. Jurczye is as yet a confirmed bachelor, he rents most of the up-stairs to a family, reserves three rooms on the third floor for his

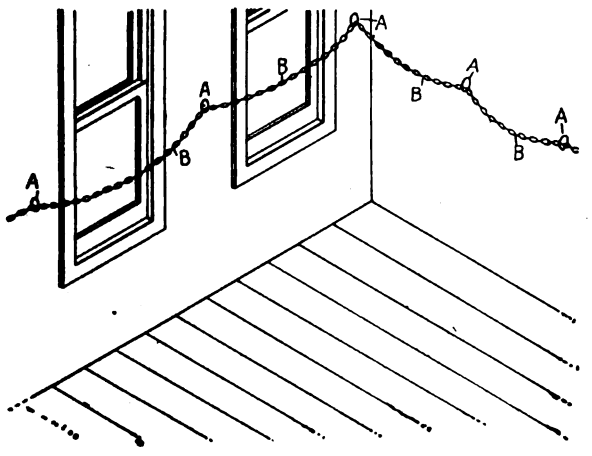


Fig. 1. The Horse Tieing Chain.

own use, and eats with his tenant! Some arrangement that. It isn't every blacksmith who has "all the pleasures of home" with none of the responsibilities!

The Shop in a Store Building

The entire interior of the shop is whitewashed each fall, using a machine which the smith purchased for that purpose. The horse-hitching facilities in this shop are most excellent and complete. All around the whitewashed walls, on three sides of the shop, heavy staples have been inserted about every six feet and each staple carries a ring made of half-inch iron and about three inches in diameter as shown at A A A, etc., in Fig. 1.

Between the rings A A old chains B have been placed—good strong chains too, about 3/8-inch iron or steel was used in the links. The chains were evidently made from unwelded links which were closed after being slipped into the chains and the several rings. Horses can certainly be tied anywhere, around this shop. The shop is lighted by a row of electric bulbs, suspended six feet from the walls, and extending entirely around the shop.

When the driver needs light in setting a batch of shoes, he has only to turn on one or two lights exactly where he needs them. And, turning the lamps out when not needed, saved a lot of "juice" for the shop owner. The floor of the shop, where horses are tied, is thickly coated with sawdust, there being in the back yard, three commodious bins, one for coal, one for fresh sawdust and one bin for dirty sawdust and sweepings from the shop floor. The fresh sawdust on the floor, the clean whitewash on walls and ceiling, and the *clean shop windows* certainly present suggestions for most pleasing innovations in some other shops!

Two Concrete Double Forges

There is one part of one side of this shop where no horses are ever tied, consequently there are no staple-rings and chains, but there are two double forges, giving the shop a capacity of four fires, with only two chimneys, two slack "tubs" and two coal boxes. Fig. 2 shows the manner in which the forges are constructed, a square opening C being made and the fire placed in that opening, where wind seldom gets a chance to blow any ashes or gas fumes into the shop. At D, a space was left when the concrete was put in position and coal to the amount of one and one-half kegs can be stored in the cavity left for that purpose in the concrete forge, the coal being common to both fires, the spaces for which are separated merely by a sheet iron plate set in the concrete.

At E, is shown a wooden frame which supports a square cast iron vessel for taking the place of the usual "slack tub." It will be noted that the wooden support is entirely open underneath, so that the shop sweeper can get his broom in there and leave no bunches of dirt. It may also be noted that the top of the concrete forge, as shown at F, has so steep an inclination that nothing can be laid on top of it. This was done purposely. It effectually prevents a choice collection of odds and ends from gathering on top of the forge—something sure to happen were the forges made flat on top!

There is a boy in this shop. A real lively boy, a young chap in his teens, who surely has one eye on the blacksmith's trade, for he is always looking for a chance to strike with the sledge, to clean off the hoof of a horse and to cut clinches and make new ones when the driver will let him. That boy brings in all the coal, looks after the sawdust on the shop floor, takes care of the old shoes and fetches new ones as required. He is the general handy man around the place and in fact, enables four smiths to do the work of five by taking over such of their work as he can do.

And there is one thing which suits this boy "from the ground up!" In the yard, back of the shop, is a cute little brick stable,

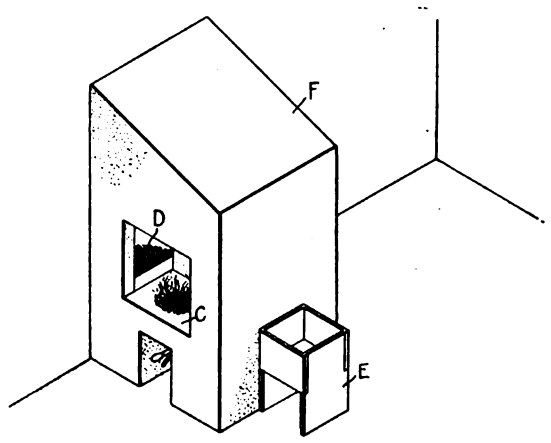


Fig. 2. The Double Forge.

just big enough to contain one small horse, one small boy and one large bale of hay. Here is kept—the boy cares for it—a little saddle horse which is the especial perquisite of the shop "boy." He is expected to fetch to the shop, horses to be shod, and to return them to their owners after they have been attended to.

Goes for and Returns Horses

The owner of the shop, Mr. Jurczye, has contracts with many concerns in the city of St. Louis, such as the Express Company, the Lively Biscuit Company, the Crane Company and other large users of horses, to do all their shoeing. The shop "boy" upon receipt of a telephone call, will jump upon his horse which stands saddled all through working hours, go and fetch the strings of horses to be shod and return them again after the work has been done. And, perhaps this part of the work don't suit the boy? Well, some, mostly!

Horse Shoes by the Carload

Horse shoes for use in this shop, are brought in large lots. Ten thousand shoes comprising a recent order lasted the shop but

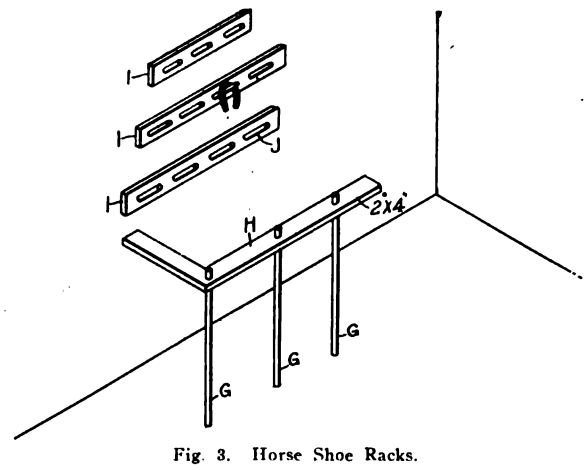


Fig. 3. Horse Shoe Racks.

three or four months and often, a carload of shoes is purchased at one time. There are horse shoes all along the forge side of the shop. Shoes stacked in great piles, in racks, and on pins which have been driven into scantlings along the wall.

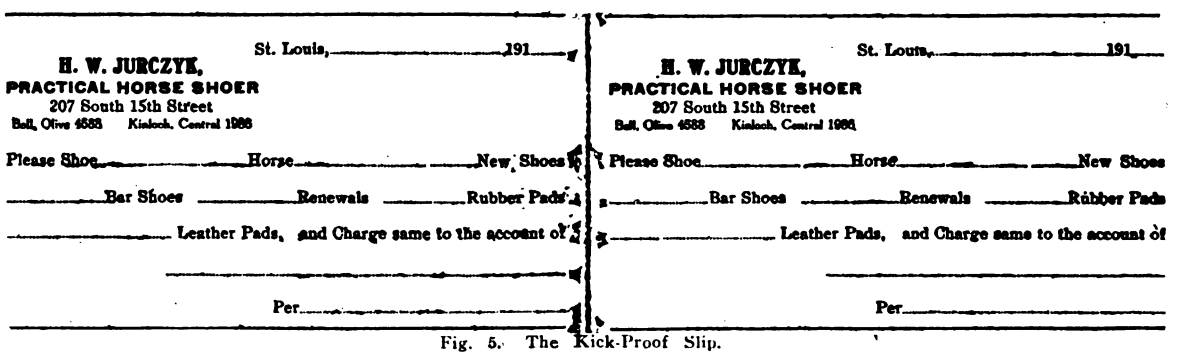
Figure 3, shows how some of the shoes are disposed of. Rods or pieces of gas pipe are driven snugly into holes bored in the floor as shown at G G, Fig. 3, and a piece of 2 x 4 inch scantling is fastened to the tops of the rods as shown at H. These rods are piled full of new shoes, packed carefully and evenly, and it is surprising how many shoes can be stored in one of these racks and what a pleasing appearance is presented by the columns of shoes when a bit of care is taken with their piling.

Above the floor storage racks, scantlings are spiked to the wall over and between the two forges, and pins have been bored and driven into the scantlings to receive sets of fancy shoes. The wall scantlings as shown in Fig. 3 at I I I, have been placed from 8 to 10 inches apart, as they are to receive small or large shoes, and the pins J, have been spaced far enough apart to allow shoes to be put in place and removed from the pins without the bunches of shoes being in the way of each other.

Shoe Racks Near the Forges

More shoe racks—double-barrelled ones—are placed at each anvil, convenient to the smith, so there never is any excuse for a mixed-up pile of shoes on the floor beside of any anvil. This rack is shown by Fig. 4. It is made much the same as the one shown by Fig. 3, only there are two scantlings and two rows of rods or pipes instead of one row. Fig. 4 shows a portion of one of these racks, the scantlings, shown at K K, being made as long as desirable or as there may be room for them. Those in the St. Louis shop are about four feet long.

The old shoes which are removed from horses, are taken care of by the boy, and once a week, these shoes are carefully looked over and those that can be used again, are taken to a forge and piled in one of the racks, to have the attention of a smith at the very


St. Louis, 191

H. W. JURCZYE,
PRACTICAL HORSE SHOER
207 South 15th Street
Bell, Olive 4583 Kinloch, Central 1986

Please Shoe Horse New Shoes
Bar Shoes Renewals Rubber Pads
Leather Pads, and Charge same to the account of

Per

St. Louis, 191

H. W. JURCZYE,
PRACTICAL HORSE SHOER
207 South 15th Street
Bell, Olive 4583 Kinloch, Central 1986

Please Shoe Horse New Shoes
Bar Shoes Renewals Rubber Pads
Leather Pads, and Charge same to the account of

Per

Fig. 5. The Kick-Proof Slip.

Digitized by Google

first opportunity. The rest of the shoes, those not fit to be used again, are placed in the yard by the boy, not thrown down helter skelter, but are packed "in and out" as closely as possible, under a shed. Sometime, these shoes will be sold, whenever the price for old iron is favorable. But Mr. Jurczye told the writer, that until the war came on, he had not sold old shoes for several years and had a young mountain of old ones in the shed which brought mighty good war prices!

One Blower for Four Fires

A single, electrically driven blower furnishes plenty of air for the four fires, all drawing the necessary blast from a single trunk-pipe and regulating the air received by a gate at each forge. The air pressure in the trunk pipe being maintained at maximum pressure all the time, even while all four fires are going "full steam ahead."

In the rear of the shop is a portable forge, and this is often pressed into use in cold weather, and when 250 horses are shod some days—and nights—the five fires are surely needed. There are also hand blowers for two of the fires for use in case the work does not make it necessary to run the large blower.

A "Ticket" System

Mr. Jurzye said that for several years, he had frequent disputes with customers in regard to what had been done, and when, to certain of their horses. It had become almost impossible, he said, to get along without more or less constant friction and he was put to his wit's end to find some way for keeping things straight. It did not make so much difference, he said, where customers had only three or four horses, for then it was easy to remember what was done when the horses went to the shop.

But, he said, when several concerns had over 100 horses each, and knew each horse only by the number branded upon its hoof, then "keeping track of this" was a tough proposition. The problem was solved, very satisfactorily for this shop at least, by making use of the slips, or "tickets" shown by Fig. 5.

When a horse came to the shop, a set of these tickets (two exactly alike) were filled

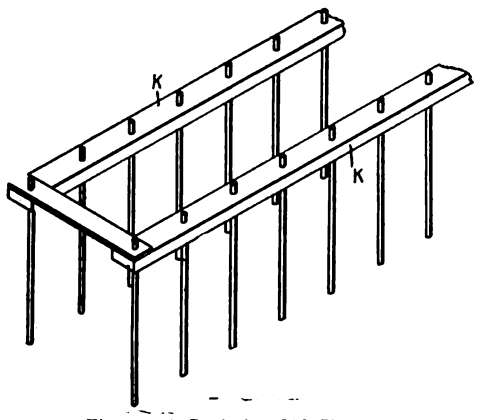


Fig. 4. A Rack for Old Shoes.

out, one given to the man who brought the horse and the other, torn from the first along the perforated line, would be filed by the smith for use when making up his bills at the end of each month. When the boy, on his saddle horse, went after a string of horses, he took a bunch of these "tickets," and before taking the horses back to the shop, he filled out a pair of tickets for each horse, had the half signed which came to the shop with the horse, and then, there was no more trouble in the settlement, about what had been done to any horse at any given time, for a look through the slips, would tell the story.

The slip which came to the shop, showed the smith exactly what he was to do to each horse and also carried the signature of someone in authority to do the work in question. The slip which was given to the horse owner, enabled him to check the bills of the smith, also to check the work which had been done on the horse at the time it was returned from the smithy. All in all, the ticket system, so the writer was advised, proved a great convenience, and by no means would the shop do business without that or some equally good system of keeping track of work done and ordered.

It was suggested that a sort of duplex book be used, so as to avoid writing out two tickets, exactly alike. This method was criticized because, it was stated, that the use of carbon paper was not a very inviting proposition on account of the rather hard usage the tickets were sometimes subjected to, being carried in the pocket, horseback or afoot, and the handling of carbon paper in wind or rain not being very desirable. But the writer is still of the opinion that a duplex book, with the backs of the "original" sheets carbon coated, would prove far more convenient than the double ticket as shown by Fig. 5.

Filing the "Tickets"

For taking care of the "tickets" and their proper protection and segregation, a cabinet was used, into which the half-slips would just slide easily without projecting for wind to drag them from their pigeon holes. The cabinet shown by Fig. 6, contains 13 compartments and the horizontal partitions are all left loose. The tickets or slips are hard to get out as they do not come quite to front edge of the cabinet, but lie a fraction of an inch back of the front. But, by grasping the partition and its pile of slips with the thumb and finger, the slips—and the partition—are drawn out together until the slips can easily be gotten hold of. Then, the partition is pushed back, out of sight and out of the way.

"Ticket" Case

Some pieces of sheet zinc were cut to the same size as the half-tickets and one of the zinc strips was placed on top of the slips from each customer. In that way, it was possible to place several accounts in each pigeon hole of the cabinet, thereby adding greatly to its capacity and making the 13-hole affair take care of 100 or more accounts.

The Rock Drill Blacksmith

Part X—Construction of Various Types of Fuel, Oil and Coke Heating Furnaces

Copyright, J. F. SPRINGER



I now propose a design based largely on the improved form of oil furnace developed at the Boston Navy Yard for the purpose of imparting temperatures up to welding heats to big-chain links. In both their original form and the later improvement, two burners were employed, each sending its jet upward. Compressed air was supplied from both ends of the furnace, so that one air jet was directed against the other. These air streams, horizontally disposed, would naturally unite with the upward jets from the burners.

An aperture was left on the roof or cover, and, of course, the general combination of gases and air flowed upward through it. In the earlier form, the link would be let down into this aperture, with its lower end actually inside the fire-box. As already said, the results were not good. "It was found that in spite of careful attendance the link would burn away and be badly scored or otherwise damaged."

The later form provided a kind of chimney surrounding the aperture where the flames issued forth. The link would be let down into this chimney. The new position was perhaps 10 or 12 inches higher than the old. "No further trouble was experienced and heats were readily obtained." We have here the testimony of one of the Naval officers concerned. It tells us not only that the remedy was successful, but that the heating capacity was still good. Doubtless some heat was lost, as the chimney must have absorbed a certain quantity. On the other hand, this loss may very well have been fully offset by the fact that more gas was probably burnt in advance of the flames reaching the work than was the case with the earlier form of furnace. This would mean more heat developed before the work was reached.

I now propose that we utilize the successful experience at the Boston Navy Yard* and put it into shape usable for rock drill bits. The furnace may conveniently be built up from the ground B (see the accompanying figure showing a vertical cross-section viewed from one end of fire-box). Naturally, the floor C and the wall L L, the roof G G, and the upper extension of the fire-box E D, are all of firebrick laid in a refractory cement. The fire-box A, is thus constructed, and also the flue M F, is merely an addition to the height of D.

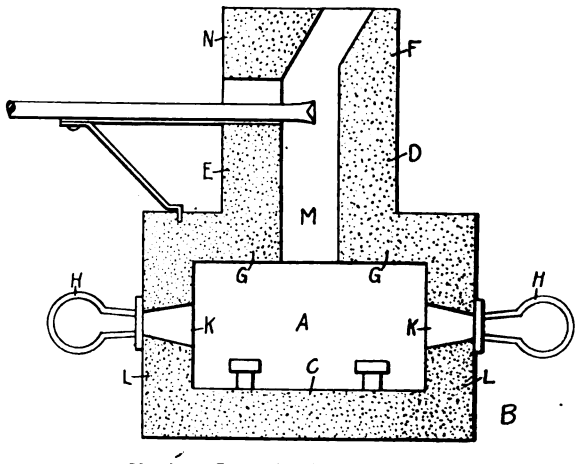
N, is the fire-box arch, arranged over a long narrow opening through which the work is introduced until the parts to be heated are squarely over the flue M. Two oil burners are shown at P P. The connections and service pipe through which the oil is supplied are not shown. H H, are two branches from the air main and K K are their inlets into the fire-chamber. It will be understood that the oil burners are arranged in a double line extending from near end of the fire-box to near the other end.

To each pair of burners standing abreast, there are two opposing streams of air supplied by the branches H H and entering through the inlets K K. As to dimensions, these will naturally be governed largely by the conditions at the mine. The top of the wall E, it will be, perhaps, convenient to get at about 34 inches above the general level B. The width of the fire chamber A, may be taken at, say, 24 inches, and its height at, say, 12. The width of M may be set at 6 or 7 inches.

The length of the furnace and the length of the fire-box and flue will naturally depend on the amount of work. The size of the air pipe H H, will turn in part on the number of openings K K, to be served. The entire furnace may be held to shape by a shell of steel plate. A door should be arranged at one end to facilitate access to the interior of the fire-chamber for the purpose of repairs and the like to the burners. There should be little or no dirt.

Facts as to Fuel Oil

Fuel oil is a product of petroleum obtained after kerosene, gasoline, and other light-weight oils have been removed. It varies greatly in accordance with the districts from which the petroleum is secured. Under ordinary conditions, it is cheap, provided the point of use is not more than a hundred miles or so from the refinery. Perhaps an average price will be from three to five cents a gallon.



Vertical Cross Section of Fire Box.

It has splendid heating qualities, 1 pound of it being equal to about 1¼ pounds of high-grade steam coal.

The burners differ greatly. In some, the oil is forced through little passageways in such manner that when the oil emerges from

* See paper in *Trans. Soc. Naval Architects and Marine Engineers*, vol. xxi (1913), p. 165 and plate 96.

Digitized by Google

the burner it is already atomized—that is, broken up into minute drops. Burners of this type are scarcely suitable for commercial use, unless adequate arrangements are made to strain the oil before sending it on to the burners. Fuel oil is often rather dirty, containing sand or other foreign matter. Other burners, use a jet of compressed air or of live steam to break up the oil as it comes out through the oil nozzle of the burner.

At some mines, compressed air will be as convenient as steam. At others, steam will be more easily gotten. With a good, commercial burner, made for dirty oil, there should be little or no trouble from clogging, whether air or steam is employed. The steam method may be used without compressed air. That is, the air needed to keep the flames going will not have to be supplied under pressure, but may simply be allowed to enter the fire-chamber.

It will now be understood, perhaps, that the type of burner may affect the arrangments of the furnace. Thus, in the improved type of oil furnace, the diagram shows tubes supplying compressed air. Naturally, when compressed air is not to be used, these tubes will be omitted. However, where simply the natural air in its uncompressed form is to be used, adequate provision must be made for admitting it into the fire-box. Oil furnaces use a good deal of air.

Naturally, oil will be bought in quantity and kept stored in some way. A steel oil tank may be used for the purpose. Let it be located in a pit and at such a level that the upper surface of the oil is well below the tips of the burners. The pit may have a concrete lining. In fact, the oil itself may be kept in a concrete reservoir, if proper steps are taken with the concrete.

A Special Coke Forge

I am indebted to the American Tempering Co., Springfield, Illinois, for particulars of a special design of forge suited to take care of a large number of drill bits at one time. Their plan shows locations for the forging appliances, the slack tub, the tub for tempering, and a pair of the special forges. The latter are disposed so as to be within convenient reach of the point where the forging is done. First, I propose to consider the design of the forges.

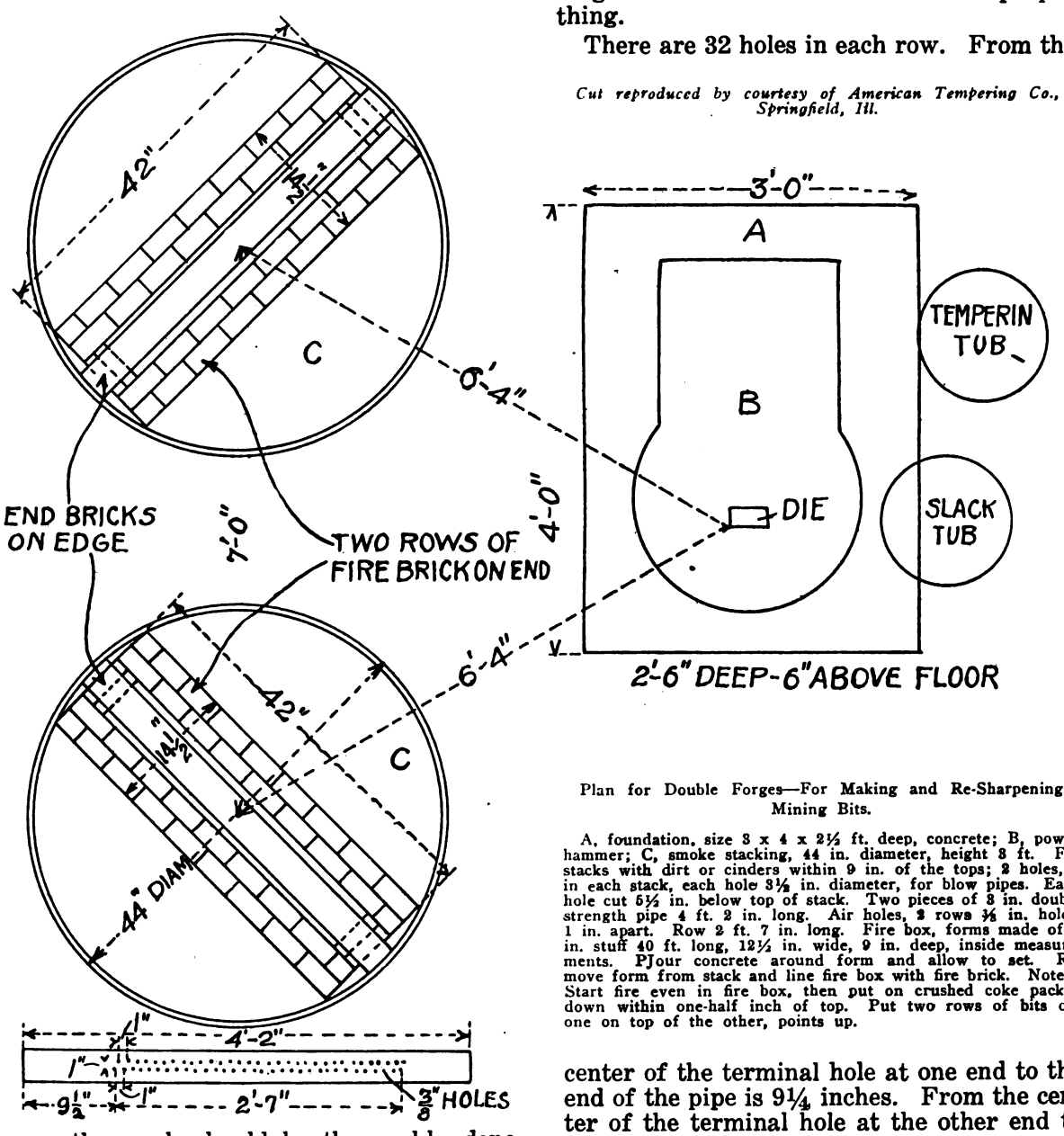
This forge burns crushed coke. It may conveniently be constructed of smoke-stacking, concrete and fire-brick. A ring of stacking, or the equivalent, is set up to form a cylindrical shell 3 feet high and 44 inches in diameter. Two holes are cut in the shell with their centers at the opposite ends of a diameter. These are 3½ inches in diameter and are both set with their centers 7¼ inches below the top of the shell.

A blow-pipe is to be passed through these and furnish the pressure air for the forge. This pipe is 50 inches long, of 3-inch size and double strength thickness of wall. When the pipe is in place, there will be something like 5½ inches clear space between its top and the top level of the shell. There is to be a long, narrow fire-box open at the top, having the blow-pipe stretched along its bottom. The shell is set so as to put this fire-box in correct position, relatively the point where the bits are to be forged. When this has been done, the shell is filled with dirt or cinders to a level 9 inches below the top, or to just about the under surface of the blow-pipe.

Concrete is to be filled into this 9 inches of space, leaving only the proper space for the fire-box. A suitable form is now to be constructed, say, of one 2-inch board for the purpose of excluding the concrete, when it is poured, from the fire-box space. The proper outside dimensions for the form are 42 inches for the length, 14½ inches for the width and 9 inches for the depth. If the end pieces are to be set in between the two side pieces, then there will be required, two boards each 42 x 9 inches, and two end pieces each 12½ x 9 inches. If, however, the side pieces are to be set in between the ends, what will be required are two boards each 40 x 9 inches, and two end pieces each 14½ x 9 inches.

This form may now be set in position, care being exercised to locate it so that the blow-pipe when passed through the holes in the shell will be exactly parallel with the long sides of the form. If it should be a trifle large, the corners may be pared down a little. The position, once determined, is marked with chalk on the inside of the shell, in case the form is to be taken out and wetted preparatory to pouring the concrete. If, however, the form is to be greased, instead of wetted, then it may be left in.

As it is quite important to have the blow-pipe fairly parallel with the form, it may seem best to cut holes in ends of the form and put the blow-pipe through shell and form. The form may be wetted or greased to prevent the concrete from sticking. In either



Cut reproduced by courtesy of American Tempering Co., Springfield, Ill.

Plan for Double Forges—For Making and Re-Sharpening Mining Bits.

A, foundation, size 3 x 4 x 2½ ft. deep, concrete; B, power hammer; C, smoke stacking, 44 in. diameter, height 3 ft. Fill stacks with dirt or cinders within 9 in. of the tops; 2 holes, 1 in each stack, each hole 3½ in. diameter, for blow pipes. Each hole cut 5½ in. below top of stack. Two pieces of 3 in. double strength pipe 4 ft. 2 in. long. Air holes, 2 rows ¾ in. holes, 1 in. apart. Row 2 ft. 7 in. long. Fire box, forms made of 1 in. stuff 40 ft. long, 12½ in. wide, 9 in. deep, inside measurements. PJour concrete around form and allow to set. Remove form from stack and line fire box with fire brick. Note—Start fire even in fire box, then put on crushed coke packed down within one-half inch of top. Put two rows of bits on, one on top of the other, points up.

case, the work should be thoroughly done. Greasing is perhaps the easier thing with which to make a sure success. Crude vaseline, properly thinned with kerosene, will be a suitable grease, but various oils may be used. The form is put in place and the concrete poured to fill in the space between it and the shell on both sides.

The concrete may be made in accordance with the formula; one measure of (Portland) cement, 2½ measures of sand and 5 measures of crushed rock. The cement should be of good quality. The sand, if it is not free from loam, clay and the like, should be washed until it is quite clean. Clean pebbles may be used instead of the crushed rock. Cinders may be substituted, but will hardly make a very good concrete. The third ingredient may, in fact, be left out entirely, and a cement motar made instead of a concrete.

The mortar will, ordinarily, cost something more, as it requires more cement to produce the same bulk at the end. The formula 1 to 2½ or 1 to 3 may be used, if only cement and sand are to be employed. These formulae mean 1 measure of cement and 2½ or 3 measures of sand. As the character of a concrete, or mortar, depends in part upon the mixing, care should be taken to make a very thorough job of it. The concrete or cement mortar is allowed to set.

Fire-bricks are used to line the space left after the form has been removed. That is to say, a double lining is put in place on each side for the full 42 inches of length.

The 50-inch blow-pipe is to be provided with a double row of small holes for the discharge of the air into the fire. These holes may properly be made ⅜-inch in diameter. The holes in each row are placed at intervals of one inch, measuring from the center of one hole to the center of the next. The two rows are placed so that the line of centers of one row is one inch from the line of centers of the other. Further, the arrangement of the two rows of holes is what is called a "staggered" arrangement. That is, the holes in the two rows are not arranged so that we have a column of holes, two abreast. The diagram will make clear what is the proper thing.

There are 32 holes in each row. From the center of the terminal hole at one end to the end of the pipe is 9¼ inches. From the center of the terminal hole at the other end to the end of the pipe is 9¾ inches. The staggered arrangement distributes the pressure better than the two-abreast mode of placing, and in addition does not weaken the pipe wall as much.

As the mode of laying off these holes may not yet be fully clear, let me state it in a somewhat different way. Lay off lengthwise on the pipe two parallel lines one inch apart. Measure 9½ inches from one end of the pipe on one of the lines and mark the place. Then mark the line at intervals of one inch until a total (counting the one 9¼ inches from the end) amounts to 32. The last mark should then be 9¾ inches from the farther end. Now, go back to the other end of the pipe and measure on the other line from the pipe-end a distance of 9¾ inches and mark the place. Then mark this line at intervals of one inch until a total of 32 places has been marked. The final place marked should be 9¼ inches from the farther end.

The blow-pipe when properly perforated is put in place and connected up with the blower or other source of pressure air. The forge will then be ready for business.

(To be continued.)

Digitized by Google

BLACKSMITH & WHEELWRIGHT

The Pioneer Journal of Its Class in the World.

Member of the Audit Bureau of Circulations.

PUBLISHED MONTHLY BY

M. T. RICHARDSON COMPANY,

71-73 MURRAY STREET, NEW YORK.

POST OFFICE BOX, 654. TELEPHONE—7377-7378 Barclay.

CHICAGO OFFICE, Garland Building, 58 East Washington St.

Entered as second-class matter at the Post Office in New York City.

M. T. RICHARDSON, President and Treasurer — F. R. WHITTEN, Secretary

M. T. RICHARDSON, Editor

FRANK L. AVERY, Managing Editor

F. R. WHITTEN, Advertising Manager — H. F. LUDINGTON, Western Representative

GEO. A. SMITH, Eastern Representative

FRANKLIN MYERS, Art and Copy Dept.

FOREIGN AGENTS:

NEW ZEALAND

MR. R. HILL, Matlock House, Davenport, Auckland, New Zealand.

GREAT BRITAIN

ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance.....$1.00
One Copy, six months, in advance.....60 cents
Single Number.....10 cents
Canadian subscriptions.....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English Money.

Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

ADVERTISING RATES SUPPLIED ON APPLICATION.

SPECIAL NOTICE

Subscribers failing to receive their magazine regularly will favor us by giving us notification to that effect.

CHANGE OF ADDRESS

Subscribers who desire the address of their paper changed should send us the old as well as the new address.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

Our Editor's Letter

JUST about this time every month I pull the cover from my typewriter and limber up my fingers to write a personal letter to all of the readers. Usually I am brimming full of ideas and can punch out words by the hundred, but this month there does not seem to be anything left to say. I sit at my desk and gaze soulfully at the Statue of Liberty which I can just see through the fog, but she does not seem to give me any ideas.

When I can see her no longer because of the falling rain I hunt through the papers, but they are full of Peace Terms, Women's Suffrage, Trans-Oceanic Flight and the weather. I don't dare talk about the weather, it is not a safe topic to dwell upon. I feel like cussing every time I think of my little two by four garden where the beans crawled out for a few brief hours and were washed back again by the rain and the tomato plants withstood the downpour for nearly a week before they too melted and returned to the earth. I assume that my readers have the same feelings about the weather.

Neither is it fitting for me to say much about Women's suffrage, for my wife occasionally reads the magazine. I wrote an editorial setting forth my views as to the Peace Terms so that subject is crossed from the list. The Trans-Oceanic flight is only two-thirds over and as the daily papers carry all the news about it, there's nothing left to say.

If I were at a party and had no more to say than I have now, I would keep quiet, but there is half a column to fill and something must be done about it. Reminds me of the ancient Assyrian whom the King requested to tell a story which would last forever. The Assyrian told of the immense granary which an Egyptian had built and into which one ant had gained entrance. The ant gathered just one tiny grain and carried it to his hole, then he came back for another, and so on.

The King suggested that in the course of years the supply of grain might run short and so the story would be ended, but the wily Assyrian said, "No, for at the next harvest the granary was again filled."

Like the Assyrian, I might easily fill the space assigned for this letter, I might tell about the crow which came to visit the corn in my garden and "caw-cawed" for half an hour, or the chickens in the next yard that "cheep-cheep" for hours at a time, despite the weather. But somehow or other a column of "caw-caws" or "cheep-cheeps" is not interesting reading. If one has nothing to say in print, one must say it in an interesting way or not at all.

There is just one thing that I might mention, however, and that is regarding old metal. The smith should not hold on to his old metal at present for it looks as though the prices on junk iron and steel were on the downward path. Doubtless there will be a big call for these metals for building work, but within a short time the market will be sold up and metal return to pre-war prices or nearly so.

At present, too, it is a good plan to buy only enough iron for current work.

I wish that the smiths would send in price lists, for if I could publish even one list in each issue, the readers could be kept informed as to prevailing prices and charge accordingly.

The Money Question

WITHOUT doubt of all the skilled laborers, the Blacksmith is the most poorly paid and yet, strange to say, the smith himself does not realize it. As we go over the price lists which we receive from various parts of the country, we often marvel at the figures. We wonder how any business man can afford to invest his money in his business and then be content with a daily wage.

The average smith is rather inclined to figure only upon the material used and his time without taking into consideration the fact that his machine tools and shop are things that should be paid for, in time, by his customers.

The smith who owns a shop and does his own work must figure upon making a fair day's pay, then to this, he must add the cost of rent, light, fuel, interest on the money invested in his shop, a certain amount to pay for the wear and tear on tools and the cost of stock used.

In making the charge to his customer, it is only fair that he explain his figures if necessary. If his customer is fair minded he will not complain. Too much business is done on the "guess" plan. The smith who estimates on a job and plans to make only enough to cover cost of material and his own time, looses money. In time, even though he seems to make a fair day's pay, he is forced to close up shop and work for some one else.

Every smith in the country, even if his shop is a one-man, one-forge, one-anvil affair with room for not more than one horse at a time, should keep track of his business so that he knows just how much money he makes and whether or not he must advance prices.

The smith who does good work need not fear that he will lose his customers just because he adds a few cents to his price list. If his customers had the choice between poor work at low prices and good work at reasonable prices they surely would choose the latter.

Practical Horseshoeing

IN this issue we print the second installment of a series of articles entitled, "Practical Horseshoeing," and, though doubtless many of our older readers will feel that some of the information is out of place and unnecessary, the information given is the foundation of the theory of horseshoeing.

One might just as well try to train a surgeon by allowing him to operate at a hospital without giving him any previous teaching, as to start a young man into the smith game without a general idea of horses.

In order to build a house a contractor must know something about cement and brick, but he must also know something of the ground upon which the house is to stand. If he builds the house upon sand, his foundation must be deep or the house will settle. So it is with the blacksmith, he must know something about the foot of the horse and why certain things must be done, or his work will not be correctly done.

Anyone can shoe a horse, simply pull off the old shoes and nail on some new ones. This might go rather hard with the horse, but he couldn't tell anyone about it until the extra hoof growth caused lameness. Besides, if the hoof growth had been even, then the shoe might be all right until the next smith did the job in the right way. But the good smith, whether he has studied anatomy or not, knows how to shoe the horse in the right way the first time.

One cannot learn too much about one's trade, so we advise all our subscribers, young or old, to read through each article in the series.

Wait But Work

THERE is an old saying, which is often quoted, that "All things come to him who waits."

Like many popular sayings this one is defective and misleading inasmuch as it seems to imply that one has simply to fold one's hands, sit at ease and time will bring the result desired. "Watchful Waiting" may be desirable under some circumstances, but is usually the resort of the man who has not the courage to make a decision and tries to postpone the settlement.

Nothing could be farther from the truth than the saying referred to. It could be amended profitably as follows: "All things come to him who waits and works," for working will have far more to do with the result than the "waiting" part of the programme.

The Cry of the Spoiled Child

BUT a short time ago we were figuratively patting ourselves on the back and telling each other that we had "done the job right," that we "had Germany upon her knees" and that "Peace is forever assured." As we read over the reports from that country we began to realize the colossal egotism that pervades Germany. Instead of taking her medicine in good grace, she must howl like an angry and spoiled child.

She refutes the responsibility for the war and blames Russia, England, France, Italy and practically every other nation, even Belgium seems to be at fault for trying to prevent Imperial Germany's hordes from trampling upon her soil and laying waste her towns.

To quote the words of her statesmen, "Germany did not want war, it was her only desire to have peace and it was only her desire for peace that drove her to her own defense."

"And besides," the German government now says, "the Americans claim that they fought imperialism, not the German people. That being so, it is not right that the German people pay the indemnity."

Our terms to Germany are harsh but just. She can never repay the loss which she has caused, but evidently she is unwilling to pay even a small part of the property damage losses and feels that the Allies are the ones to pay the indemnity.

At present, Germany's cry is not that of the conquered but the wail of a spoiled child who knows himself to be in the wrong but expects someone else to pay for the damage.

The taxes in Germany are not much greater than they are in our own country, simply because Germany is not the bankrupt nation that she claims to be. If Germany were to be given her own way and we were to accept the peace terms which she has so obligingly outlined, she would be ready for war again within five years and we would have the whole job to do over again.

The only hope for the world is to keep Germany where she belongs, to make her realize that she lost money by the war.

Digitized by Google

THERE'S NO EXCUSE FOR A SHABBY BUGGY

Manufacturers of paint and leather substitutes can supply anything needed to keep a carriage in good condition and looking bright and neat.

Paint will greatly lengthen the life of any vehicle; in fact, looking at it from that standpoint, the paint really costs nothing.

It may be safely left to the paint dealer to sell one the right kind of goods. For the wheels and body, use a special carriage varnish; for the top, a top renewer designed for that particular purpose.

If the top is worn out, some good leather substitute which is sold by the yard by stores handling dry goods, also by auto and carriage top makers, will be found a very satisfactory material for a new one. It is best to have an experienced top maker make the new top.

If the top is kept dressed with the top renewer, it is likely to last as long as the body and wheels.

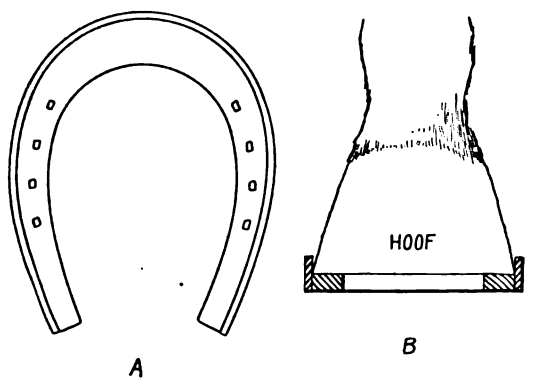
The same is true of the seat and back upholstery. A seat dressing will help greatly to prevent or retard the deterioration of the upholstery.



Shoeing Foundered Horses

From L. L. Ott, California.—I am just back from the service and in looking over the old numbers of THE BLACKSMITH AND WHEELWRIGHT notice that Mr. Albert Baker, of Wisconsin, wants to know how a foundered horse can be shod. The horse can probably never be cured because the trouble is due to long service.

The shoes that my father makes have a



piece welded on all around them. The idea is to keep the foot intact, that is so that it cannot spread and break, for the foot is very brittle. The sketch at *A* and *B* clearly shows how the outside edge of the shoe is fitted with a piece of iron to prevent the foot from spreading.

Repairing Old Wagons

From Roberts & Roberts, Iowa.—In our locality we find many farm wagons which have been dumped into some corner and forgotten and have managed to persuade the farmers to let us repair them.

Most of the wagons are regular 3′ 8″ or 4′ 6″ standard size and fitted with narrow tires. The wheels are usually dished so badly that they are useless and a tire cannot be kept on them.

Generally the wheels can be cut down to 3′ or to 3′ 8″, taking out most of the dish, then putting on a 3 by 2¼ inch bent rim and a 3 by 9/16 inch tire. The whole thing is then given about four coats of paint and we find that jobs done in this way have given ten years of service and are still in service.

It once seemed good economy to throw away the wagon gear, just because the wheels were dished, but is no longer economical. We are turning out from twelve to fifteen jobs per year of this kind and they work in with our regular work very well. By doing this work, we keep busy and save jobs that otherwise would be lost. We save material that otherwise would go to the scrap heap.

We get $42 for the job mentioned or for $57 we can furnish the four wheels new. We hope that this information will be of value to some one of the other readers and that the other smiths will make an effort to persuade farmers to have their farm wagons repaired.

For Mr. Weber of Minnesota

From W. B. Fagg, Nebraska.—I notice in the May issue of the B. & W. that Mr. J. M. Weber of Minnesota wants to know about spring welding. This work is easy if a smith goes at it in the right way and uses the right welding compound and a good clean close fire.

If you want a spring to last, it should never be split welded but flat welded. The end should be scarfed thin at the edge and at first heated to a cherry red, not above that color. Use E. Z. Welding compound and as soon as the flux flows and is thoroughly melted, place the two ends together, place some Crescent Compound on the joint and pound the metal out flat.

I have welded hundreds of springs in the last thirty years and it used to be a difficult job for me to get the welds smooth.

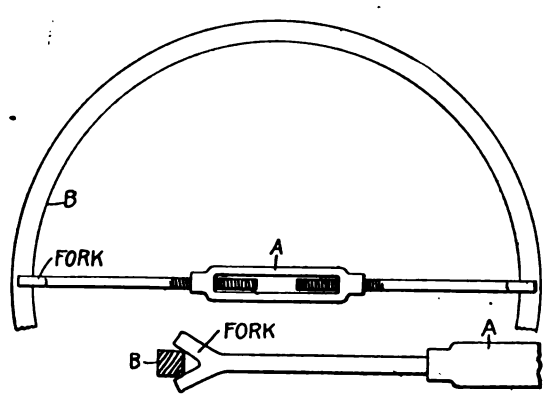
I am now getting along in years and soon I will have to let others take my place but I will never get too old to read the B. & W., if I can get it. I want to do more writing for the magazine but of late have been pretty busy since the war took all my boys.

I see so many questions asked by the other smiths, questions that I can easily answer, that I want to write and help them. My prices are good and most of my work is done for cash. If I had to do work for some of the prices which I see published in the B. & W. I would have to shut up shop.

It is time that the smiths woke up and put their prices up where they belong. This can be done now, there never will be a better time. We should all stick together.

Opening Stubborn Rims

From G. D. Gillis, New Hampshire.—If Mr. R. A. Roberts, of Florida, will take a three-quarter inch turn buckle, as shown at *A*, and weld on enough three-quarter inch rod to make the required length and adjust



An Easily Constructed Rim Opener.

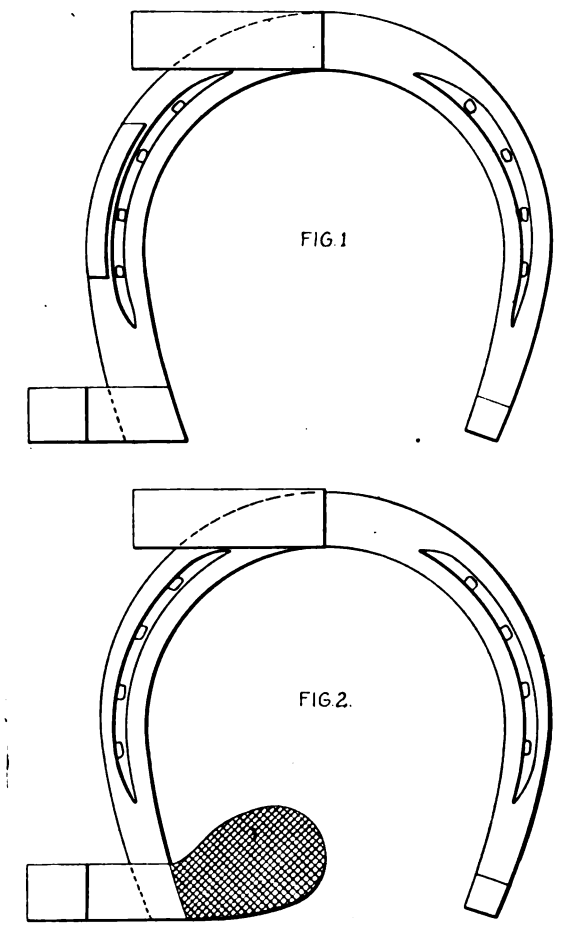
the device by putting in a block of wood for larger rims, then split the ends *B* and point them to keep them from turning, I think he will be able to open stubborn rims very satisfactorily.

Straightening a Horse's Foot

From G. W. Kenyon, New York.—I notice that Mr. Charles Chism, of Ohio, wants to know how a hoof can be straightened when the horse wears his shoe on the outside, and as yet I have not seen any suggestions. I suppose most blacksmiths might consider this a simple question easily answered, but it is not as easy as it looks. There are plenty of blacksmiths who do not know the correct method for shoeing.

Every day I see horses whose shoes are worn badly on the otuside and not worn at all on the inside. Sometimes this trouble is due to a faulty gait and sometimes to improper shoeing, though I never have any trouble from the latter cause. If the gait is faulty, a crooked shoe is necessary, a straight one should not be used.

My best suggestion to Mr. Chism is that he send the horse to me, but since this would be impractical, I will try to tell him how the work can be done. In the first place, the foot should be dressed level. Then a shoe should be made, as shown in Fig. 1, if the case is very stubborn, or in some cases a shoe like that in Fig. 2, will work very nicely. I make such shoes from new steel tire iron one by one-quarter or one by five-sixteenths. In some cases one and one-eighth by five-sixteenths and sometimes one and one-quarter by five-sixteenths.



Shoes for Straightening a Foot.

The size of the shoe in most cases will determine the size of the stock to use. You will notice that shoe No. 2 just fits the foot, while that one shown in sketch No. 1 extends from one-quarter to one-half of an inch to the side. Both designs show the shoe for the right foot.

A smith who cannot shoe a horse that is not deformed or does not have a faulty gait, and do the work so that the horse will not wear the shoes unevenly had better quit the trade and find another job.

Conducting Business

From George W. Hardy, Idaho.—It has been sometime since I have written anything for your magazine and this letter may not be of much interest, but I will try and give a few hints on building and conducting a smith shop.

I think that we should change our policies a little bit and have our blacksmith shops well lighted and have plenty of room, if we can afford it. The shop should be kept warm, but well ventilated. A cold shop with open cracks and broken windows is hardly fit when used as a barn, much less as a workshop.

My shop is made of stucco, the walls are three inches thick, upon the outside of that a thickness of wall paper, and over that a

Digitized by Google

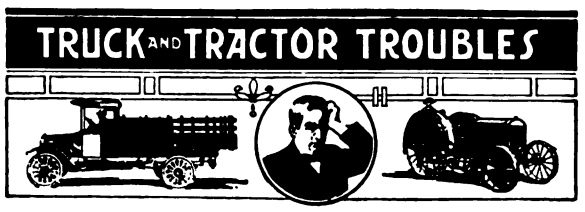
facing which is painted so that I am not bothered with wind or cold.

I think that a shop should be kept clean and attractive, both inside and out. I keep my old shoes and small scraps of iron from the anvil piled in a neat, round pile in the street at the front of my shop. This makes a nice advertisement for me and a convenient place for old shoes. Tools should all have a place and they should all be kept in it as well as be kept in good condition, for a man can do better work with good tools and faster work if he knows where they are.

A smith should be urged to read not only the blacksmith papers, but other publications so as to keep posted on up-to-date methods. He should try to be honest with his customers and do his work as best he can and make a point of never putting out a job unless it is well done. He should try to do the work as it comes into his shop and not show any favoritism. If the smith will only adhere to these rules, there is little doubt of his success.

I ran a shop over 20 years in old Mexico and moved from there in 1912. I spent some time in Arizona and then came to this town where I have been for about four and a half years. When I came here I had a large family and could not get any help. I ran into debt for tools and material for my building, but now I am out of debt and have managed to build a comfortable house.

In my shop I have two forges, a power drill, a disc grinder, emery wheel and am now installing a trip hammer. All this machinery is run by an electric motor. I expect to put in an oxy-acetylene welding plant next month.



A Trailer Car

From L. L. Ott, California.—I am greatly interested in trailer cars and have done a lot of experimenting along that line. I notice that those that were pictured in your November number were all right, but in some ways they are not.

My experience tells me that the front spring is not correctly put on. I use a trailer on a Ford car and in making the spring I use one and one-quarter inch or one and three-eighths inch steel axle stock which I took from an old spring wagon. I had the spindle ends turned down to fit the Ford front wheels and cones, then cut it and welded it so as to give a 56-inch tread.

I would suggest that the sills be made of ash, oak or hickory. I made mine out of pine, but found that it was not satisfactory. Fig. 1 shows a side view of the trailer. The side and end gate boards are removable so as to give a floor rack for lumber. The springs that I have are not heavy enough to carry 800 lbs., but will carry 600 easily.

Sketch No. 2 shows the spring and my method of hanging both upon the sill and the axle. I left a six-inch clearance at *A*,

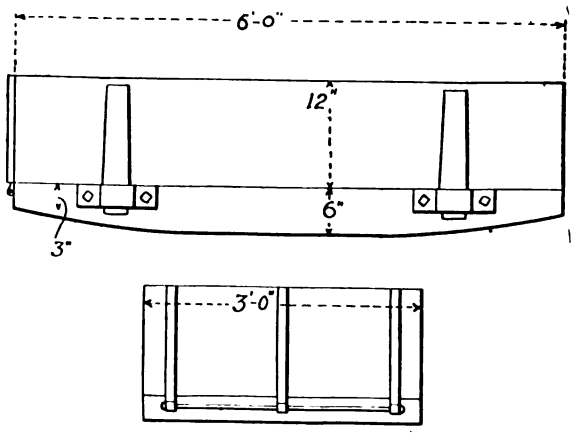


Fig. 1. Sketch of Side and Rear of Trailer Car.

but if the load is heavy an eight-inch clearance is probably better. At the rear end of the spring the fitting upon the sill has a slot in it, as shown at *B*, so that the bolt which holds the spring to the sill can slide back and forth. The tongue or towing bar was a problem and I gained considerable experience from my trailer. First, I put the towing spring on the front of the trailer axle, but it would not work satisfactorily so I changed it and put the towing bar on the middle sill

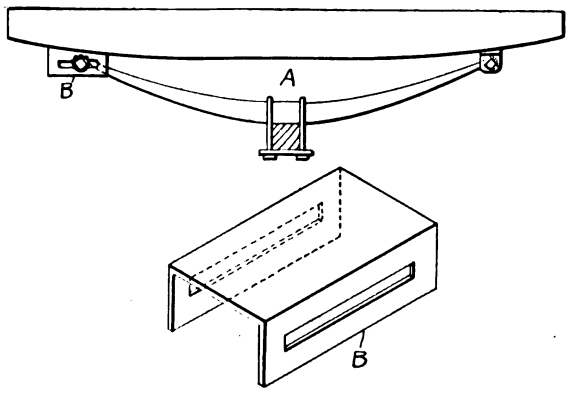


Fig. 2. How the Springs Are Hung.

of the trailer, one bolt in the end at the center of the trailer with two clips to hold it in place.

Before I explain how the towing iron was made I will give my reason for fastening it to the trailer body instead of the axle. As the trailer moves along the wheels jump up and down in order to take care of ruts and bumps in the road, but the body of the car runs more smoothly. I found that if the trailer were towed from the axle the bar would have too much up and down motion.

In Fig. 3 I show the hitch or tongue which I used. The tongue itself is made of round iron rod which will slip inside of the pipe *A*. A recoil spring *D* is put upon each side of a pin in this bar and the pipe slipped over it. Upon the end of the pipe is screwed a cap *B* and the towing arm *C* fitted to it.

This towing arm fork fastens upon the fitting, shown at *E* and this fitting which is made of five-eighth by two and a half inch iron with a seven-eighth inch hole through it, is fastened so that it will fit right over the Ford spring clips. The trailer hitch, shown at *F*, goes on the other end of the pull bar and fastens to two eyes on the trailer body. This permits up and down movement

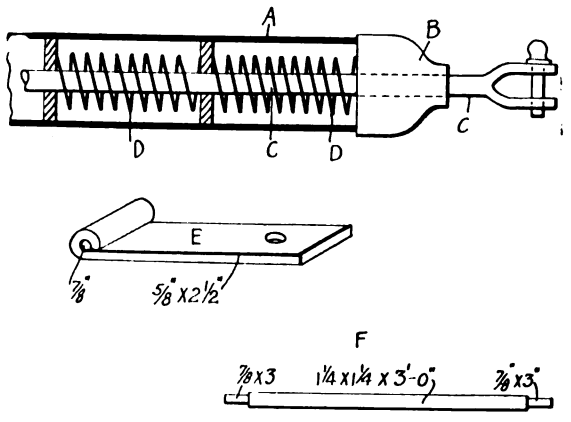
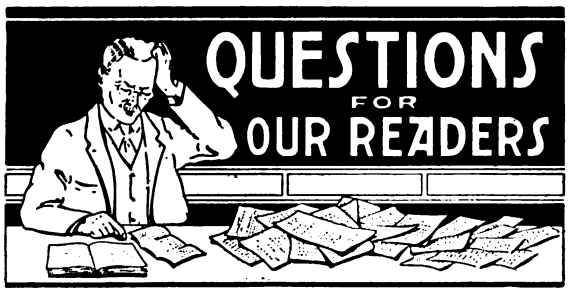


Fig. 3. The Towing Bar.

of the trailer. The hole in this is large so that there is plenty of play and the car or trailer can be turned.



A Saw Table?

From Chas. Jenkins, Canada.—Will some brother be good enough to tell me through the columns of the Blacksmith and Wheelwright how to build or make a small saw table or stand for a circular rip saw with tilting table and give full measurements and also how fast the saw should run. How many R. P. M., say, on a ten or twelve inch saw for use in a small country shop.

A Kerosene Torch

From C. C. Richter, Iowa.—Will someone kindly send me directions and drawings from which I can construct a kerosene preheating torch in which I can use kerosene under air presusre? (This question was asked in our March number, but as yet we have received no answers, surely someone of our readers have constructed such a device.—EDITOR.

Adjusting a Peerless Tire Bender

From Jonathan Vickers, New Mexico.—We have in our shop a Peerless tire bender which we bought in 1906. This machine has a rule on the side marked 1.2.3.4.5 and can be adjusted by moving the rule.

Can any of the readers of the BLACKSMITH & WHEELWRIGHT tell me how to adjust this machine so as to bend a circle of four feet or of three feet six inches, or in fact any particular size that I desire?

Tire Bench

From John O. Lane, Arkansas.—Will some one of my brothers tell me how to build a bench from angle iron? I want to use this bench for putting on tires.

CARRIAGE BUILDERS' NATIONAL ASSOCIATION

We have received notice from Mr. Henry C. McLear, Secretary of the Carriage Builders' National Association that the annual convention and exhibition will take place in the Hotel LaSalle, Chicago, Ill., during the week commencing September 23, 1919.

Both the convention and the exhibition will be held under the same roof and the committee have arranged with the Hotel LaSalle for railings, chairs, tables, rockers, settees, as well as for the other furniture needed to fit up the exhibitors' spaces.

The exhibitors must be either active or associate members and the exhibits must be confined to models of vehicles or automobiles and to the materials used in the construction of the same, as well as coachmen's outfits, harness and horse furnishings. No finished vehicles will be exhibited.

Exhibits may be placed in position either on September 19th or 20th, and after being placed upon exhibition cannot be removed until after 5 o'clock on Friday, September 26th. As usual, the exhibition will close on certain days so that attendants and visitors may attend the business meetings. All applications for space as well as membership may be addressed to Mr. Henry C. McLear, Secretary, Mt. Vernon, N. Y.

Only Horses

These fine lines from Captain Galtrey's book on "The Horse and the War" every lover of the horse will keenly appreciate:

Every head across the bar,
Every blaze and snip and star,
Every nervous, twitching ear,
Every soft eye filled with fear,
Seeks a friend and seems to say,
"Whither now and where away?"
Seeks a friend and seems to ask,
"Where the goal and what the task?"

. . . . . .

Wave the green flag! let them go —
Only horses, Yes, I know;
But my heart goes down the line
With them, and their grief is mine —

. . . . . .

There goes timid, child-like trust
To the burden and the dust!
High-born courage, princely grace,
To the peril it must face!
There goes stoutness, strength and speed,
To be spent where none shall heed;
And great hearts to face their fate
In the clash of human hate.

. . . . . .

Wave the flag and let them go! —
Hats off to that wistful row
Of lean heads of brown and bay,
Black and chestnut, roan and gray!
Here's good luck in lands afar —
Snow-white streak and blaze and star!
May you find in those far lands,
Kindly hearts and horsemen's hands.

(Quoted from *Our Dumb Animals.*)

Digitized by Google

Index to Advertisers

Aetna Nut Co., horseshoe calks.....Front cover
Akron Rubber Mold and Machine Co., tire repair outfits 2
Akron-Selle Co., gears..... 27
American Calk Co., calks.....Front cover
American Horse Shoe Co., horseshoes...2nd cover
Anti-Borax Compound Co., welding compounds .....4th cover
Armstrong Mfg. Co., bolt dies..... 27
Armstrong-Blum Mfg. Co., punches and shears .....Front cover
Barcus Mfg. Co., horse stocks.....Third Cover
Barnett, G. H., files and rasps.....Front cover
Bear Mfg. Co., automobile accessories..... 27
Bertschy-Bermo Co., welding plants..... 25
Bicknell Mfg. & Supply Co., punches and shears, spark plugs 8
Birch Motor Cars, automobiles.....4th cover
Bradley, C. C., & Son, shaft coupler....3rd cover
Brooks, The, Machine Co., welding outfits..... 6
Bryden Horse Shoe Works, horseshoes..... 26
Buffalo Forge Co., blacksmiths' tools..... 7
Burden Iron Works, horseshoes.....3rd cover
Butterfield & Co., taps, dies and screw plates.. 8
Campbell Iron Co., supplies.....Front cover
Canedy-Otto Mfg. Co., blacksmiths' tools..... 4
Capewell Horse Nail Co., horse nails..Front cover
Champion Blower & Forge Co., blowers..... 3
Champion Shock Absorber Sales Co., Inc., shock absorbers 25
Champion Tool Co., blacksmiths' tools..... 4
Chase, L. C., motor topping.....Front cover
Columbus Anvil & Forging Co., anvils..4th cover
Cortland Welding Compound Co., welding compounds 1
Crane Puller Co., pullers..... 28
Cray Bros., blacksmiths' tools..... 25
Crescent Machine Co., woodworking machinery 6
Diamond Calk Horseshoe Co., horseshoes.... 19
Doxey, N. D., welding compounds..... 27
Durner, A. E., disc sharpeners.....3rd cover
Eberhard Mfg. Co., iron castings..... 23
Edwards, C. D., Mfg. Co., shears..... 27
Electric Blower Co., blowers..... 27
Electric Wheel Co., wheels..... 27
Empire Mfg. Co., wheels..... 27
Felton, Sibley & Co., paints..... 1
Firestone Tire & Rubber Co., tires..... 26
Fisher & Norris, anvils and vises..... 8
Franklin Steel Works, toe calks..... 6
Giant Grip Horseshoe Co., horseshoes..... 28
Gogel Mfg. Co., tire heaters..... 25
Greb Co., grip pullers..... 2
Greenfield Tap & Die Corporation, screw plates and blacksmiths' machinery..... 22
Gwilliam Co., ball bearings.....4th cover
H. B. Tempering Process Co., tempering process 2
Hart Mfg. Co., stocks and dies.....4th cover
Harvey Spring & Forging Co., auto springs.. 24
Hay-Budden Mfg. Co., anvils.....4th cover
Heller Bros., horse rasps, tools, etc..... 8
House Cold Tire Setter Co., tire setters, hollow and spoke augers.....4th cover
Jenner, H. W. T., patents..... 20
K. & W. Rubber Co., tire reliners..... 21
Kerrihard Co., hammers 2
Little Giant Co., hammers..... 1
Linde Air Products Co., oxygen..... 8
L. S. P. Calking Machine Co., calking machines 24
Lucas, J. L., & Son, auto heel rests..Front cover
Macgowan & Finigan Cordage Co., hammers 4th Cover
Ness, Geo. M., Jr., steel stamps.....Front cover
New Era Spring & Specialty Co., springs.... 1
Nicholson File Co., files and rasps..... 24
Ottawa Mfg. Co., engines 25
Palm, Louis F., tire coolers .....4th cover
Parker, C. L. attorney 27
Parks Ball Bearing Machine Co., woodworking machinery 6
Peck, Stow & Wilcox Co., pincers 28
Phillips-Laffitte Co., welding plates 1
Phœnix Horseshoe Co., horseshoes and toe calks 5
Porter, H. K., bolt clipper .....4th cover
Prentiss Vise Co., vises .....4th cover
Plymouth Foundry & Machine Co., punches and shears 6
Prest-O-Lite Co., Inc., gas 8
Rahe Auto and Tractor School, school..... 25
Rosewater Electric Co., blowers 6
Rowe Calk & Chain Co., horseshoe calks, Front cover
Sheldon Axle & Spring Co., axles..... 5
Sherwood, W. L., woodworking machinery.... 27
Standard Horse Nail Co., horseshoe nails, 4th cover
Star Mfg. Co., agricultural implements..... 25
Sterling Tire Corp., hoof pads 28
Stokes Bros. Mfg. Co., rasps.....Front cover
Strite Governor Pulley Co., plow blade sharpeners 2
Thompson Tuyere Iron Co., tuyere iron, 4th cover
Union Horse Nail Co., horse nails 24
Universal Wheel Compressor Co., wheel compressors 27
West Tire Setter Co., tire setters, hammers.... 25
Wheel B, Top & Hardware Co., supplies.... 25
Whisler Mfg. Co., nut splitters, jointer heads.. 25
Witte Engine Works, engines 27
Young, W. F. Veterinary remedies 25

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co..... 25

Anvils
Columbus Anvil & Forging Co.....4th cover
Columbus Forge & Iron Co..... 2
Fisher & Norris 8

Attorneys
Hay-Budden Mfg. Co.....4th cover
Parker, C. L..... 27

Auto Heel Rests
Lucas, J. L. & Son.....Front cover

Automobile Accessory
Bear Mfg. Co..... 27

Automobiles
Birch Motor Car Co.....4th cover

Automobile Springs
Harvey Spring & Forging Co..... 24

Axles
Sheldon Axle & Spring Co..... 5

Ball Bearings
Gwilliam Co.....4th cover

Blacksmiths' Machinery
Greenfield Tap & Die Corp..... 22

Blacksmiths' Tools
Buffalo Forge Co..... 7
Butterfield & Co..... 8
Canedy-Otto Mfg. Co..... 4
Champion Blower & Forge Co..... 3
Champion Tool Co..... 4
Cray Bros..... 25
Heller Bros. Co..... 8
Nicholson File Co..... 24
Peck, Stow & Wilcox Co..... 28

Blowers
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3
Champion Tool Co..... 4
Electric Blower Co..... 27
Rosewater Electric Co..... 6

Bolt Dies
Armstrong Mfg. Co..... 27

Bolt and Rivet Clippers
Porter, H. K.....4th cover

Calking Machines
L. S. P. Calking Machine Co..... 24

Calks, Horseshoe
Aetna Nut Co.....Front cover
American Calk Co.....Front cover
Diamond Calk Horseshoe Co..... 19
Rowe Calk & Chain Co.....Front cover

Calks, Toe
Franklin Steel Works 6

Catalogue and Reference Book

Chisels
Champion Tool Co..... 4
Peck, Stow & Wilcox Co..... 28

Clipping Machines

Chucks
Buffalo Forge Co..... 7

Disc Sharpeners
Durner, A. E.....3rd cover
Little Giant Co..... 1

Engines
Ottawa Mfg. Co..... 25
Witte Engine Works 27

Farriers' Tools
Barnett Co., G. & H.....Front cover
Champion Tool Co..... 4
Heller Bros. Co..... 8
Peck, Stow & Wilcox Co..... 28

Files and Rasps
Barnett Co., G. & H.....Front cover
Nicholson File Co..... 24
Stokes Bros. Mfg. Co.....Front cover

Forges
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3

Gas
Prest-O-Lite Co., Inc..... 8

Gasoline Engines
Witte Engine Works..... 27

Gears
Akron-Selle Co..... 27

Grip Pullers
Greb Co..... 2

Hammers
Champion Tool Co..... 4
Kerrihard Co..... 2
Macgowan & Finigan Cordage Co.....4th cover
Little Giant Co..... 1
Peck, Stow & Wilcox Co..... 28
West Tire Setter Co..... 25

Hollow Augers
House Cold Tire Setter Co.....4th cover

Hoof Nippers
Champion Tool Co..... 4

Hoof Pads
Sterling Tire Corp..... 28

Hoof Parers
Champion Tool Co..... 4

Trucks
Akron-Selle Co..... 27

Hoof Shears
Champion Tool Co..... 4

Horseshoes
American Horseshoe Co.....2nd cover
Bryden Horse Shoe Works 26
Burden Iron Works .....3d cover
Diamond Calk Horseshoe Co..... 19
Giant Grip Horseshoe Co..... 28
Phœnix Horseshoe Co..... 5
Rowe Calk & Chain Co.....Front cover

Horseshoe Calks
Diamond Calk Horseshoe Co..... 19
Rowe Calk & Chain Co.....Front cover

Horseshoe Nails
Capewell Horse Nail Co.....Front cover
Standard Horse Nail Co.....4th cover
Union Horse Nail Co..... 24

Horse Stocks
Barcus Mfg. Co.....3d cover

Iron Castings
Eberhard Mfg. Co..... 23

Jack Mfrs.
Rowe Calk & Chain Co.....Front cover

Kerosene Engines
Witte Engine Works 27

Lawn Mower Grinders

Motor Topping
Chase, L. C.....Front cover

Nut Splitters
Whisler Mfg. Co..... 25

Oxygen
Linde Air Products Co..... 8

Paints and Varnishes
Felton, Sibley & Co..... 1

Patents
Jenner, H. W. T..... 20
Parker, C. L..... 27

Pincers
Peck, Stow & Wilcox Co..... 28

Plow Blade Sharpeners
Strite Governor Pulley Co..... 2

Pullers
Crane Puller Co..... 28

Punches
Champion Blower & Forge Co..... 3

Punches and Shears
Bicknell Mfg. & Supply Co..... 8
Peck, Stow & Wilcox Co..... 28
Plymouth Foundry & Machine Co..... 6

Schools
Rahe Auto & Tractor School 25

Screw Plates
Butterfield & Co..... 8
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3
Greenfield Tap & Die Corp..... 22

Shaft Coupling
Bradley, C. C. & Son .....3d cover

Shears
Edwards, C. D. Mfg. Co..... 27

Shock Absorbers
Champion Shock Absorber Sales Co., Inc... 25

Spoke Augers
House Cold Tire Setter Co.....4th cover

Springs
New Era Spring & Specialty Co..... 1

Starters

Steel Stamps
Ness, George M., Jr.....Front cover

Stocks and Dies
Butterfield & Co..... 8
Champion Blower & Forge Co..... 3
Hart Mfg. Co.....4th cover

Supplies
Campbell Iron Co.....Front cover
Wheel B, Top & Hardware Co..... 25

Swages
Champion Blower & Forge Co..... 3

Tempering Process
H. B. Tempering Process Co..... 2

Tires
Firestone Tire & Rubber Co..... 26

Tire Bending Machines
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3

Tire Coolers
Palm, Louis F.....4th cover

Tire Heaters
Gogel Mfg. Co..... 25

Tire Reliners
K. & W. Rubber Co..... 21

Tire Repair Outfits
Akron Rubber Mold & Machine Co..... 2

Tire Setters
Buffalo Forge Co..... 7
House Cold Tire Setter Co.....4th cover
West Tire Setter Co..... 25

Tire Shrinkers
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3

Tongs
Champion Tool Co..... 4

Tool Grinders
Phœnix Horseshoe Co..... 5

Tuyere Irons
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3
Thompson Tuyere Iron Co.....4th cover

Veterinary Remedies
Young, W. F..... 25

Vises
Butterfield & Co..... 8
Fisher & Norris 8
Prentiss Vise Co.....4th cover

Wagons
Akron-Selle Co..... 27

Welding Compounds
Anti-Borax Compound Co.....4th cover
Cortland Welding Compound Co..... 1
Doxey, N. D..... 27

Welding Outfits
Brooks, The, Machine Co..... 6

Welding Plants
Bertschy Bermo Co..... 25

Welding Plates
Phillips-Laffitte Co..... 1

Welding Supplies
Linde Air Products Co..... 8

Wheel Compressors
Universal Wheel Compressor Co..... 27

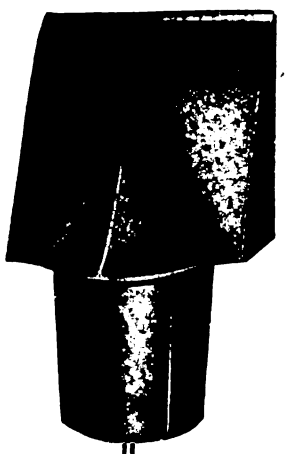
Wheel Dishers
Crescent Machine Co..... 6

Wheels
Electric Wheel Co..... 27
Empire Mfg. Co..... 27

Woodworking Machinery
Buffalo Forge Co..... 7
Crescent Machine Co..... 6
Parks Ball Bearing Machine Co..... 6
Sherwood, W. L..... 27

Wrenches
Champion Tool Co..... 4
Peck, Stow & Wilcox Co..... 28

Wrenches (Knife Handle and Pipe)



SIX STYLES OF CALKS

but only

ONE BEST QUALITY

and that—the very best—backed up by fifteen years of scientific study and perfect mechanical equipment.

Diamond Calks

are shaped better—wear longer and fit in the shoe tighter.

They're best by test and there's a calk for every purpose.

MANUFACTURED BY

DIAMOND CALK HORSESHOE CO.
DULUTH, MINN.

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

will be inserted under this head at 3 cents a word, including the address, for each insertion, payable in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York
PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT

Patents

PATENTS FOR INVENTIONS.
H. W. T. JENNER, patent attorney and mechanical expert, 622 F Street, Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trademarks registered.

For Sale

FOR SALE
Blacksmith, implement, hardware and garage business. Oil and gas station. All corner property. Ill health reason for selling. Write for particulars, W. J. OTT, Woodlake, Calif.

FOR QUICK SALE
I offer at great sacrifice one scientific hydraulic cold tire setter No. 2; one L. S. P. calking machine; $125 buys them both. Address L. L. WARREN, Pendleton, Texas.

FOR SALE
1 No. 408 Champion steel horseshoer's forge, $25; 1 heavy floor emery stand, $10; 1 No. 1 Eureka, new style tire bender, $10; 1 iron split pulley, 28 in. diameter, 5 in. face, for 1 11/16 shafting, $5; 1 new steel shafting, 1 11/16 x 12 ft. long, $5; 1 steel shafting, 1 7/16 x 16 ft. long, $4; 9 adjustable 12 in. iron drop hangers for 1 7/16 in. shafting, $2 each; 1 "one cow" Viking cream separator, good as new, $20. Address Andrew Bjerk, Box 105, Colgate, N. D.

FOR SALE
A fully equipped blacksmith and horseshoeing shop. The only shop in this village. Plenty of work for two men. A rich farming community. Reason for selling, I have bought a farm and wish to move on to same. For particulars, write, E. K. Johnson, Box 64, Grasston, Minn.

FOR SALE
Arco Wand Vacuum Cleaner runs by motor or gas engine. I have both. A big money maker for a live young man acquainted with this business. Will sell with motor or engine or both. Have no one to run it now. Mrs. M. A. Tuttle, Lake Charles, La.

FOR SALE
One 16 in. lathe with 8 in. bed, with all equipments and chuck, price $200. One 18 in. lathe, 10 in. bed, with all equipments. Price $225. Both lathes in good shape and suitable for auto shops or small machine shops. Cullander Machinery Co., Belzoni, Miss.

FOR SALE
Blacksmith Shop, fully equipped, in a first-class farming country, a bargain if taken at once. No opposition. Apply to W. D. Lewis, Box 64, LaMoille, Ill.

FOR SALE
One shop, tools and stock doing $5,000 business; also 1 house and lot. E. J. Bee, Auburn, W. Va.

Wanted

WANTED
Good all around blacksmith at once. Young married man preferred. M. W. ABTS, Morrill, Nebr.

WANTED
Good all around Blacksmith, 16 years' experience, handy with acetylene welding torch, would consider good position in shop where automobile work is done. Please give particulars and wages you are paying in first letter. J. Grusch, Winchester, Wis.

WANTED
Experienced horseshoer as floor man. Must also be able to do job work when not shoeing. Must be a sober, reliable, steady man. To such a good job will be given the year round. Address J. F. Coleman, Rice Lake, Wis.

WANTED TO BUY
Second hand new way two cylinder air cooled gasoline engine, 3½ horsepower. Address I. H. Farmer, Box 23, Taintor, Ia.

Miscellaneous

PRINTING FOR BLACKSMITHS
Increase your business by handing out our printed business cards with "The Blacksmith's Ten Commandments" printed on back; 50 for $1.00. NEWS PRINTING CO., Stockton, Ill.

Tires

DOUBLE TREAD TIRES
We carry a full line of new and used tires and tubes. H. GINSBERG & SONS, 236 W. 48th Street, New York City.

PRICE WRECKERS

Double Tread Tires with Double Lock Stitch

30x3	N. S.	$5.50	34x4½	N. S.	$11.00
30x3½	"	6.50	35x4	"	10.00
32x3½	"	7.25	36x4	"	10.25
31x4	"	7.50	36x4½	"	11.00
32x4	"	8.00	36x5	"	12.00
33x4	"	9.50	37x4½	"	12.25
34x4	"	10.00	37x5	"	13.00

We carry a full line of Firsts and Factory Blemished Tires and Tubes at moderate prices.

ROYAL TIRE EXCHANGE
282 Halsey St. Newark, N. J.

TIRES

GUARANTEED 4000 MILES

Buy *New Firsts* and save 40 to 50% on the *New Prices*

"Tires that repay in satisfaction"

	Plain	Non-Skid	Tubes		Plain	Non-Skid	Tubes
30x3	10.00	10.75	1.50	34x4	21.00	22.50	2.75
30x3½	12.50	13.50	1.75	34x4½	28.00	29.50	3.50
32x3½	14.00	15.00	2.00	35x4½	29.00	31.50	3.50
31x4	19.00	20.00	2.25	36x4½	30.00	32.50	3.50
32x4	19.75	21.00	2.50	35x5	33.50	36.00	4.00
33x4	20.50	22.00	2.50	37x5	35.50	38.00	4.00

DOUBLE TREAD TIRES

	Plain	Non-Skid		Plain	Non-Skid
28x3	4.50	5.00	34x4	9.00	10.00
30x3	5.50	6.00	36x4	9.00	10.00
30x3½	6.60	7.35	34x4½	10.00	11.00
32x3½	7.00	7.70	35x4½	10.00	11.00
31x4	7.70	8.25	36x4½	10.00	11.00
32x4	7.70	8.25	35x5	11.00	12.00
33x4	9.00	10.00	37x5	11.00	12.00

TERMS: I will send tires C. O. D. privilege of examination. 2% cash discount when remittance in full accompanies order.

NOTE: Special proposition to dealers.

I have built a reputation for service and dependability for over 10 years. In selling you, it is my desire to maintain and uphold this reputation.

I. JAFFESS

1319 B Fifth Avenue Cor. 111th Street

241 B West 54th Street Near Broadway

NEW YORK CITY

Tires Tires

Big Drop in Tire Prices

We reduced our prices on

DOUBLE TREAD TIRES

from 10 to 25%.

30 x 3½	Non-Skid	- - -	$ 6.50
34 x 4	"	- - -	9.75
37 x 5	"	- - -	13.00

Write for full particulars

B. LIBEN & COMPANY
DEALERS AND JOBBERS
In All Makes of Tires and Tubes

261 WEST 54th STREET NEW YORK
TELEPHONE CIRCLE 2460

TIRES --- DOUBLE TREAD

Guaranteed for good service. Big—Strong—Extra Heavy. 30x3 Tire $5.50; 30x3½ $7.00; 33x4 $10.00; 34x4 $10.25; 36x4½ $13.00; 37x5 $14.00. Big saving on other sizes and Tubes also. Trade in your old Tires. 10% deposit required on C. O. D. orders. Send for list now! State size and bead of tire. Orders filled same day received.
M. LIBEN & CO., 205-RK, W. 48th St., N. Y. City

Phoenix Horse Shoes and Bull Dog Calks

Phœnix Horse Shoes and Bull Dog Toe Calks are known wherever horses are shod. Both these products are of standard quality and are made by the largest manufacturers of horse and mule shoes in the world. This company does business on a very large scale, having extensive rolling mills and factories at Joliet, Ill., and Poughkeepsie, N. Y., but the main office of the company, to which all correspondence should be addressed, is at Chicago, Ill. Readers are invited to send for samples of these shoes and calks.

Sandbo Starter

The blacksmith is the logical man to sell automobile equipment to the farmer, and he should become familiar with automobile accessories. He should be able to make quite a little money by installing starting devices on old cars, or cars not equipped with starters. The farmer who intends to keep up-to-date should investigate the Sandbo Starter designed especially for Ford cars and manufactured by the Bear Manufacturing Co., Rock Island, Ill.

This device can be installed upon practically any Ford car and requires but little work in installing it. It is said to be positive operating since it turns the engine over past two compression points. Our readers who are interested in this device should write the Bear Manufacturing Co. at the address given above.

Why Not Do Tire Repairing?

Many blacksmiths are installing tire repair equipment as a means for securing extra income, and there are hundreds of blacksmiths who should investigate this proposition because, if properly managed, tire repairing can be made a very profitable business. The Akron Rubber Mold & Machine Co., Sweitzer Avenue, Akron, Ohio, manufacture a thoroughly reliable line of vulcanizing machinery. Readers who are interested should write today for free booklet which is published by this company and entitled, "Tire Repairing, the Business of the Times." In writing, readers are requested to use the coupon attached to the advertisement of this company, or else mention THE BLACKSMITH AND WHEELWRIGHT.

Are Your Horses Ready?

Each year before commencing the Spring season of hard work, it pays to look over your horses to be sure that they are in the best possible condition to do their best work. Heal up that sore or remove the blemish that decreases their value. Strengthen the strained tendon or ligament by the mild stimulating action of some good liniment, yet be carefull in the selection of that liniment, choosing one that will not lay up the horse during treatment, that will not remove the hair or leave a scar, yet a liniment that acts quickly and surely. Abrosbine is all this and in addition is economical as it is highly concentrated, requiring only a few drops at each application. Absorbine has been successfully used for over a quarter of a century. Absorbine may be procured of your druggist or will be delivered prepaid to your address upon receipt of price. Interesting booklet on treatment of horses sent free to our readers who write W. F. Young, P. D. F., 55 Temple St., Springfield, Mass.

H-B Tempering Process

We call the attention of our readers to the advertisement of the H-B Tempering Process Co., of Clearbrook, Minnesota, and would suggest that readers who do any steel tempering write this company for particulars relative to their new process of tempering.

Welding Compound

Smiths who do oxy-acetylene welding should send for samples of the new welding compound which is manufactured by the Weldum Products Co., of Indianapolis Ind. We understand that this product is giving great satisfaction and that all who use it are entirely pleased with the results.

Justrite Plow Blade Sharpener

This is the busy season for the smith who works in a farming country, for there is much business to be had in the plow repair line. The old hand methods of doing work are gradually going out of date for the simple reason that with machines many times as much work can be done in the same time and more money made.

The Strite Governor Pulley Company, 307-309 South Third St., Minneapolis, Minn., are marketing an interesting tool at a very low cost. This machine, which is belt operated is designed for sharpening plow lays or blades and is said to do the work in an efficient manner. The machine is not, however, limited in its work for it will take care of practically any knife sharpening operation where a fine drawn edge is required.

In operation, the share, shovel or blade to be sharpened is moved back and forth upon the anvil. At the same time a roller, operated by the machine itself automatically wipes or rolls out the point with a forward and back motion. The machine requires approximately two horsepower and is made of heavy materials so that it should last a lifetime.

Buffalo Forge Catalogue

We are in receipt of Section No. 400, a 33-page catalogue of fans blowers and exhausters. As our readers are no doubt aware, the line of fans manufactured by the Buffalo Forge Company of Buffalo, N. Y., is extremely large and comprises fans for practically every purpose. The fans, blowers and exhausters made by this concern are the result of practical knowledge which has been

Digitized by Google

gained by years of experience in this particular line.

Blacksmiths who are in need of fans either for the forge or for shop ventilating purposes, of any size should familiarize themselves with the Buffalo Forge Company's line. Send for Section No. 400 (catalogue), it is sent free to interested readers.

New Maxotire Factory

The K & W Rubber Company, of Delaware, Ohio, recently purchased more than ten acres of ground along the Big Four Railroad in Delaware and have erected a new and modern factory which is to be devoted to the manufacture of their product Maxotires. This building is said to be the largest in the world devoted exclusively to the manufacture of tire reinforcements.

The company have already moved into their new factory and say that within a short time will be running their own rubber stock.

Ambrine.

The Ambrine Laboratories, Inc., 347 Madison Ave., New York, N. Y., are putting on the market an emergency case for automobilists in addition to their regular emergency case, which was primarily designed for hospitals and industrial plants.

Ambrine is considered by prominent surgeons and doctors to be one of the best remedies for all kinds of burns or scalds. It is claimed by the manufacturers and borne out by photographs taken of various cases that when Ambrine is used upon serious burns, the cure is practically complete.

Immediately upon the application of Ambrine to burns or scalds the pain is alleviated. Ambrine then forms a shell over the injury which protects the tissues against outside contamination. This shell forms a heat retainer which maintains the temperature of the injured spots so that the injury heals rapidly.

Upon applicaion Ambrine is adhesive but after a short period it becomes non-adhesive. Thus it can be removed practically without pain and without tearing the tissues. Since it can be easily removed the skin heals without apparent scars or without contraction.

Farm Lighting Plant.

At the present time there is a big call for farm lighting plants. The average farmer has gotten over his feeling of dread at the gasoline engine simply because he has accustomed himself to this machine in his automobile. The day of oil lamps has passed and every rural community offers a large field for farm lighting plants.

The Mayhew Co., Meinecice Ave., Milwaukee, Wis., manufactures a complete line of lighting plants. These plants may be had in a great many sizes and styles from 3 to 15 kilowatts. Their type K farm lighting plant (which is illustrated in the advertisement now running in this magazine) is complete and consists of a gasoline engine, a generator, and a set of storage batteries, together with indicating devices and controlling apparatus.

Every reader in a rural community should familiarize himself with this particular line and write for a catalogue, and, if possible, obtain an agency for such an outfit.

This company also manufacturs generators for use in garages where storage battery work is being done. In such event the generators may be had to operate directly from the line shafting.

Insyde Tyres.

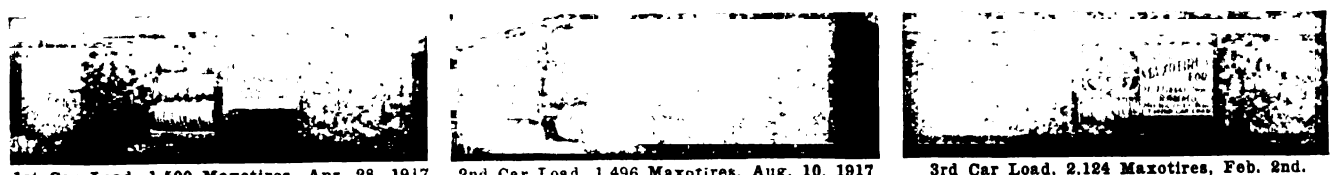
Ninety per cent. of the tire troubles today are caused by blow-outs and blow-outs are due to rupturing of the tire fabric. A puncture or any broken place in the tread sooner or later develops into a blow-out unless it is attended to.

To obviate all chances for blow-outs, or in fact punctures and the trouble caused thereby, the Automobile Accessories Co., B. & O. R. R. & Blue Rock St., Cincinnati, Ohio, manufactures an accessory called an "insyde tyre," which not only removes the air pressure load from the tire, but tends to deflect any nails, tacks or sharp pins from cutting the tube.

Insyde Tyres are made of especially tough fabric, which is vulcanized with rubber over tire molds. They are shaped to fit the casing into which they are to be inserted. Thus there is no danger that the tube will be pinched by wrinkles. The part of the insyde tyre which comes in contact with the tube is coated with rubber and so treated that it will not stick to the tube.

The manufacurers claim that when insyde tyres are used the life of the casing will be prolonged from one thousand to five thousand miles. The manufacturers claim that insyde tyres never wrinkle, creep, pinch or stick to the inner tube. They are made in sizes from three inches to five inches tire diameter for practically all shoes on the market.

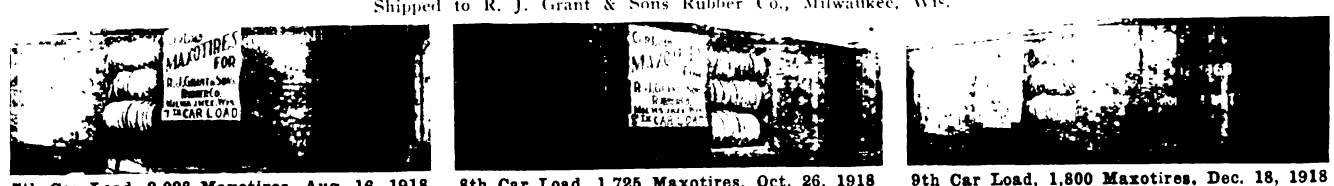
In order to show what can be done with Insyde Tyres, sometime ago a casing that had been blown out nine times was fitted with an Insyde Tyre and the tire driven over 800 miles with no signs of trouble.



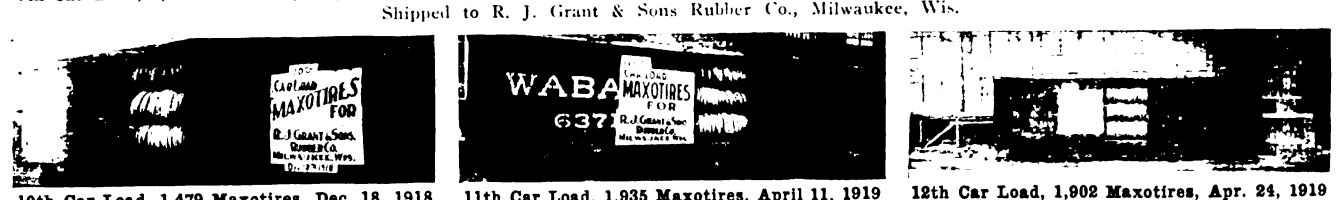
1st Car Load, 1,500 Maxotires, Apr. 28, 1917 — 2nd Car Load, 1,496 Maxotires, Aug. 10, 1917 — 3rd Car Load, 2,124 Maxotires, Feb. 2nd.
Shipped to R. J. Grant & Sons Rubber Co., Milwaukee, Wis.



4th Car Load, 1,840 Maxotires, Apr. 19, 1918 — 5th Car Load, 2,000 Maxotires, May 30, 1918 — 6th Car Load, 1,986 Maxotires, July 13, 1918
Shipped to R. J. Grant & Sons Rubber Co., Milwaukee, Wis.



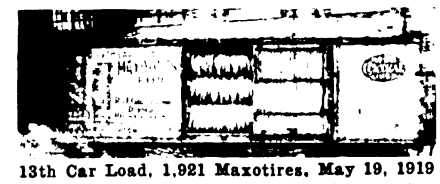
7th Car Load, 2,028 Maxotires, Aug. 16, 1918 — 8th Car Load, 1,725 Maxotires, Oct. 26, 1918 — 9th Car Load, 1,800 Maxotires, Dec. 18, 1918
Shipped to R. J. Grant & Sons Rubber Co., Milwaukee, Wis.



10th Car Load, 1,479 Maxotires, Dec. 18, 1918 — 11th Car Load, 1,935 Maxotires, April 11, 1919 — 12th Car Load, 1,902 Maxotires, Apr. 24, 1919
Shipped to R. J. Grant & Sons Rubber Co., Milwaukee, Wis.

13 Car Loads

of



13th Car Load, 1,921 Maxotires, May 19, 1919
Shipped to R. J. Grant & Sons Rubber Co., Milwaukee, Wis.

MAXOTIRES
MAKE ALL TIRES TROUBLE PROOF

TO ONE AGENT
IS SUFFICIENT PROOF OF
MAXOTIRE PRACTICABILITY and ECONOMY
Mr. CAR OWNER

Boil it down: MAXOTIRES must be giving users satisfaction, either taking the grief out of motoring or keeping down tire-bills or both. They must be practical. If those owners who used the 2 Car-Loads shipped in 1917, did not like them for any reason, the agent would not have purchased any more. But he bought 8 Cars in 1918 and 3 Cars already in 1919 and now has a standing order for 2 large Car-Loads every month. His business is increasing. Why?

PHOTOS of many CAR-LOAD "re-orders" from other agents will be gladly furnished upon request.

The photos prove that MAXOTIRES *must be* something *useful—practical*—and ***they are.*** When we started the reliner in 1908, we had the MAXOTIRE in mind, but it took years and years to *perfect* the MAXOTIRE. There is nothing like the MAXOTIRE in preventing blowouts (even right at the rim), eliminating punctures, tube pinches, protecting one's tube and in adding *thousands and thousands* of miles to *weak* tires.

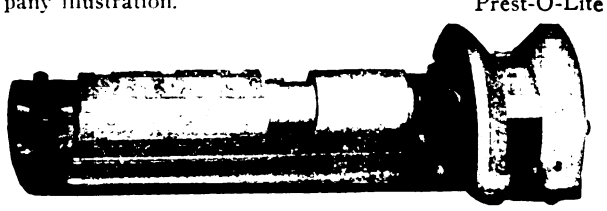
MR. CAR OWNER: What better evidence would you want than CAR-LOAD RE-ORDER EVIDENCE that with MAXOTIRES, you may enjoy freedom from tire trouble and unnecessary tire expense?

MAXOTIRES are saving owners much trouble and hundreds of thousands of dollars. Write *today* for "free" MAXOTIRE CATALOG and name of nearest MAXOTIRE AGENT and begin to save too.

K & W RUBBER COMPANY, 50 to 60 Channing St., Delaware Ohio
Reliable—Established 1908 at Ashland, Ohio

Wagon Maker's Outfit.

W. L. Sherwood, of Kirksville, Mo., is putting on the market a valuable tool for the wood worker known as "The Wagon Maker's Outfit," which consists of a nine-inch jointer head as shown by the accompany illustration.



The Wagon Maker's Outfit.

The company manufacturers a large line of wood working tools at prices well within the reach of small shops. Smiths who intend enlarging their plants should write for the 1919 catalog, No. 15.

Prest-O-Lite Acetylene.

Every repairman who has ever handled an oxy-acetylene torch realizes that unless the gases used are pure he cannot do decent work. If any moisture is present or if the acetone is driven off from the containers the necessary amount of heat at the torch is not obtainable. In some cases if the acetone reaches the work the metal is badly damaged.

The Prest-O-Lite Co., Inc., 30 E. 42nd St., New York City, are among the leaders in the gas manufacturing line and make a specialty of their "dissolved acetylene," as they term it. Under the Prest-O-Lite service plan, the user simply returns the tanks for filling and receives in exchange a filled set. So great is the distribution of the Prest-O-Lite cylinders that the operator need not wait for his supply, neither must he carry a large number of tanks on hand.

Prest-O-Lite gas is said to be in the purest form obtainable. It is said to give the best results when used with any type of blowpipe or welding torch. Our readers should familiarize themselves with 'Prest-O-Lite acetylene and the service that goes with it.

The Bickley Power Pulley.

The Bickley Power Pulley is a small compact device 6½ inches in diameter, weighing twelve pounds, which enables one man to move extremely heavy loads. It is built like an automobile transmission, being entirely enclosed, gear driven, roller bearings and running in grease. It is provided with twenty-three feet of cable, all of which is wound on the pulley.

Outfits are provided to fit the needs of the automobilist farmer, contractor, electrician and factory. The cable is instantly ready for use on account of the over-hung construction. A carrying handle retains the cable on the pulley when not in use.

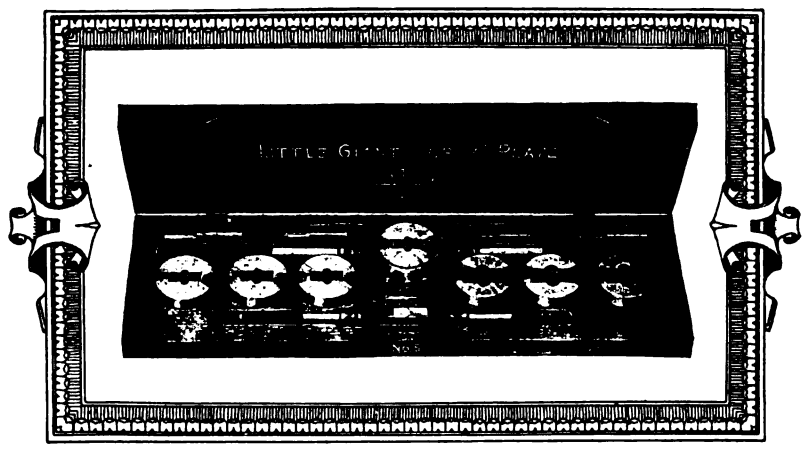
The ratchet handle makes it possible to operate the device in very restricted quarters. It will hoist to within one inch of the point of support. Automatic irreversible pulling ratio up to 150 to one. Fully guaranteed. Operates in any direction. One turn of the handle hoists about one-half inch. The device is made by the Bickley Mfg. Co., 1035 Chestnut st., Philadelphia, Pa.

Ambu Moves.

AMBU devices and equipment for battery shops and garages have made good so well—have so filled a long existing demand—are so popular that they quickly outgrew their old quarters in the Gunther Building.

On May first the American Bureau of Engineering, the makers of the famous AMBU Electric Trouble Shooter, moved their offices and stock rooms to the "Row." They are now located at 1601-1603 S. Michigan Ave., Chicago. Garage men should make note of the new address.

Digitized by Google



The price of good service

The man who sends his car to you for repairs wants two things —dependable work and quick work.

He wants results—not excuses: performance—not promise. Satisfy him and you've made a friend for life—a booster—the best advertisement you can buy.

The price you pay to give your customer good service is often no more than the price of a

Look for the trademark

SCREW PLATE

These handy tools in your shop eliminate guesswork and make many repair jobs easy. They represent exactly the difference between "just ordinary" work and the best work that can be done. And the time and labor they save on the first few jobs will pay their cost many times over.

"LITTLE GIANT," "O. K.," "GREEN RIVER," "LIGHTNING."
The Screw Plates that save you dollars.

Ask your Supply Dealer for folder telling how G T D Tools mean dollars of profit.

GREENFIELD
TAP & DIE CORPORATION
Greenfield, Massachusetts, U.S.A.
World's Largest Manufacturers of Screw Cutting Tools

Digitized by Google

EMCO MALLEABLE **E** IRON CASTINGS

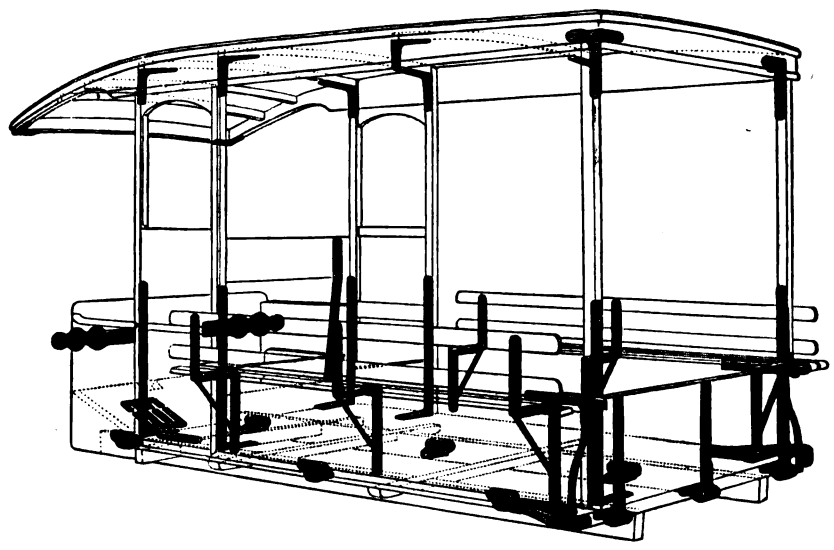
—QUALITY AND SERVICE—

We do not make Bodies,

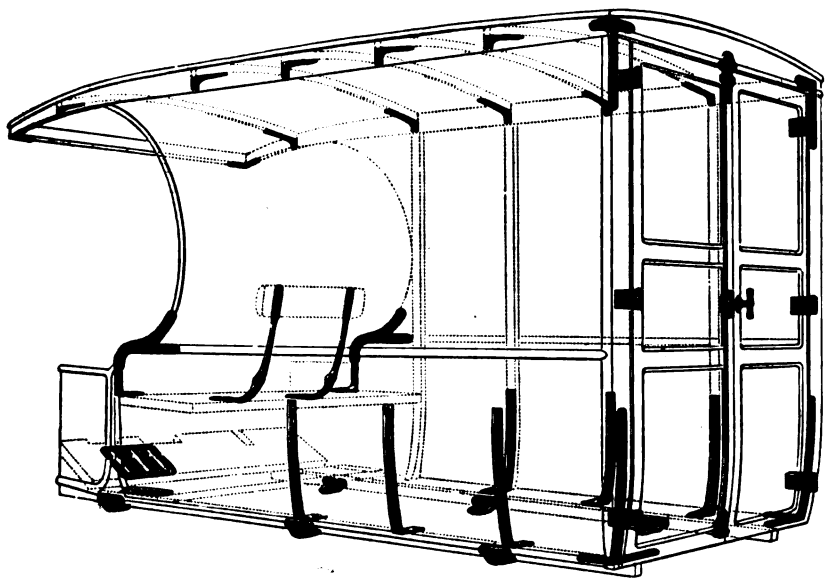
but only

IRONS

for them



Set No. 6



Set No. 2

Our Bulletin

"ASSEMBLIES OF IRONS"

for Vehicle Bodies, will

be mailed on

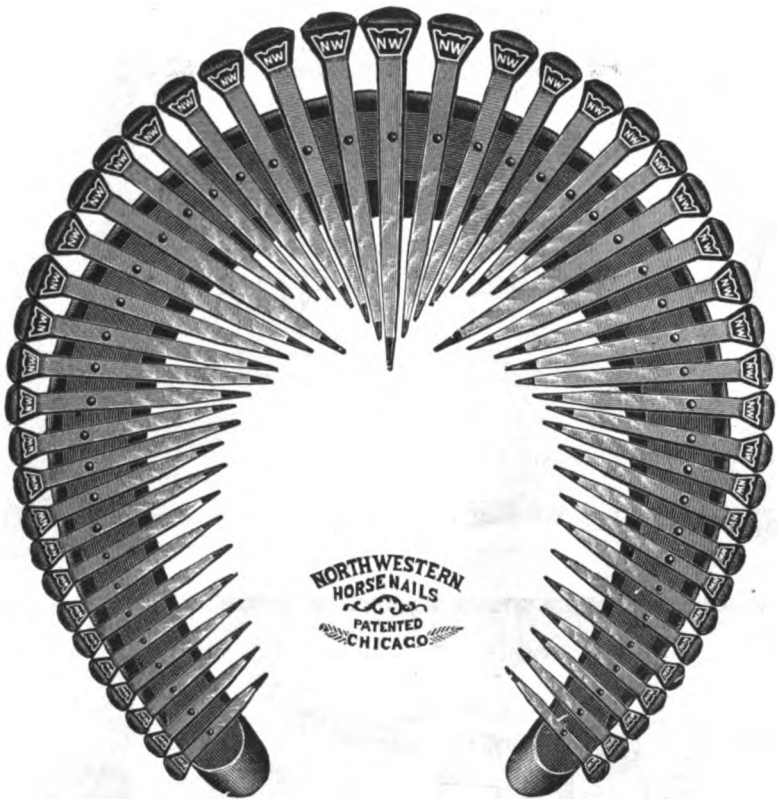
request

THE EBERHARD MANUFACTURING COMPANY

CLEVELAND, OHIO

Digitized by Google

NORTHWESTERN HORSE NAILS



MADE OF THE BEST QUALITY MATERIAL

The most perfect in form and finish and will hold a shoe longer than any other nail made.

THE RE-INFORCED POINT makes it the easiest to drive and the safest to use.

UNION HORSE NAIL COMPANY

Manufacturers

CHICAGO ILLS.

The Spring

bears the responsibility of the entire automobile world.

On it depends the comfort, the very lives, in fact, of those who ride in motor cars.

On it depends, too, the life and upkeep of the automobile. For engine, mechanical parts, and tires are all vitally affected by spring action.

How important then, that Harvey Springs be used always!

This is a case where good judgment says use the best.

Write for free Harvey Book of Springs containing specifications for all springs.

Harvey Spring & Forging Co.
1086 17th Street
Racine, Wis.

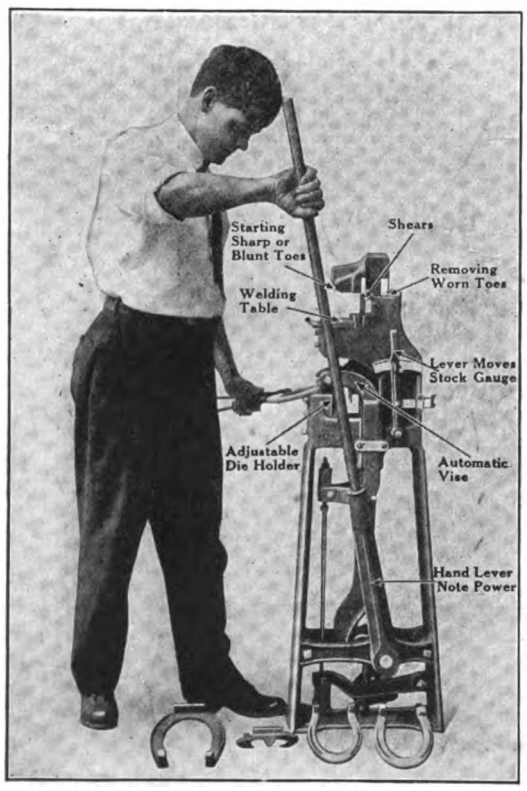
Harvey RACINE

Easy Riding Guaranteed

BOLTLESS AUTOMOBILE SPRINGS

1919 MODEL
THE L. S. P. CALKING MACHINE

The Greatest Time and Labor Saving Machine On Earth



1919 MODEL—Fully covered with Patents

OUR 1919 Model is the same as our 1918. We agree with the users and so would you, that it cannot be improved.

Do not mistake this for a machine which makes toe calks or a foot vise. This machine is for turning heel calks, both Blunt and Sharp, sticking and welding toe calks, clipping and trimming ends of shoes. IT CALKS SHOES, doing the work just the same as you do by hand with the hammer, only it is done much better and easier, and in a fraction of the time.

In turning heels, you can turn up just as much stock as you wish, upset or stoveup to make as heavy as you like and square up the calks without use of hammer. There is no losing of toes when you weld on the L. S. P.

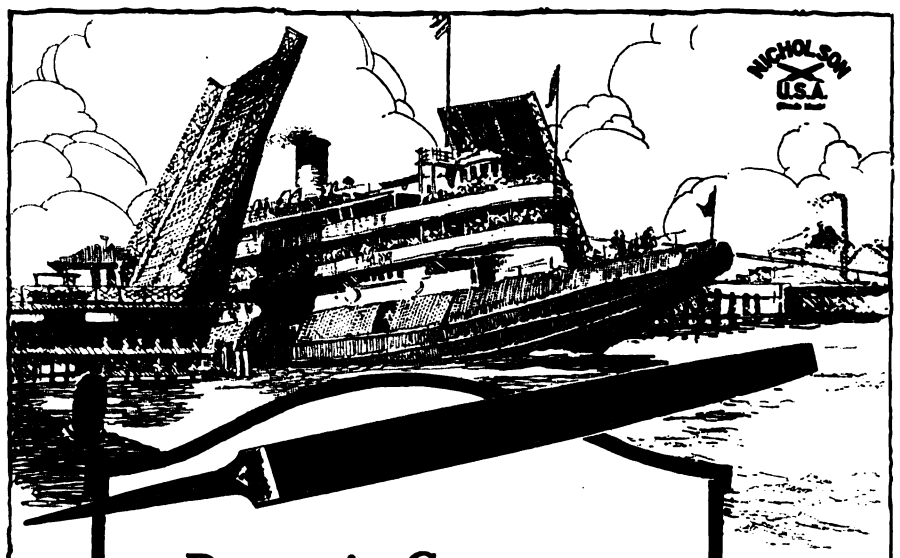
It is a strong, handsome, well made machine and will last, as you might say, a life time, fully warranted for one year. It is in use in the best shops in the United States, users claiming more for it than we do.

Write at once for full information and prices.

L. S. P. CALKING MACHINE CO.

P. O. Box 225 WYALUSING, PA., U. S. A.

NATIONAL MACHINE CO., Brighton, Ontario, Canada



Domestic Commerce Nows Calls for Renewed Development

The natural growth of every community on the North American continent, halted by the war, is resuming. Now, while American industries are looking overseas toward foreign trade, far-seeing manufacturers are also working for a more efficient development of every agency of internal economic progress

Nicholson Files

will contribute to the bridging of rivers, the building of roads, the mining of ores, the harnessing of waters, and to every productive American enterprise.

Write for our Catalog and File Filosophy —a fifty years' education in Files and Filing in an hour's reading.



Nicholson File Co.
Providence, R. I.

Digitized by Google

A Big String of Fish Isn't Carried up a Side Street

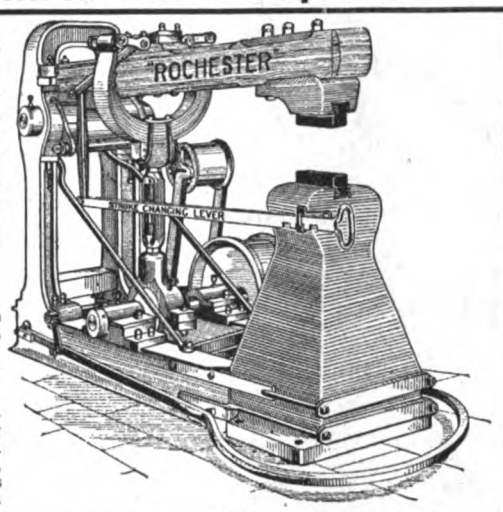
THE ROCHESTER WEST TIRE SETTER

And the average man will stop and feast his eyes on that string of fish, with that longing feeling; well, you know what it is. Now, we want you to look on the

ROCHESTER HELVE HAMMER

with that same longing feeling.

It is a well-built, substantial tool for welding and general forging. MADE IN SIX SIZES, 25 lb. to 100 lb. Heads and two styles of frame.

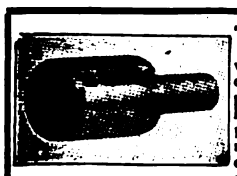


Read More Catalogs and Fewer Newspapers

THE ROCHESTER HELVE HAMMER

SEND A CARD TO THIS ADDRESS FOR OUR CATALOGUE AND PRICES

WEST TIRE SETTER CO.
ROCHESTER, NEW YORK



THE only successful Chuck to hold square taper shank wood bits and drills so you can use them in your drill press. See the spring. It keeps the drills from dropping out of the chuck. Made right. Priced right. If your dealers won't supply you we can.

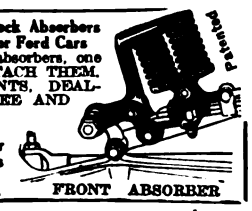
WHISLER MFG. CO., Gibson, Iowa

"CHAMPION" Shock Absorbers for Ford Cars

E-Z Ride springs, four absorbers, one set; ANYONE CAN ATTACH THEM. CAR OWNER'S, AGENTS, DEALERS WRITE FOR "SEE AND TRIAL OFFER."

Guaranteed by

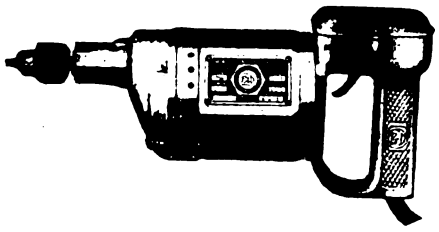
Champion Shock Absorber Sales Co., Manufacturers
Dept. 458.
INDIANAPOLIS, IND.



FRONT ABSORBER

New Black & Decker 3/16 and ¼-inch Portable Electric Drills Have Trigger Switch.

The Black & Decker Mfg. Co., Baltimore, Md., have recently placed on the market two new models: a 3/16" and a ¼" portable electric drill *"with the pistol grip and trigger switch."* This patented feature has hereto-



The Black & Decker Portable Drill.

fore been obtainable only in the Black & Decker 3/16", ½", 5/8" and 7/8" sizes.

These two models are one-hand drills, which is made possible by the pistol grip and trigger switch. This makes it possible to handle the tool like an automatic pistol, the current being controlled by pulling the trigger without the necessity for changing the position of the hand holding the drill.

In addition to the advantage of convenience, this control saves the breakage of drill bitts, so often caused by the drill sagging on the bit when the operator changes the position of his hands to switch off the current.

These two models have 1/6 horsepower motors with series compensated windings, and operate on any current from direct to 60 cycle alternating. Cooling is by means of a vane impeller mounted on the armature shaft, which causes a forced circulation of air all through the housing. Gears run in grease in a grease tight compartment like an automobile transmission.

No Load Speed of the 3/16" drill is 1600 R.P.M., Energy Consumption 175 watts.

No Load Speed of the ¼" drill is 1200 R.P.M., Energy Consumption 175 watts.

The Templar Car.

Undoubtedly there is a large field for automobile manufacturing concerns and since the market at the present time is very short of cars, there will be more cars sold this year and next year than ever before in history. Even the workingman of today is earning enough money to support a car and people who could not afford such a machine two years ago are now able to purchase one.

Automobile plants during the war were cut in production to a great extent and their stock of finished cars was greatly depleted. For this reason, undoubtedly stock in automobile manufacturing plants will be of great value and pay big dividends. Concerns which have been in existence for some time are well worth investigation, and our readers who intend to invest should by all means investigate the Templar Motors Corp., Guardian Bldg., Cleveland, Ohio.

Do you want anything? Is your shop for sale, or do you want to buy a shop or hire a man? If so, a "Want" advertisement in THE BLACKSMITH AND WHEELWRIGHT will bring you good results. See terms at the head of the "Want" Department on another page.



Free 448 PAGES OF BARGAINS

POST PAID

WE WANT TO SEND YOU THIS 448 PAGE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

Tells how you can work up a profitable auto supply and repair business.

Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

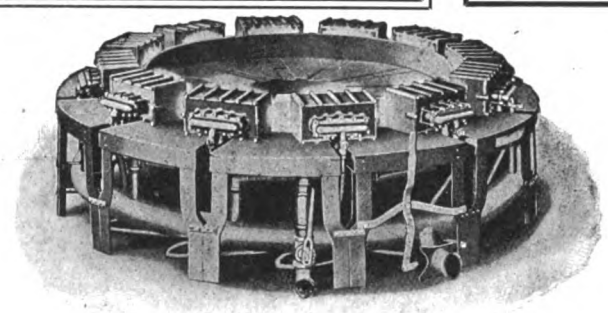
CRAY BROTHERS, Carriage Hardware and Auto Accessories
1117 W. 11th Street, Cleveland, Ohio, U. S. A.

LOWER PRICES ON

Wheels

GET OUR NEW CATALOGUE, No. 61

WHEEL TOP & HDW. CO.
Dept. W2 Cincinnati, O.



TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas, Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.

OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.





Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE GOGEL MFG. CO., TOLEDO, OHIO.

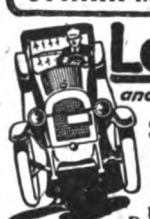


OTTAWA KEROSENE ENGINES

Start Easy in any weather. Pull steady. Carry big overload. All sizes and styles. 1½ H-P. to 22 H-P. **90 Days' Trial. Money Back Guarantee.** Prompt shipment.

Low Prices Write for present money saving prices and **Free Book,** telling all you want to know about engines. Write today.

OTTAWA MFG. CO. King Street, OTTAWA, KANS.



Learn Auto and Tractor Business

$100 To $400 A Month

GREATER opportunities than ever due to increased production of Autos, Trucks, and Tractors. Big demand for Repairmen, Garage Foremen, Drivers and Tractor Operators. Thousands of our graduates making big money.

Learn in 6 to 8 Weeks

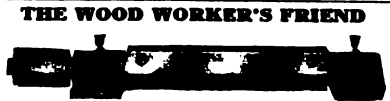
Immense additional equipment from our former Military Division. Same practical method as used to train soldier mechanics for U. S. Army in 60-day courses.

Free Now. Write today, giving age and occupation for **7-Day Trial Offer** and 68-page Opportunity Book.

Rahe Auto & Tractor School
3164 Oak St., Kansas City, Mo.



THE WOOD WORKER'S FRIEND



Wood stock and lumber is high. With our Jointer Heads you can buy rough lumber of any kind and dress it to suit your job. Saves time, money and lumber. Would this be any object to you? If so, get circulars and prices. Sold on 30 days' trial. Manufactured by

Whisler Mfg. Co. Gibson, Iowa



ABSORBINE
TRADE MARK REG. U.S. PAT. OFF.

will reduce inflamed, swollen Joints, Sprains, Bruises, Soft Bunches; Heals Boils, Poll Evil, Quittor, Fistula and infected sores quickly as it is a positive antiseptic and germicide. Pleasant to use; does not blister or remove the hair, and you can work the horse. $2.50 per bottle, delivered. Book 7 R free.

ABSORBINE, JR., the antiseptic liniment for mankind, reduces Painful, Swollen Veins, Wens, Strains, Bruises; stops pain and inflammation. Price $1.25 per bottle at dealers or delivered. Will tell you more if you write. Liberal Trial Bottle for 10c in stamps.

W. F. YOUNG, Inc., 55 Temple St., Springfield, Mass.

Leading Blacksmiths use

STAR STEEL SHAPES

Solid Cast, Crucible, Soft Center Steels

Write your Jobber to-day

Made by

STAR MFG. CO. Carpentersville, Ill.

WELDING PLANTS, $25.00 to $300.00

Designed for all purposes. Small cash payment; balance, three to six months. Every mechanic and shop should have one.

BERTSCHY-BERMO CO. OMAHA, U. S. A.

ROBERGE'S GREAT BOOK

"THE FOOT OF THE HORSE"

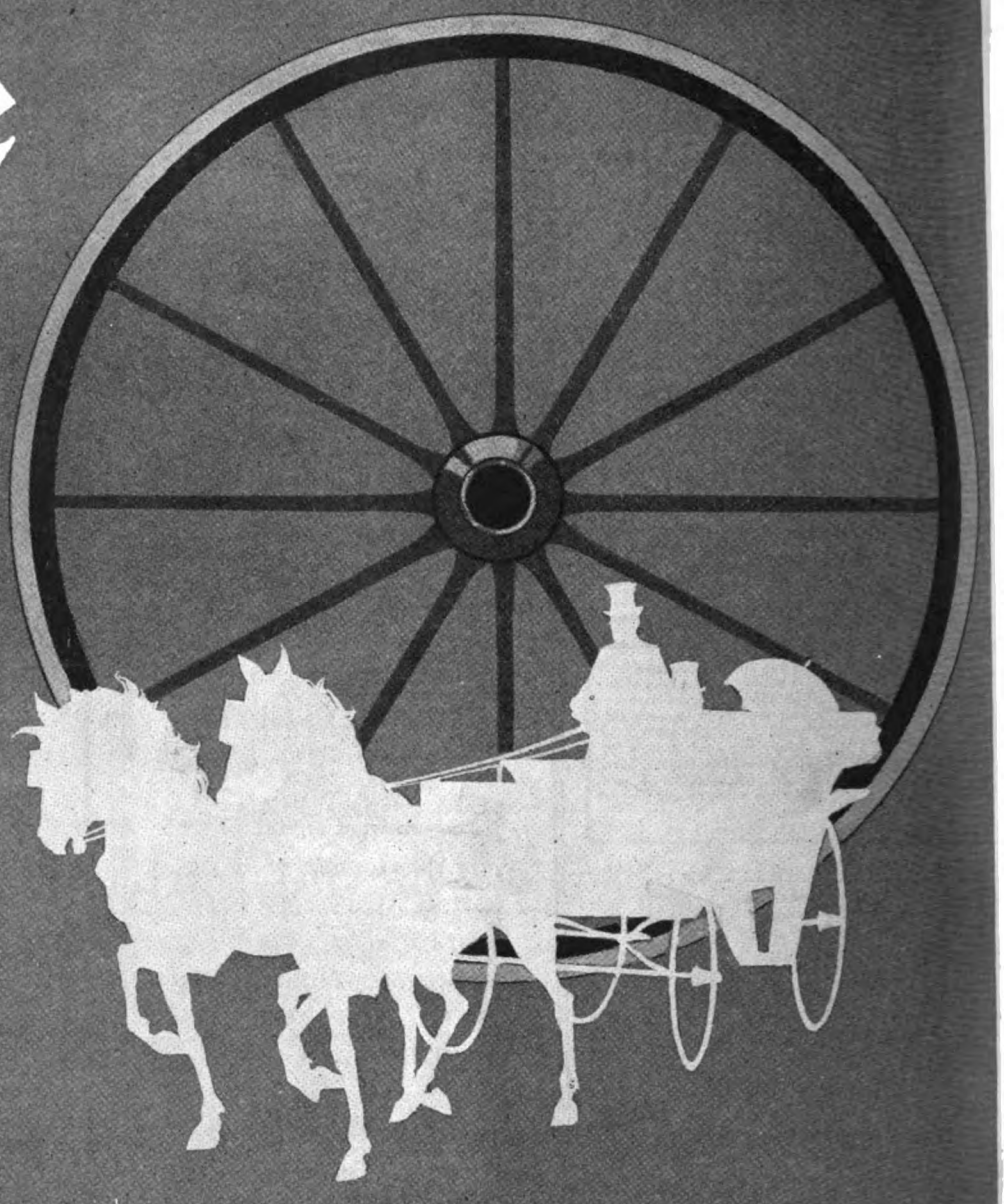
By DAVID ROBERGE

The author of this book for many years enjoyed the entire confidence of Robert Bonner, who, in his day, owned many of the fastest trotters the world has ever seen. Bonner and Roberge worked together in shoeing the former's horses. Many believe that David Roberge was the ablest horseshoer this country has ever seen. His book is filled with plates and illustrations showing proper methods of shoeing horses for every kind of lameness. We have sold large numbers of these books and they have always given entire satisfaction. The work represents the life experience of its author. Sent to any address, postage prepaid, on receipt of price, **$3.00.** Address

M. T. RICHARDSON CO., Publishers, 71-73 Murray Street, New York.

Digitized by Google

Firestone
Carriage Tires

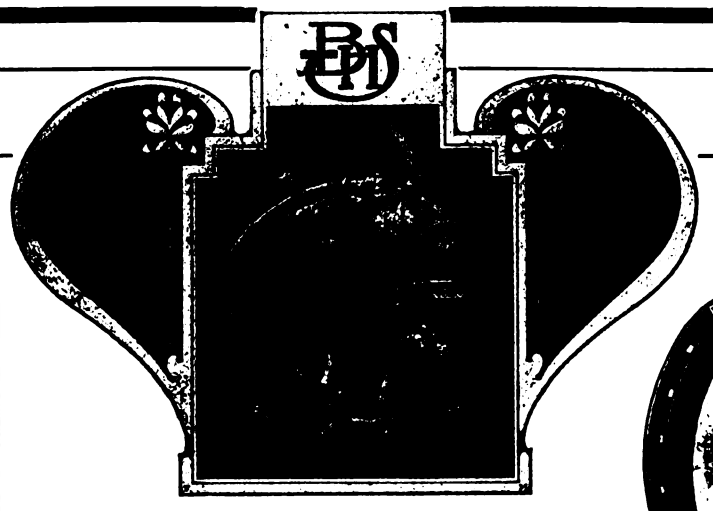


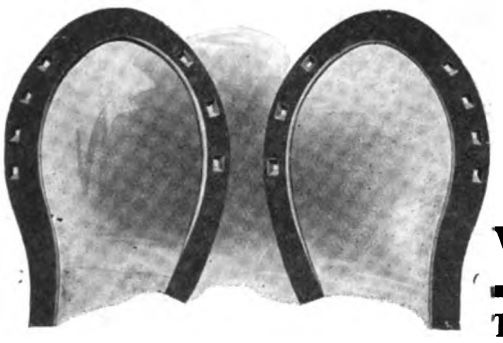
THERE are many reasons why the most exclusive trade demands Firestone equipment and looks up the Firestone dealer.

Of course the first reason is the well-known Firestone name, a sufficient guarantee. But there are interesting records of leadership in service. Write for them.

FIRESTONE TIRE AND RUBBER CO.
FIRESTONE PARK AKRON, OHIO
BRANCHES AND DEALERS EVERYWHERE

THE ART OF HORSESHOE MAKING







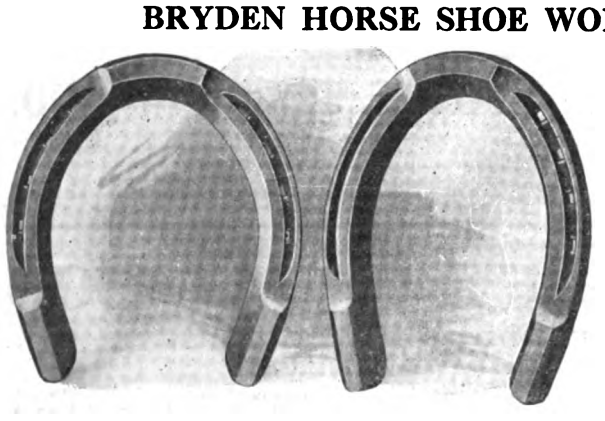
WE MAKE SHOES
TO MEET EVERY REQUIREMENT

Here Are a Few of Our Specialties

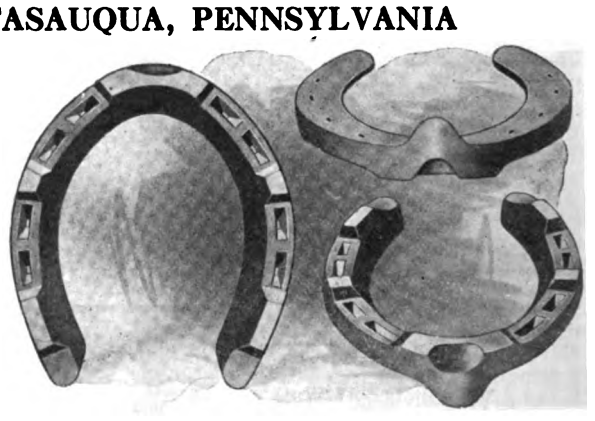
Sideweights — Bryden "C" Horse and Mule
Ideal Calked — Toeweight — Clipped Goodenough

Send for Descriptive Catalog which Shows Our Full Line with Weights, Etc., Etc., Etc.

BRYDEN HORSE SHOE WORKS CATASAUQUA, PENNSYLVANIA







Digitized by Google

THE ARMSTRONG MFG. COMPANY

BRIDGEPORT CONN., U.S.A. — NEW YORK OFFICE 248 CANAL STREET

like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



"Makers of the Genuine ARMSTRONG Stocks and Dies."

ENDS FORD CRANKING

A remarkable new attachment for Ford cars and trucks which enables anyone to start the motor from the seat, without getting out to crank, is being offered on free trial by the Bear Mfg. Co., 307 Bear Bldg., Rock Island, Ill. This simple device spins the motor and never fails to start the engine instantly. It should be on every Ford. Easily and quickly attached. No mechanics needed. If you want to try one without any obligation to purchase write them today.

Edwards Shears

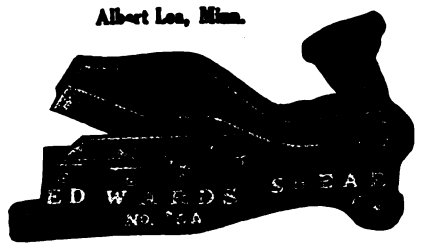
For twenty-four years the Two Leading Low Priced Shears in the U. S., representing the Greatest Value for the Least Money.

No. 5, weighs 200 lbs., cuts 4x⅛ inch soft steel.
No. 10, weighs 430 lbs., cuts 4x¼ inch soft steel.

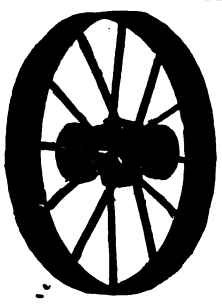
At their price you should have had one long ago. Order one from the first iron man that calls on you. They All Sell Them.

Write for descriptive circular and prices.

C. D. EDWARDS MFG. CO.
Albert Lea, Minn.



EMPIRE STEEL WHEELS



Plain or Grooved Tire To Fit Any Wagon.

FARM TRUCKS
All Standard Types

Write today for Proposition to Blacksmiths

EMPIRE MFG. CO.
P. O. B. 209
QUINCY, ILL.

"GEARS AND WAGONS"

Selle Gears

Forty years of success has placed "Selle Gears" and Wagons in the hands of the largest wagon users in the world. Express and Transfer Companies, Department Stores, etc., specify "Selle Gears" and will take no other after once tried. 230 Page Catalog Free.

THE AKRON-SELLE CO. Akron, Ohio



SAMPLE OF WELDING COMPOUND FREE

BLACKSMITHS!

Let me send you a trial package free and you will use no other. Anchor Welding Compound has no equal for strength. It welds the hardest steel. No hammer needed. Good for both big and little jobs. Try it.

Write to-day and mention The Blacksmith and Wheelwright.

N. D. DOXEY, ELMIRA, N. Y.



THE CLIPPER

9 in. Jointer
— or —
Hand Planer

Price only $40.00

Can you afford to do without this planer at the above price?

Cast iron and steel construction.

Catalogue No. 15 for the asking gives full line.

W. L. SHERWOOD
KIRKSVILLE, MO.

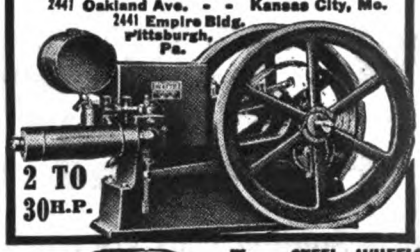
Get a WITTE BIG CUT IN ENGINE PRICES



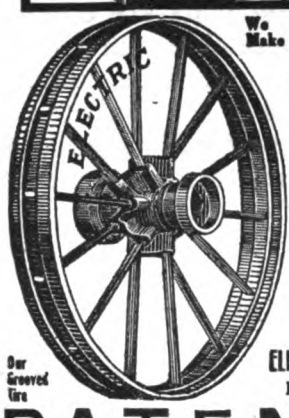
No Cut In Quality

I have made a big smashing reduction in engine prices—for quick shipment—all styles—all sizes—2 to 30 H. P.—Kerosene or Gasoline—Stationary, Portable or Saw-rig—Buy on your own terms. I guarantee safe delivery, make **Immediate shipment**—guarantee every part of your engine against defects as long as you use it—no "strings"—no time limit. Write me at once for prices on this special factory direct offer. Book Free.—Ed. H. Witte, Pres.

WITTE ENGINE WORKS
2441 Oakland Ave. - - Kansas City, Mo.
2441 Empire Bldg, Pittsburgh, Pa.



We Make STEEL WHEELS
To Fit Any Axle
Plain or Grooved Tire



Steel or Hickory Axles
Any Size
A Full Line of Wood and Steel Farm Trucks
With Steel or Wood Wheels
Write for Large Catalog and Prices

ELECTRIC WHEEL CO.
Box N, Quincy, Ill.

PATENTS

C. L. PARKER
Ex-Member Examining Corps, U. S. Patent Office
Attorney-at-Law and Solicitor of Patents

American and foreign Patents secured. Trade marks registered. Searches made to determine patentability, validity and infringement. Patent suits conducted. Pamphlet of instructions sent upon request.

McGill Building WASHINGTON, D. C.

SMASHING GOOD PROFITS!

Make the most of the present—the future will look out for itself.

UNIVERSAL WHEEL COMPRESSOR

Adjustable for all types of auto and truck wheels. Repair work can be done in a jiffy—good fat profits rapidly made.

Wheels of any size can be repaired. Wire wheels can be trued up and new spokes put in them as well as in wooden wheels.

This machine is constructed so the compressing ring can be moved like a turntable. No belts, pulleys nor power needed. Takes up very little space. Can be easily moved.

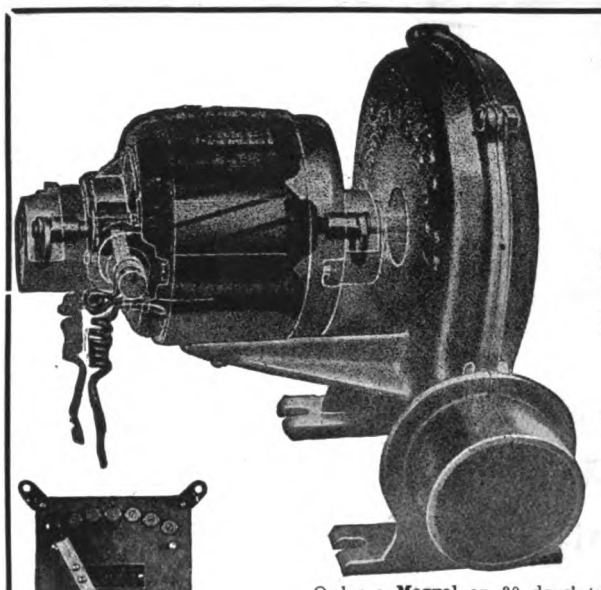


DON'T PUT IT OFF WRITE TO US TODAY

You owe it to yourself and to your business to get all the facts. Don't you think it's pretty decent of us to let you know about this big money maker?.—All right! Then write for full details. (You'll get more money out of it than we will, we can assure you.)

Hurry—the big season's now getting in full swing.

UNIVERSAL WHEEL COMPRESSOR CO.
CEDAR RAPIDS, IOWA



"ONE FIRE" MARVEL

A. C. or D. C.
or
UNIVERSAL MOTORS

Extra Large Ring Oil Bearings

Case Hardened Armature Shaft

$38.00 Net

Order a **Marvel** on 30 days' trial through your **Dealer**, or your Electric Light Company

Electric Blower Co., 352 Atlantic Avenue BOSTON, MASS.

940 Pages instead of 824 — NINTH EDITION — 3362 Illustrations instead of 2000

$4.46 prepaid DYKE'S AUTO ENCYCLOPEDIA $4.46 prepaid

Entirely re-written, hundreds of illustrations and many new subjects added. Practically a new book. A non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 50 Instructions—Simplified and Practical.

3362 Illustrations—the kind you understand at a glance.

2 Supplements, part printed in two colors, treating on the construction, operation, repairing and adjusting of the FORD and PACKARD—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.

775 Illustrations and 279 pages on Electric Ignition, Electric Starters and Generators, etc.

81 pages and 79 illustrations on the Delco system alone.

60 pages and 254 illustrations on Adjustments, Tests, etc., of leading Electric Systems.

264 pages and 1189 Illustrations on Repairing.

Oxy-Acetylene welding. Axle, Differential and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.

27 pages and 180 illustrations on Tires and Tire Repairing.

44 pages and 119 illustrations on Carburetion.

89 pages and 291 illustrations on Engines and Parts.

16 pages on Digest of Troubles.

6000 lines to the Index. This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. Index begins on colored paper, easy to refer to.

Dictionary is also included, which gives the meaning of motoring terms.

Inserts: There are five—printed in colors. New features you never before saw or heard of in one of the inserts.

Additions to the Ninth Edition:
TRUCKS, TRACTORS, MOTORCYCLES, AIRPLANES and LIBERTY ENGINE

HOW TO BECOME AN EXPERT AUTOMOBILE MECHANICIAN

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion subject so thoroughly, you can adjust any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

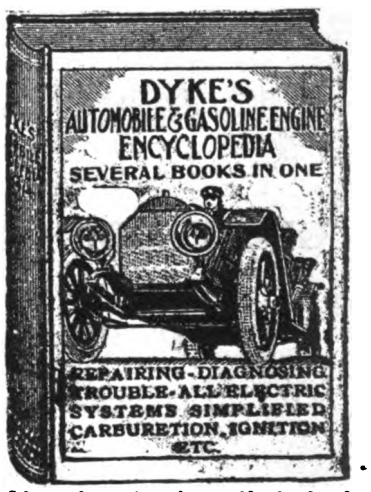
You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical Automobile book in America. Price $4.46, prepaid.

Address all orders to

THE BLACKSMITH & WHEELWRIGHT
73 MURRAY STREET NEW YORK



It's worth ten times its cost if only placed on the shelf and used as a reference.

Digitized by Google

STERLING

PADS and PROTECTORS

Sterling pads are one solid, inseparable piece. The tough, pliable, waterproof back, made of our patented rubber and fibre compound, is vulcanized (not cemented or stitched) to the resilient rubber heel. They will never pull apart. STERLING Pads and Protectors are waterproof—do not swell, shrink or get soggy in stable moisture.

They are best for the horse's hoofs, and best for the shoer's business.

We sell exclusively through the regular jobbing trade. Please ask us for samples.

STERLING TIRE CORPORATION
RUTHERFORD, N. J.

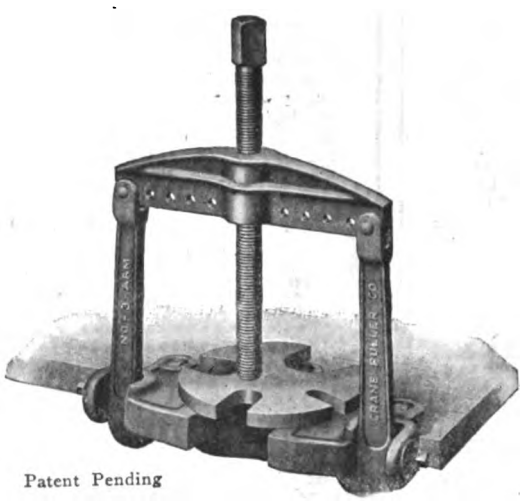
WILL SAVE ITS COST ON ONE JOB

CRANE'S

PATENTED

Wheel Puller

For Removing Fly Wheels, Auto Wheels, Gears, Collars, Commutators, Pulleys, Couplings, etc.



Patent Pending

CRANE PULLER WITH ARBOR PRESS BASE

By using the base as shown in illustration an Arbor Press is made of the Puller, giving a wide range of work. This press will do work on wheels of any size where the hub of the wheels is not over 11 inches in diameter.

Thousands of these Pullers are in use in all kinds of factories. Any good mechanic knows the value of this tool.

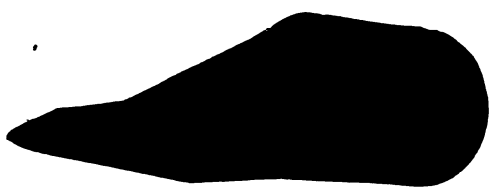
Don't wait until you have a bad case, and wish you had a Puller, order now.

Pullers may be had without base if you desire.

Send for our new catalog.

CRANE PULLER CO.

60 Lake Street, - - Arlington, Mass.



Good Work May Be Done with Good Tools

but—work that gives lasting satisfaction is done with Giant Grip Shoes, Calks and Tools.

Giant Grip Shoes, Calks and Tools are made for work and wear—the choice of master workmen who know their trade.

To shoe with Giant Grip marks you as the man who works with better tools —and profits by such service.

Ask us for details.

GIANT GRIP HORSESHOE COMPANY

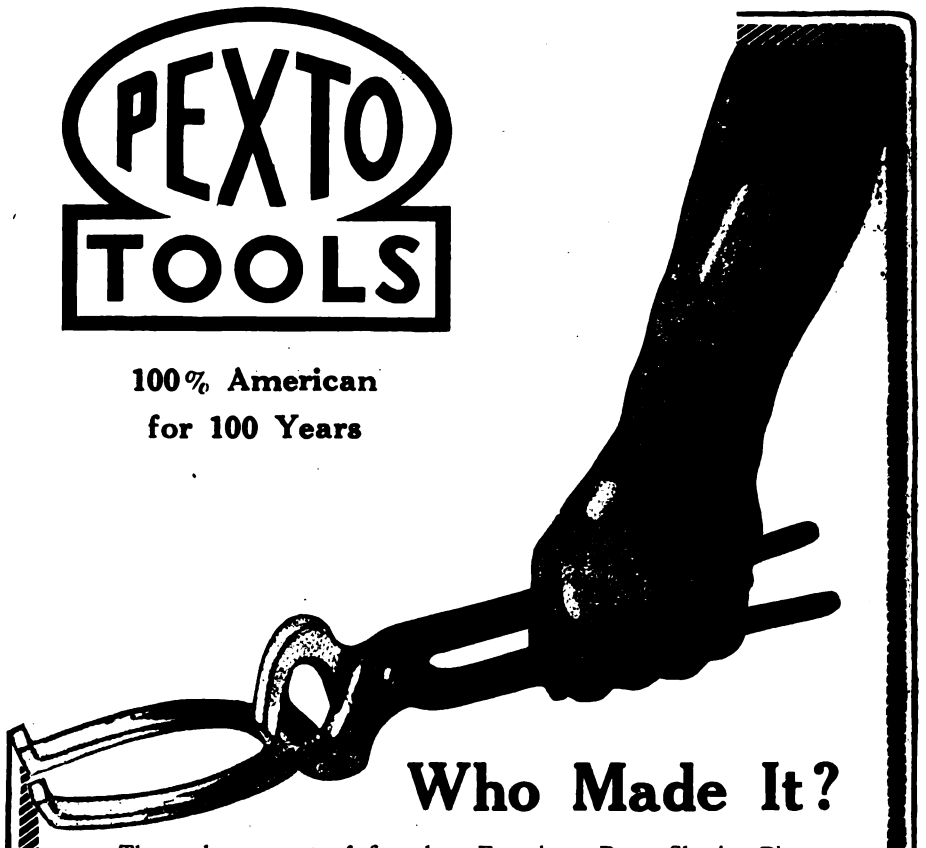
Established 1863

OSHKOSH - WISCONSIN

Also makers of Giant Grip Traction Equipment for Motor Trucks

PEXTO TOOLS

100% American for 100 Years



Who Made It?

Three chances out of five the Pincer that gives the best service in your shop is a Pexto.

Quality will "out."

You get just as much out of a tool as the maker puts into it.

Examine a Pexto Shoeing Pincer, compare it, test it for a year. You'll have no other.

If your dealer can't supply you, write us.

THE PECK, STOW & WILCOX COMPANY
Southington, Conn. Cleveland, Ohio

Address correspondence to 209 W. Center St., Southington, Conn.

PEXTO

BLACKSMITHS' TOOLS

Digitized by Google

ESTABLISHED 1880 — The Pioneer Journal of its Class

THE BLACKSMITH & WHEELWRIGHT

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U. S. Patent Office.

Entered as Second-class Matter March 4, 1880, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Published Monthly.

Vol. LXXX. No. 1 — NEW YORK, JULY, 1919 — TERMS: One Dollar a Year. Foreign, $1.50. (6s. 3d.)

THE NEW YORK PUBLIC LIBRARY ASTOR, LENOX AND TILDEN FOUNDATIONS

BUYERS' GUIDE AND INDEX TO ADVERTISEMENTS, PAGE 22.

THE ART OF HORSE SHOE MAKING



WE MAKE SHOES TO MEET EVERY REQUIREMENT

Here Are a Few of Our Specialties



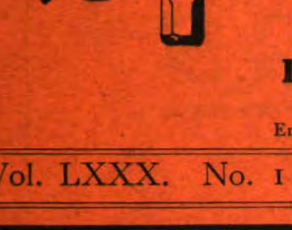
Sideweights—Bryden "C" Horse and Mule Ideal Calked — Toeweight — Clipped Goodenough.

Send for Descriptive Catalog which Shows Our Full Line with Weights, Etc., Etc., Etc.



Bryden Horse Shoe Works

Catasauqua, Pa.



Saw Those HeavyBars ON A MARVEL Power Hack Saw

Machine stops when work is cut off. Requires very little power.

Price is Low. Write Us.

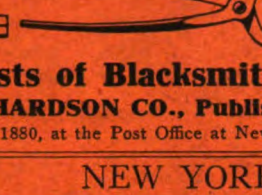
Ask for reply by return mail.

ARMSTRONG-BLUM MFG. CO.

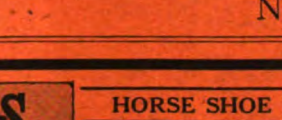
340 N. Francisco Ave., Chicago, Ill., U. S. A.

Hi-Lo-Jacks

Six Sizes



Close to 6 in. Extend to 17 in.



Capacities ½ to 12 tons

Made by

The RoweCalk & Chain Co.

Plantsville, Conn.

SUREGRIP CALKS



American Calk Co.

DETROIT, - - - MICH.

WONDERFUL INVENTION

Makes the repaired WOOD Wheel better than new. Guarantee every wagon against loose tires or dished wheels.

PLEASE EVERY CUSTOMER

Saves Time, Costs Less, A Business Builder, A Money Maker.

Want the AGENCY? Then WRITE TODAY.

ADJUSTABLE WAGON TIRE MFG. CO.

Shipping Point Near You. OKLAHOMA CITY, OKLA.

Stokes Bros.' Improved Horse Rasps

Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A



Nails for Your Shoeing Box



Experts in all parts of the country and of the World praise the superior qualities of Capewell horse nails.

A vast army of horseshoers—numbering many thousands—will accept no substitute. They insist upon having The Capewell brand.

In the fine, well wrought fibre of a Capewell nail there's wonderful strength and strain resisting power.

Consequently, the man who buys Capewell nails gets the one which drives easiest and holds best. The nail which brings credit to the user.

The checked head Trade Mark is on each nail head. It stands for the best quality and the greatest economy in horse nails. The world's best and sold at a fair price.

Satisfy yourself and your customers by always using Capewell nails. Remember: The nail that holds the shoe holds the customer. A satisfied customer is the best advertisement.

The Capewell Horse Nail Company

Hartford, Conn., U. S. A.

Leading Horse Nail Makers of the World

THE TEETH IN

BLACK DIAMOND RASPS ARE MINGLED

So as to Cut Clean and Free and Leave no Furrows in the Work

Twelve Medals of Award by Jurors



At International Expositions

C. & H. BARNETT COMPANY

Black Diamond File Works, PHILADELPHIA, PA.

Owned and Operated by NICHOLSON FILE CO.

Copy of Catalog sent Free to any interested file users upon application.

AETNA STEEL TOE CALKS

Made by THE AETNA NUT CO., Southington, Conn.

BLACK HORSE BRAND

BEST SHAPE
BEST SPUR
TO DRIVE
BEST STEEL



TOE AND HEEL CALKS

SOLD BY ALL DEALERS

STEEL STAMPS

BURNING BRANDS
RUBBER STAMPS
STENCILS

GEO. M. NESS, JR.

61 FULTON ST. NEW YORK

Send for price list.

ADVERTISE

Believe that you are destined to win, whatever be the odds. The quitter is sure to be a failure.

Digitized by Google

UNIFORMITY

SHELDON

AXLES AND SPRINGS

HAVE LONG BEEN

INTERNATIONALLY FAMOUS

For Their Superiority In

DESIGN, MATERIALS and WORKMANSHIP

REASON:

Sheldon Took Guesswork Out of Axle and Spring Manufacturing

which means

UNIFORMITY OF PRODUCT

Sheldon Axle & Spring Co., Wilkes-Barre, Pa.

The Better Your Equipment The Bigger Your Profits

Buy CANEDY-OTTO

AND INCREASE YOUR INCOME

Once Tried, Always Used : There's a Reason—Quality

OVER 200 DIFFERENT STYLES

SEND FOR CATALOGUE No. 12



No. 19 DRILL

A low-priced combined hand and power self-feed drill.

Drills to center of 16½ in. circle.



No. 16 ELECTRIC DRILL

The largest and most mechanically perfect post drill manufactured.

Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.

Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1½ in.



No. 100 ROYAL FORGE

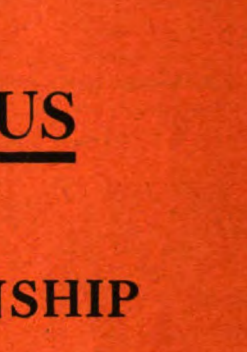
The most popular forge ever made.

Fan, 12 in. Hearth, 31½x46½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x56 in. Blower, 12 in.



Blower, 12"
Wt., 135 lbs.
Height, 47"

ROYAL BLOWER

(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.

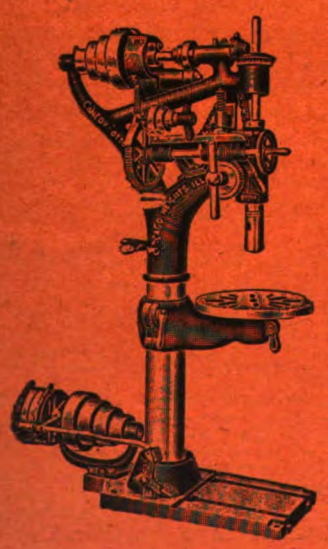
Fire pot is 8x9 in. inside.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS



No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.

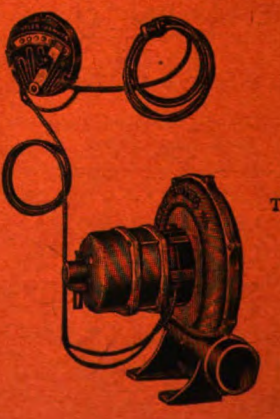
All machines are tested before leaving the factory, and guaranteed in every respect.

Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.



No. 1½ SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



No. 8 ELECTRIC BLOWER

The best outfit money can buy.

Digitized by Google

"F-S" PAINTS



"F-S" Products Stand the Most Rigid Inspection.

Your good work will stand even higher at inspection when you use "F-S" Superfine Coach Colors on your carriage, coach and automobile bodies. The best of material is used as in all "F-S" products—ground in gold-size Japan.

FELTON, SIBLEY & CO., Inc.

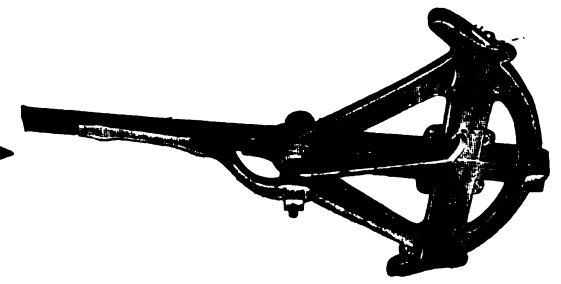
Manufacturers of Colors, Paints, Varnishes since 1863

136-140 North Fourth Street, Philadelphia

(147)

"NATIONAL" Safety Short Turn
FIFTH WHEELS

Wrought Perch Weld here



Wrought Perch Safety Guide

UNDER VIEW STYLE "J"

Seven Styles **Nineteen Sizes**

ONLY WHEEL WITH WROUGHT PERCH. This forms a ONE-PIECE PERCH THE ENTIRE LENGTH of the running gear including the SAFETY GUIDE.
Your customers will recognize that this construction is unequalled for SAFETY, STRENGTH and DURABILITY. Please them by using NATIONAL wheels.

Send for catalogue and prices. We have a complete stock from which your orders will be shipped promptly.

WE ALSO MANUFACTURE

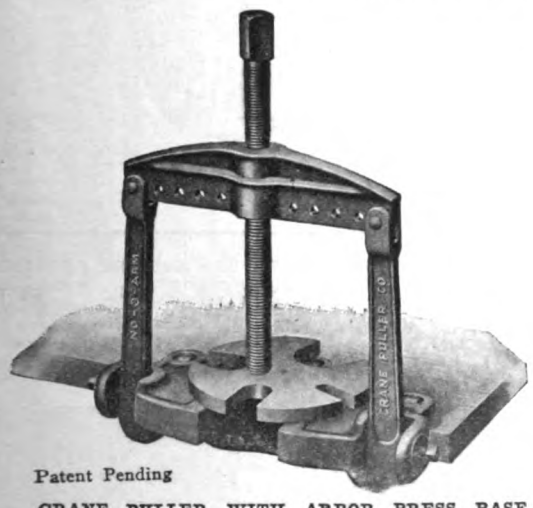
Refined Malleable Iron Castings.
Bolster Plates (All Sizes).
Link Belt and Combination Conveyor and Transmission Chain.
Malleable Elevator Buckets (standard sizes).
Complete Elevators and Conveyors.

LANCASTER FOUNDRY COMPANY

LANCASTER, PA., U. S. A.

WILL SAVE ITS COST ON ONE JOB
CRANE'S
PATENTED
Wheel Puller

For Removing Fly Wheels, Auto Wheels, Gears, Collars, Commutators, Pulleys, Couplings, etc.



Patent Pending

CRANE PULLER WITH ARBOR PRESS BASE

By using the base as shown in illustration an Arbor Press is made of the Puller, giving a wide range of work. This press will do work on wheels of any size where the hub of the wheels is not over 11 inches in diameter.

Thousands of these Pullers are in use in all kinds of factories. Any good mechanic knows the value of this tool.

Don't wait until you have a bad case, and wish you had a Puller, order now.

Pullers may be had without base if you desire.

Send for our new catalog.

CRANE PULLER CO.

60 Lake Street, - - Arlington, [Mass.

There's a Harvey Jobber near you who can supply you, on a moment's notice, with a Harvey Spring for any make or model of automobile.



Car-owners naturally place more confidence in dealers who handle the Harvey Spring.
They have learned to look for and insist upon this trademark that guarantees quality—

Send to your jobber for the Harvey Spring Book or write

Harvey Spring & Forging Co.
1087 17th Street Racine, Wis.

Harvey RACINE Boltless Automobile Springs
Easy Riding - Guaranteed

Digitized by Google

IF YOU SEE THE (A) THE SHOE'S O. K.



WE BACK UP THAT SHOE

We have steadfastly refused to permit inferiority — or even its suspicion — to influence us in the materials that we use in manufacturing

American Horse and Mule Shoes

We have never permitted inadequate machinery — or cheaper methods — or lower-priced workmen to put a question mark in the records that we make.

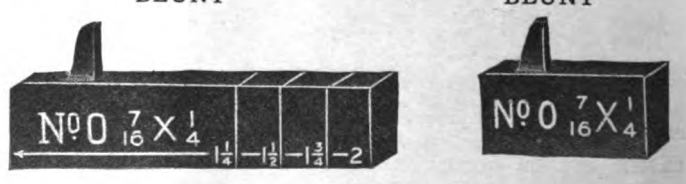
A first-class product always creates a bond of good-fellowship between you and your customers, Mr. Blacksmith, to say nothing of what the horse thinks. It is an endless source of satisfaction all round, and conserves your good name in the bargain.

It is always best to be just a trifle overstocked than understocked. The Heavy Hardware dealer who finds his stock of American Horse Shoes clear down to the marrow is in a bad fix — get your order in today.

Even if you did have two catalogs and misplaced them — you are entirely welcome to the third. Send for it.

American Toe and Heel Calks will stand the keenest competition and reveal the fact that they are MORE than "Just a little better."

BLUNT BLUNT



American Horse Shoe Company

Rolling Mills, Works and Offices

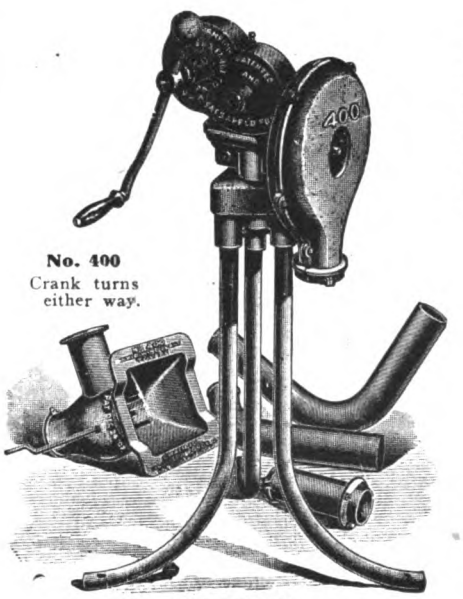
Phillipsburgh - - - New Jersey

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

WORK WITH THE FAMOUS CHAMPION BLACKSMITH TOOLS



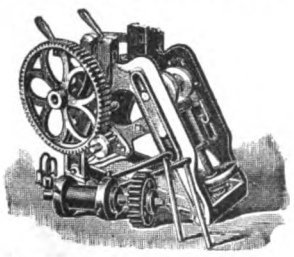


No. 400
Crank turns either way.

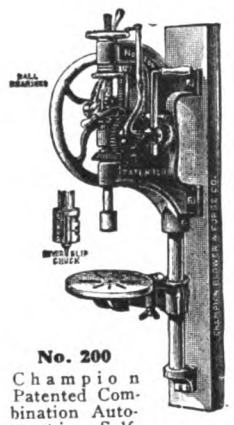
FAMOUS 400

Don't Fail to Get Our 1918 Catalog

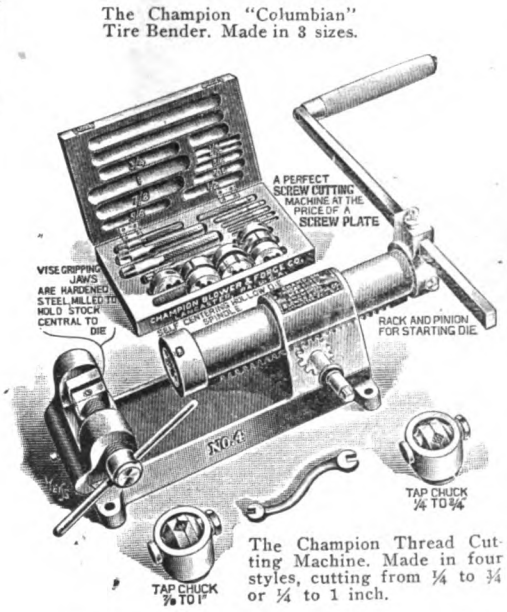
Before purchasing a Hand Blower Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



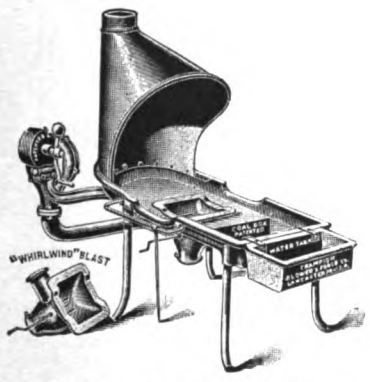
The Champion "Columbian" Tire Bender. Made in 3 sizes.



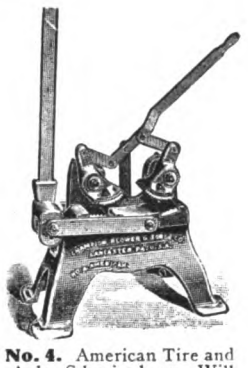
No. 200
Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



The Champion Thread Cutting Machine. Made in four styles, cutting from ¼ to ¾ or ¼ to 1 inch.



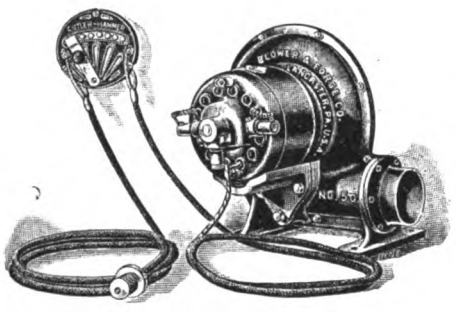
No. 433. Cast Iron Blacksmith's Forge.



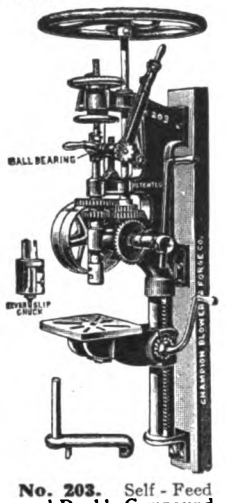
No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



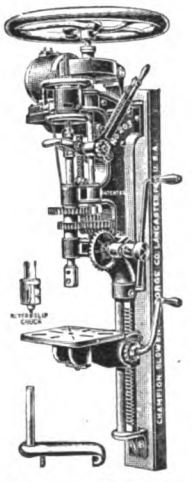
No. 408. Steel Blacksmith's Forge.



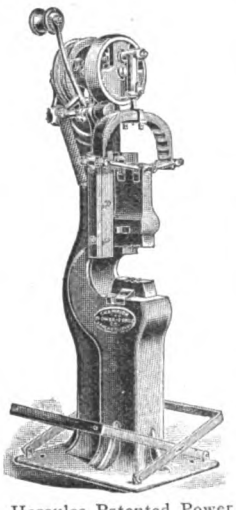
No. 60. Champion One-Fire Variable Speed Electric Blacksmith Blower.



No. 203. Self-Feed and Double Compound Lever Feed Drill.



No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.



Hercules Patented Power Hammer. Weight of ram, 65 pounds.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

Digitized by Google



Digitized by Google

EMCO MALLEABLE E IRON CASTINGS

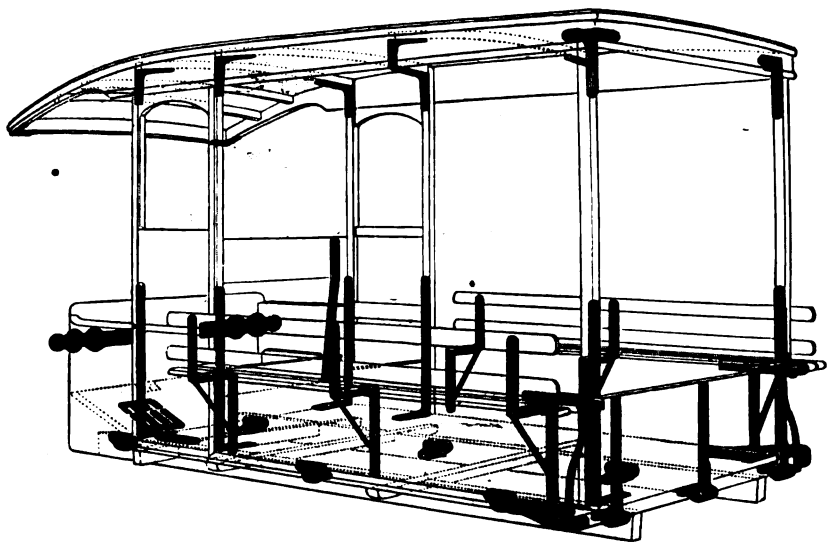
—QUALITY AND SERVICE—

We do not make Bodies,

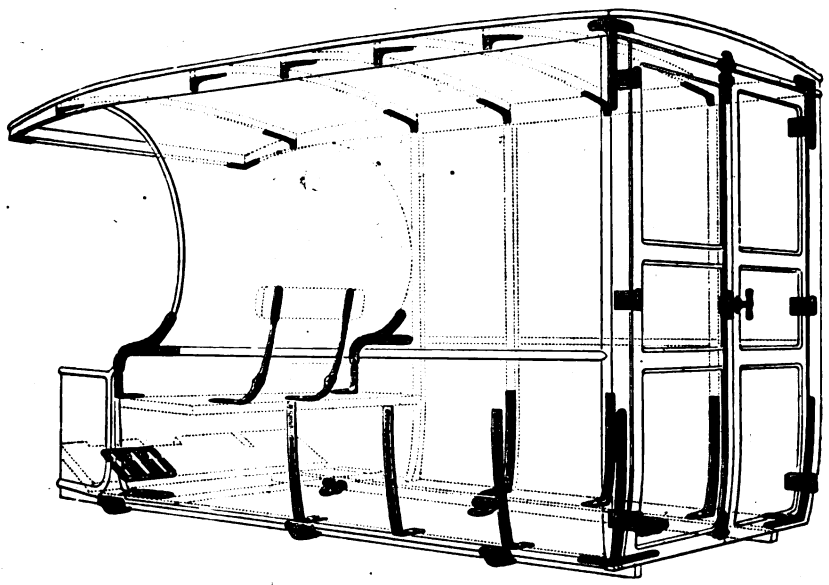
but only

IRONS

for them



Set No. 6



Set No. 2

Our Bulletin

"ASSEMBLIES OF IRONS"

for Vehicle Bodies, will

be mailed on

request

THE EBERHARD MANUFACTURING COMPANY

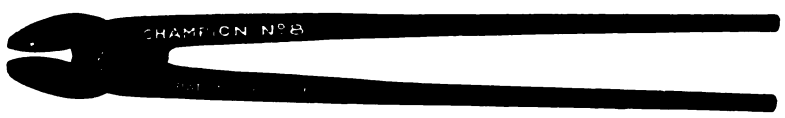
CLEVELAND, OHIO

Digitized by Google

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge

Nothing to get out of order.



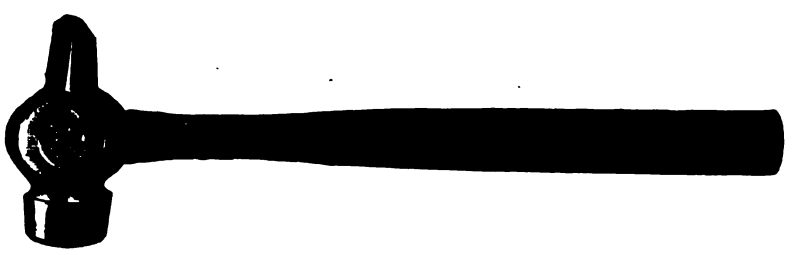
Will hold securely any size of shoe.

No. 8 16 Inches Long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

Weights, 1¾ to 3 lbs.

This Hammer is the most popular Sharpening Hammer on the market.

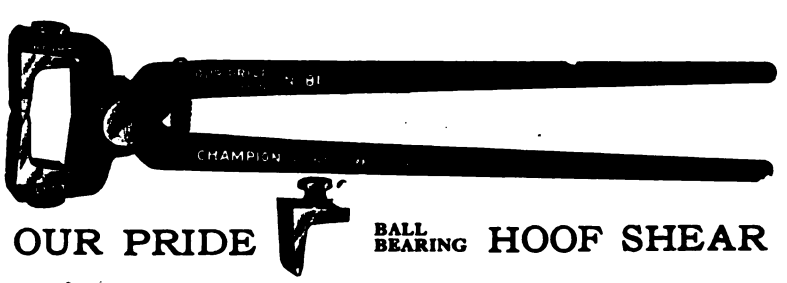


Corrugated Pein.

IT GIVES RESULTS

No. 12 ELECTRIC SHARPENING HAMMER

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.



Blades easily replaced when worn out.

All parts interchangeable.

OUR PRIDE BALL BEARING HOOF SHEAR

Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY - Meadville, Pa., U. S. A.

THE LIVINGSTON CO., 131 E. 23d Street, NEW YORK, Eastern Representatives



"E-Z" and "Crescent" Welding Compounds

It Pays to Use Only the Best

For welding axles, tires, springs and lap welding of all kinds, no other compounds give you such uniformly perfect results at low heats as "E-Z" and Crescent Compounds. In all around blacksmith work they have no equals.

"E-Z" works equally well on all kinds of steel. Welds at lower heat. Sticks to the metal. Does not boil away and waste. Leaves no scale.

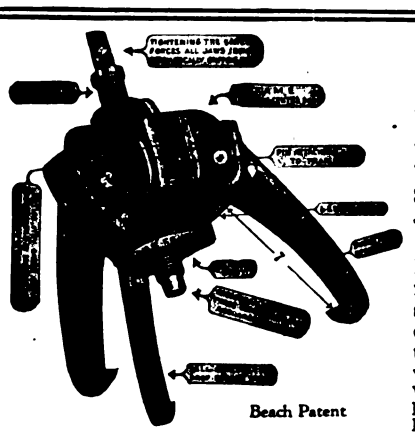
Crescent is especially good for plow work. Makes perfect welds on toe-calks. Insures smooth finish on split welds, finishing heats, welding under dies, etc.

Carried in stock by leading jobbers and dealers in United States and Canada. Your money back if not satisfied.

Write for large free sample.

Anti-Borax Compound Company
FT. WAYNE, INDIANA

GREB AUTOMATIC GRIP PULLER



Beach Patent

Make Your Gear and Wheel Pulling Show a Profit.

A Powerful automatic one-man Puller, which adjusts to work instantly. Combination of two or three arms. Two complete sets of three arms.

Senior Size for heavy work, Capacity 1 to 18 in.
Junior Size for small work, Capacity 1 to 7 in.

Ten Days' Trial

If your jobber does not have them, we will send you one. Try it ten days. If not satisfactory, return it to us and we will refund your money.

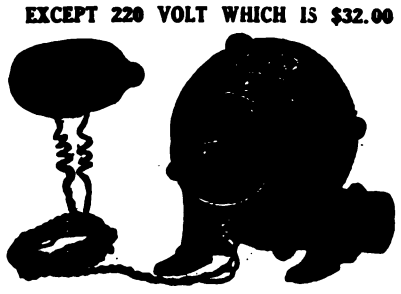
We also make the Greb Rim Tool and Grebford Extension.

10 DAYS TRIAL

THE GREB COMPANY, 219 State St., Boston, Mass.

The ROTO ELECTRIC BLOWER ONLY $30.00

EXCEPT 220 VOLT WHICH IS $32.00



Write for information about our special cash price of Twenty-Nine Dollars

SAVE TIME! SAVE MONEY!

Are you still blowing your forge by hand? Do you know this time is WASTED? Install a ROTO Electric Blower and SAVE this time. It is the greatest *time and labor saver* you can put in your shop. It will let you do *twice* the work, do it *better—quicker—cheaper*. You will then say, like hundreds of our customers,

I wouldn't sell my ROTO for $100.00 if I couldn't get another.

Buy direct and *save the middleman's profits* of $10 to $20. The ROTO is used in several departments of the U. S. Government. You can rely on it. Write for more information or, better yet, mail the coupon today and try this blower in your own shop. If not satisfied, send it back at our expense. That's fair isn't it?

Send the Coupon—Do it Now

THE ROSEWATER ELECTRIC CO.
5516 KINSMAN ROAD, CLEVELAND, OHIO

Send me by.....An AIR COOLED ROTO BLOWER with one year's guarantee, complete with cord, plug and Speed Regulator. I will return it to you at the end of 30 days, if it does not give me entire satisfaction, and if I keep it, I will pay you $30.00 for the 110 Volt, or $32.00 for the 220 Volt Blower at the end of 30 days.

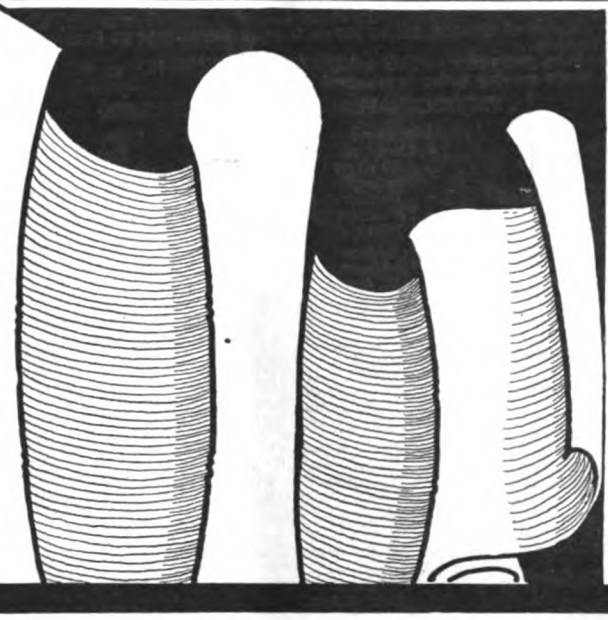
Name..... Address.....

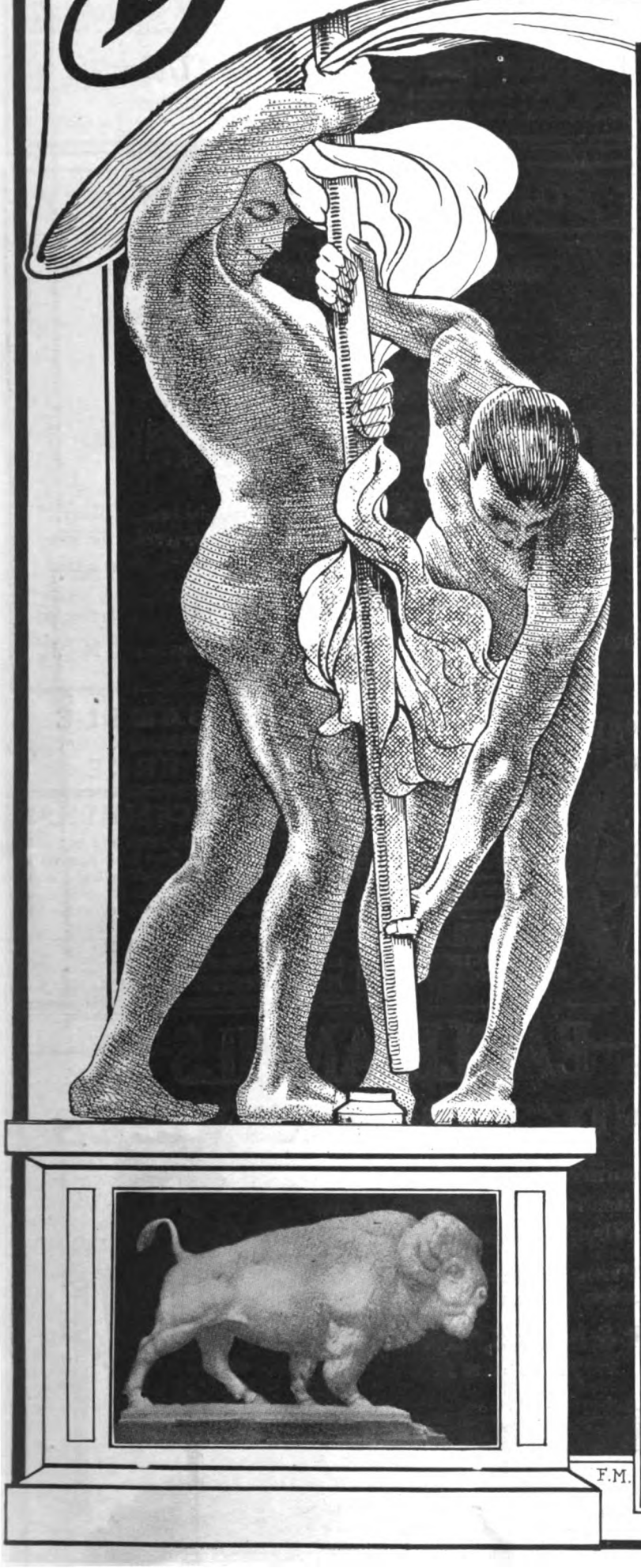
Current..... Voltage..... Cycles.....

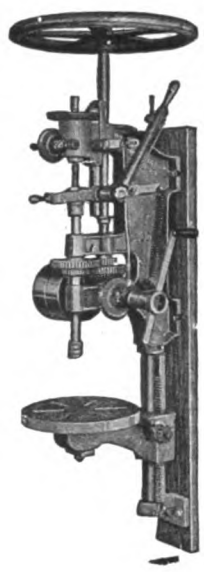
Your Electric Light or Power Company Will Give You This Information.

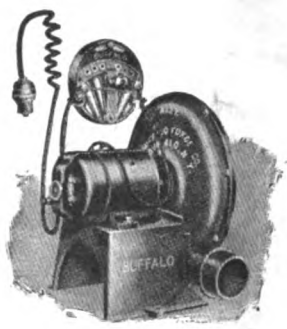
Digitized by Google

"Buffalo" TOOLS











MODERN SHOP EFFICIENCY

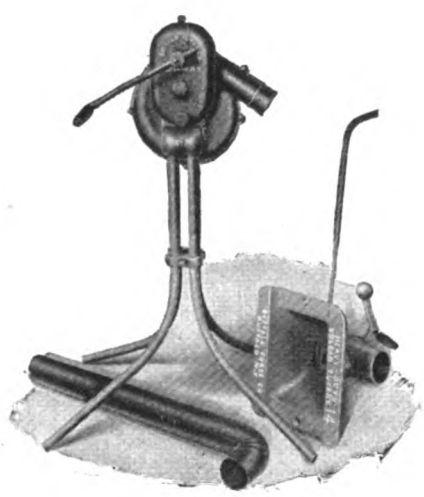
BLACKSMITHS AND GARAGEMEN are determined to have the best that may be had in Blacksmith Shop Equipment.

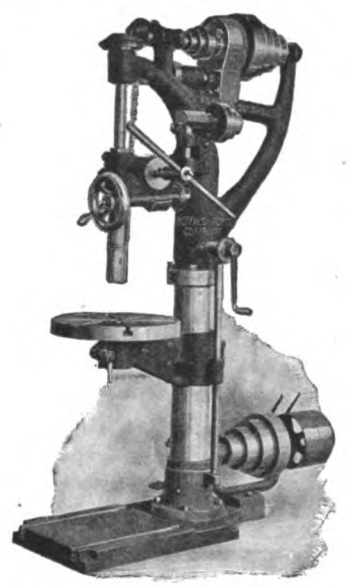
The work of the modern shop demands modern efficient tools—tools that will stand up under severe service.

Forges; electric blowers; drills—floor and post type; shears—for cutting angles, bars and sheets—and of every size from the little bench type hand power shear to the heaviest power shear made—these are the tools you should know about.

Buffalo Forge Company, Buffalo, N. Y.

WRITE DEPT. 6 FOR CATALOG





Digitized by Google

LINDE OXYGEN

From Coast to Coast 65 Producing Plants and Distributing Stations provide an unlimited supply of Linde Oxygen for users everywhere.

LINDE SERVICE means no investment except for oxygen actually received—no expensive overhead or upkeep charges.

Linde Oxygen may be obtained from any of the following Linde Plants and Distributing Stations where a large suppply of charged 100 to 200 cu. ft. cylinders is kept on hand constantly to insure immediate shipments.

Mail or telephone your order to THE LINDE AIR PRODUCTS CO., at the nearest point. **Shipments will be made on day order is received.**

PRODUCING PLANTS AND WAREHOUSES

Alabama
*Birmingham
10th Ave. & 28th St.
California
*Emeryville, Oakland
*Los Angeles
1405 Mission Road
Colorado
*Denver
S. B'way & Exposition Ave.
Connecticut
Hartford
1095 Main Street
District of Columbia
Washington
9th & Maryland Ave., S. W.
Georgia
*Alanta
Plyant St. & Southern R. R.
Savannah
OgeecheeCanal,So.of BaySt.
Illinois
*Chicago
3833 Wall Street
East St. Louis
6th & Walnut Ave.
Peoria
721-731 So. Washington St.
Indiana
*East Chicago
S.E.Cor. Kennedy& 145th St.
Fort Wayne
414 E. Columbia Street
*Indianapolis
2819 Roosevelt Ave.
Iowa
Davenport
118 Harrison Street
Des Moines
117 W. 5th Street
Kansas
Wichita
Rock Island Ave. & 2nd St.
Kentucky
Louisville
126 East Main St.
Louisiana
New Orleans
881 Fulton Street
Maryland
*Baltimore
25th & Montebello Ave.
Massachusetts
Cambridge
26 Waverly Street
Springfield
Napier Street
*Worcester
961 Southbridge St.
Michigan
*Detroit
St. Aubin Ave. & Newton St.
Grand Rapids
Pearl Street by the Bridge
Minnesota
Duluth
Seventh Ave., West
*Minneapolis
1809 Hennepin Ave.
Missouri
*North Kansas City
14th & Charlotte St.
*St. Louis
4218 Forest Park Blvd.
Nebraska
Omaha
1007 Jones Street
New Jersey
*Elizabeth
Linden Ave.
Newark
354 Plane Street
New York
Albany
Montgomery & Colonie Sts.
*Brooklyn
475 Driggs Ave.
*Buffalo
Broadway and Ideal Sts.
*Utica
Walnut & Schuyler Sts.
Ohio
*Cleveland
802 East 72nd Street
*Cincinnati
Stanton & Mellish Aves.
*Columbus
310 Dublin Ave.
Dayton
521 E. First Street
Lima
338 East High Street
Ohio
Toledo
441 South Erie Street
*Youngstown
601-621 Jones Street
Oklahoma
Oklahoma City
27 E. Grand Ave.
Tulsa
1 North Boulder St
Oregon
Portland
15th & Hoyt Streets
Pennsylvania
Allentown
211 Gordon Street
Erie
1502 Sassafras Street
*Norristown
*No. Philadelphia
13th & Cambria Streets
Pittsburgh
16th & Pike Streets
*Trafford
Tennessee
Chattanooga
212-238 King Street
Memphis
203 Washington St.
Texas
*Dallas
Harwood and Coombs St.
Houston
Cedar and Baker Sts.
San Antonio
512 Dolorosa St.
Utah
Salt Lake City
112 West Second St., South
Virginia
*Norfolk
22nd St. and Colonial Ave.
Richmond
1709 E. Carey Street
Washington
*Seattle
Henrietta St. & 8th Ave., So.
Spokane
121-123 S. Madison St.
Wisconsin
Manitowoc
810 Quay Street
*Milwaukee
36th St. & National Ave.

(Star) * Designates Plants.

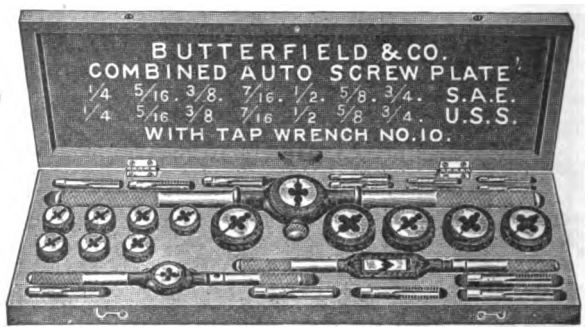
Other Plants and Distributing Stations are planned for other industrial centers throughout the country and will be established as fast as and wherever the local demand for oxygen warrants.

THE LINDE AIR PRODUCTS COMPANY

Largest Producers of Pure Oxygen in America

Forty-Second St. Building **NEW YORK**

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.

New York Store: 126 Chambers Street

THE HORSE RASP OF QUALITY



Ask Your Dealer for the *Improved*

HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, **"Slim," "Light," "Slim Light"** and **"Fine Cut."** Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial.

New catalogue mailed free on application.

HELLER BROTHERS CO., *Established in 1836,* **Newark, N. J.**

The Universal Gas with the Universal Service

PREST-O-LITE Service is a well-rounded, time-tested contract service, carrying obligations which the Company is bound to fulfill.

PREST-O-LITE Service is built on unique ability to serve — ample plant and cylinder capacity, great experience and a smooth-working, nation-wide organization — fundamentals without which service is no more than a name.

Some of the most valued heating applications in industry were inspired or developed by our Engineers. Their experience is rich in just such knowledge as may save you much loss through costly experiment or inefficient methods.

Prest-O-Lite

DISSOLVED ACETYLENE

The Gas of a Thousand Uses

has earned top place by force of organized knowledge and facilities.

If you have a metal-working problem, we are pretty certain to have a tested plan to submit — what to do and how best to do it. At your service whether you are an actual user or a potential user.

Send a sketch and data. We'll send the answer — fair and unbiased, professional rather than commercial.

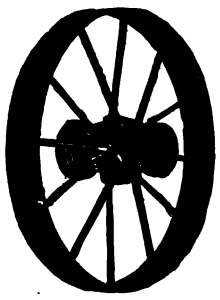
More than 40 Plants and Warehouses Ready to Serve You.

THE PREST-O-LITE CO., Inc. General Offices, 30 E. 42nd St., New York

Kohl Building, San Francisco

127-A

EMPIRE STEEL WHEELS



Plain or Grooved Tire
To Fit Any Wagon.

FARM TRUCKS
All Standard Types

Write today for Proposition to Blacksmiths

EMPIRE MFG. CO.
P. O. B. 209
QUINCY, ILL.

SAMPLE OF WELDING COMPOUND FREE

BLACKSMITHS!

Let me send you a trial package free and you will use no other. **Anchor Welding Compound** has no equal for strength. It welds the hardest steel. No hammer needed. Good for both big and little jobs. Try it.

Write to-day and mention The Blacksmith and Wheelwright.

N. D. DOXEY, ELMIRA, N. Y.

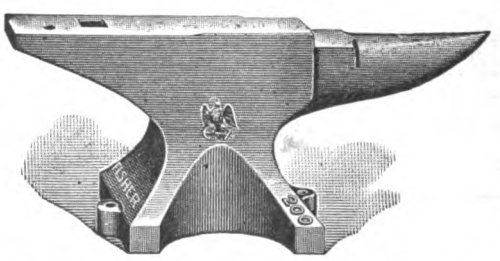
1843 **EAGLE ANVILS** 1919

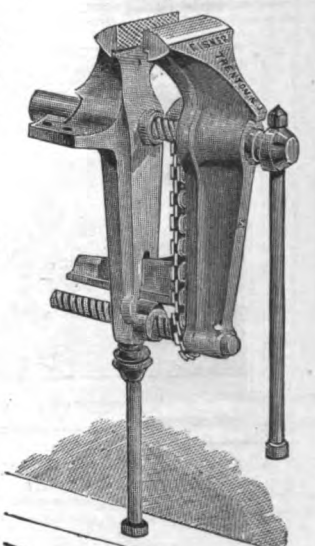
AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE

BLACKSMITH AND WHEELWRIGHT

Vol. ~~LXXIX. No. 7~~ 80 NEW YORK, JULY, 1919 TERMS ONE DOLLAR A YEAR

The Care and Repair of Tires

Part 4—How Cuts in the Fabric and Tread Are Repaired with Small and Large Vulcanizers

Copyright: M. E. FABER

THE importance of casing repair work in the up-to-date garage can hardly be overestimated. The cost of tires, that always seems high to the motorist, makes everyone who has a car highly interested in having every possible repair made. Surely the garage which makes every other kind of repair to a car should be the logical place for the motorist to go to for his tire repairs.

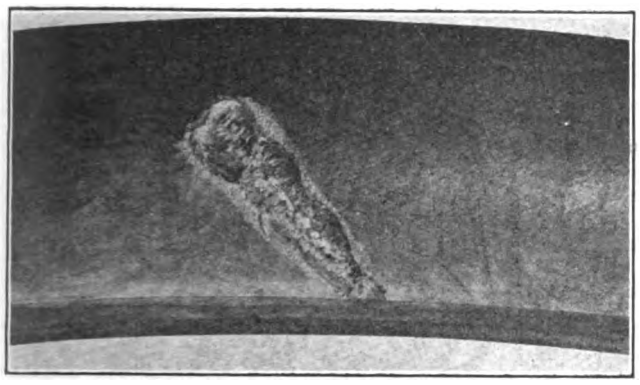


Fig. 1. This Blowout Shows the Fabric Torn clear Through Between the Tread and the Bead. The Principle of Repairing All Such Blowouts is the Same.

And certainly, in these days when it is possible for a repair man to equip himself for all practicable kinds of tire repairing at a cost but little more than that of a good sized tire, and since the vulcanizing process has been simplified to the point where it is no longer necessary to go to a school to learn the business, it is an object for any garage or repairman to prepare himself to get this profitable work.

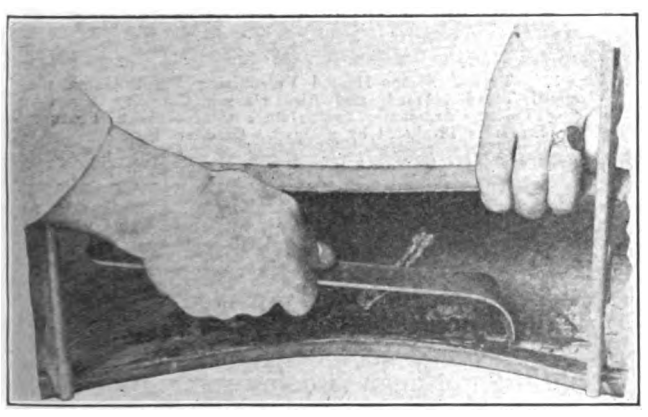


Fig. 2. Thoroughly Clean and Scrape the Inside of the Casing and Clean it on the Outside Tool.

The following description of the method to be followed in mending a typical blowout shows how easy it is for anyone with the slightest mechanical ability to handle such work with the simple equipment and without previous practical experience in tire repairing.

By the word "blowout" we refer to that class of tire injuries in which the fabric has been torn clear through, directly on the tread or close to the rim. It may be large or small, but the principle to be followed is always the same, namely, to reinforce the canvas or cord fabric to its original strength and then to weld the hole in the tread full of tough new rubber.

As an example, let us take the blowout shown in Fig. 1, and follow the various steps in the preparation and curing of a repair that will probably outlast the tire.

The first thing to do is to clean the hole through the tire and for at least six inches all around it on the inside of the casing. This is easily done by keeping the tire moist with gasoline and scraping it as illustrated. When all of the old rubber has been thoroughly cleaned off the canvas on the inside give it a final washing with gasoline and set the tire away to dry until the gasoline has all evaporated.

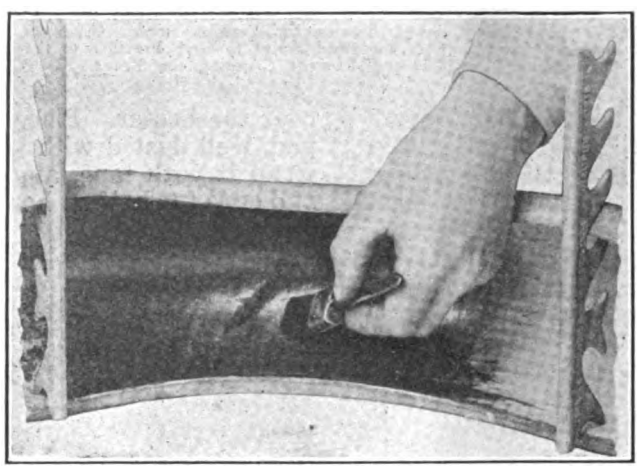


Fig. 3. After the Casing Has Been Cleaned, Coat it with Vulcanizing Cement. The Cemented Surface Should Extend at Least Six Inches All Around the Blowout.

Next coat the injury with vulcanizing cement which should be smeared in between any loose plies of fabric at the ragged edges of the damaged part. The entire cleaned surface on the inside is also cemented. Two or three layers of cement are applied, allowing each to dry thoroughly before applying the next.

Take a piece of repair canvas which is coated on both sides with raw rubber, and cut a piece about two inches larger in each direction than would be required to actually cover the hole. This is placed on the inside of the tire over the hole and carefully rolled down as in Fig. 4.

Another layer of canvas an inch larger than the first is then applied and rolled into place as in Fig. 5.

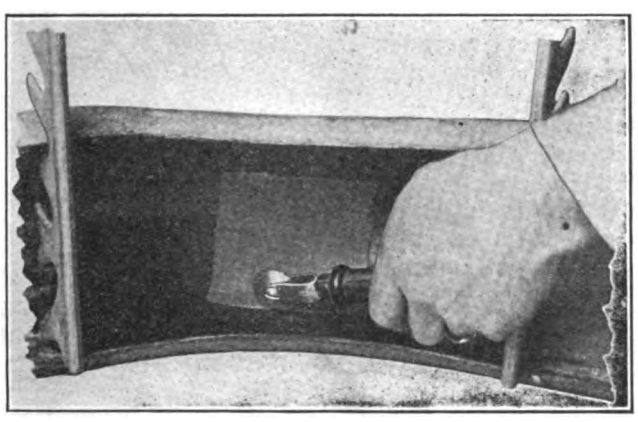


Fig. 4. After the Cement is Thoroughly Dry, Start Building the Repair by Using a Piece of Repair Canvas About Two Inches Larger in Each Direction Than the Hole. Roll This Down Carefully.

For a 3-inch or 3½-inch tire four layers are sufficient, each being about an inch larger all around than the one that preceeds it. For larger tires it is better to use five layers of new canvas in order to make the repair as strong as the rest of the tire. The last layer in all cases may be

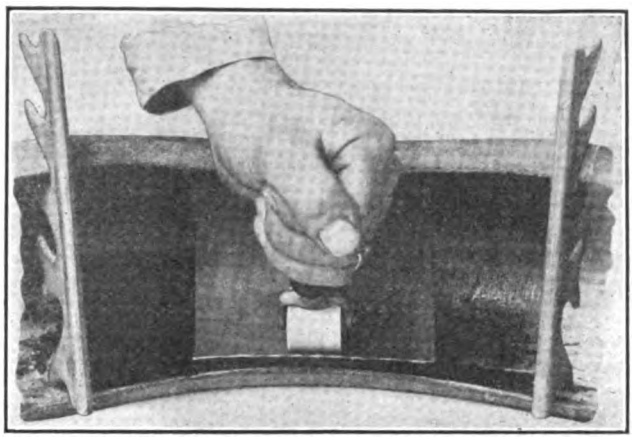


Fig. 5. The Second Layer, Larger Than the First, is Next Rolled Into Place.

of fabric coated on one side with rubber. No cement is necessary between layers.

Nothing has been cut away from the fabric originally in the tire except possibly ragged, rotten parts that cannot be worked back into the repair. To all intents and purposes a blowout patch has been built upon the inside of the tire and all that remains is to fill the gash on the outside. Practically this is the same as repairing just a superficial tread cut, because the fabric that has been put inside of the tire gives all the strength required and all that is necessary to finish the job is the water-proofing plug to fill the hole through the rubber on the tread.

The preparation of the outside of the tire simply requires filling the cut with scraps of raw rubber as in Fig. 7, which do not have to be cut to fit the hole because the raw rubber melts and flows into every crevice when heated.

Unless the vulcanizer is being used continuously and is already heated, you will have had it heating for the last half hour, so that by the time the last step of repairing the tire is finished the vulcanizer will be ready to go to work. If the vulcanizer has its temperature regulated automatically it will not need to be watched while heating or while vulcanizing, so that one can go right on getting repairs ready while steam is being raised and while other tires are being vulcanized.

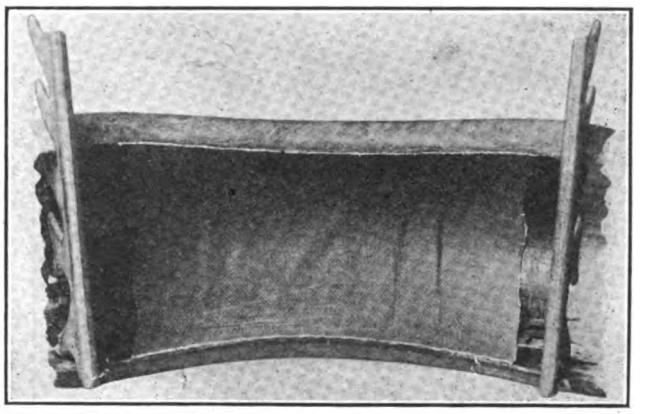


Fig. 6. Showing Appearance of the Inside of the Tire After Placing the Final Layer of New Canvas in Place. Four or Five Layers are Used, Depending on the Size of the Tire. Note that the Fabric is Well Smoothed Down and Does Not Extend Beyond the Cemented Surface.

The prepared tire is placed on the inside

Digitized by Google

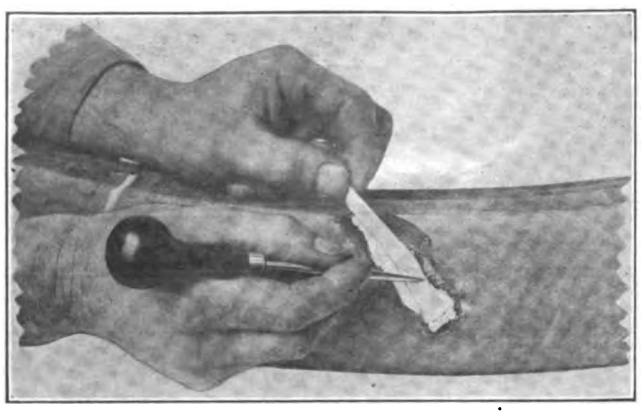


Fig. 7. Fill the Hole on the Outside of the Tire with Scraps of Tread Stock Which Do Not Necessarily Have to be Cut to Fit as the Rubber Flows When Heated. This New Rubber is Carefully Rolled and Pressed Down so That the Edges of the New Rubber Adhere to the Edges of the Cut.

form, which, owing to its peculiar shape will take any sized tire. A binding of heavy linen tape is then wrapped around the tire as shown in Fig. 8. Then by tightening the tension screws in the sliding bar underneath the heater an enormous pressure is produced that forces the repair and the tire very tightly together while they are being heated. To insure a firm pressure on the sides of the tire and to prevent crushing the bead, or clincher, soft rubber bead strips of triangular shape to fit in the groove of the bead, are used under the tape.

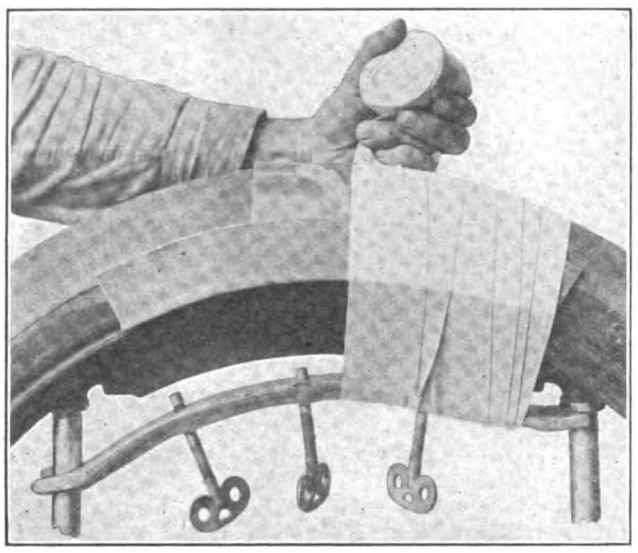


Fig. 8. The Casing is Placed on the Inside Heater and Wrapped with Tape, Which Upon Tightening the Tension Screws Gives an Enormous Pressure. Note the Bead Strips to Give Pressure to the Sides of the Tire and Prevent Crushing the Beads.

The outside heater, which is connected to the steam chamber by means of a flexible hose (or in the case of an electric vulcanizer, is supplied with current through a cable), is next clamped lightly over the repair. It does not need to fit particularly close to the tire because the wrapping of tape shapes the repair and gives all the pressure that is necessary. Thus one outside form will also fit all sizes of tires and it is unnecessary to have a different set of molds for each different size tire with the result that many of the odd sized molds would seldom if ever, be used.

It would be possible to cure the tire clear through with the inside form alone, just as it is possible to cure repairs made by the sectional method by heating only from the outside. But by using this outside form and heating from the inside and outside of the tire at the same time, the repair is cured very quickly—in from 40 minutes to an hour—and all tendency toward overcuring the tire is eliminated.

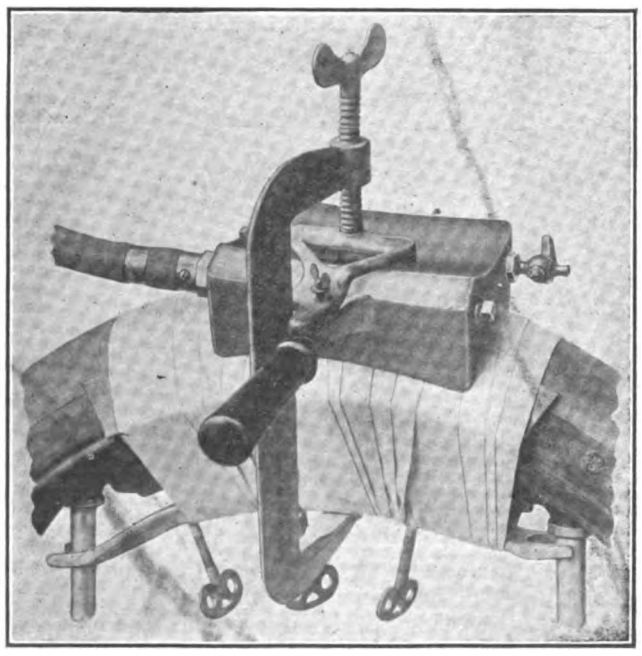


Fig. 9. Then the Outside Vulcanizing Plate is Applied.

When the repair has cured for the proper length of time, which varies with the size and thickness of the tire, the tape and bead strips, which are not injured by the heat and should last indefinitely, are removed. After the tire is taken off the vulcanizer any rough edges are removed with a rasp or a buff, and it is ready to turn over to the customer.

In case the blowout is nearer to the bead than illustrated in Fig. 1, exactly the same method is followed except that the last layer of fabric is brought clear around the bead and up the outside of the tire for an inch or so as shown in Fig. 9. This gives the rim of the wheel a chance to help hold the canvas in place and makes an exceedingly strong repair and one that is far superior in appearance to one made by stripping off the tread and replacing it as some repairmen still do.

In case the tire has a pattern moulded on the tread as is often the case, the following scheme enables one to make repairs which duplicate the rest of the tread.

Take a piece of canvas wide enough to cover the full width of the tread for about a foot and apply enough layers of raw rubber to one side of it to make the rubber about an eighth of an inch thick, or whatever seems necessary to fill the depressions in the tread of the tire. Put the tire on the vulcanizer so that a good, uninjured part of it comes over the heater. Place the prepared canvas pad, well dusted with soapstone, on the tire, wrap it with tape, apply the outside heater and cure for half an hour. The pad will take

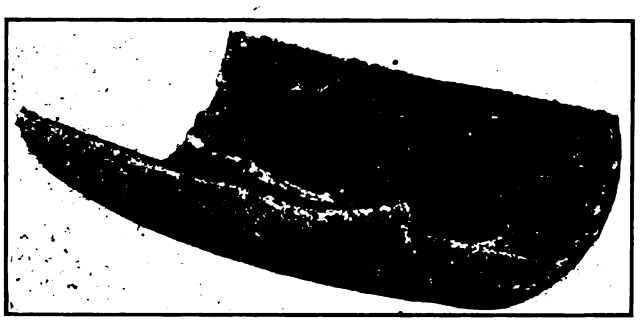


Fig. 11. The Home-Made Mold Used for Saving the Tread and Thereby Improving the Appearance of Repairs.

a perfect impression of the tread pattern, as shown in Fig. 10.

To use it, build the tire repair up in the usual way and when the repair is ready to vulcanize, this pad or pattern is placed over the repair before the tape is wrapped on. The repair will then be forced to conform to the pad and the result will be that the original tread pattern is duplicated over the repair. The pad may be saved for future use.

Other Methods of Repairing Casings

While there are several other methods of repairing casings which have also been in general use for many years, we have chosen to describe the Wrapped Tread Method on account of its simplicity and economy and because it is especially adaptable to the requirements of the repairman who wants to start into the business with the least possible outlay as well as those who wish to do every kind of repairing that it is considered practicable and profitable to handle in the garage.

Speaking generally, the sectional method of repairing casings, and the methods of retreading will only interest a comparatively few repairmen in the larger cities where sufficient of that class of repairs can be secured to make the installation of the expensive, complicated equipment, and the employing of expert workmen a profitable undertaking.



Fig. 10. When the Blowout is Close to the Rim, the Last Layer of Fabric is Brought Clean Around the Bead and Up the Side of the Casing.

The illustrations used in this article were furnished by the C. A. Shaler Co.

This is the last article of the series by Mr. Faber and we trust that many of our readers will profit by the valuable information given.

Tire repairing is an interesting branch of automobile work. Annually there are thousands of tires thrown into the scrap heap that might be returned to active service with but little work.

The average blacksmith, after a little experimentation, should be able to make practically any of the repairs to tubes or casings necessary and in his odd moments pick up considerable money.

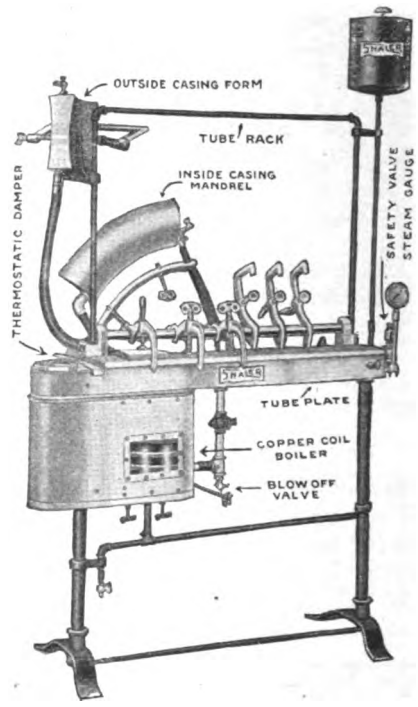


Fig. 12. Typical Steam Heated Vulcanizing Plant Using the Wrapped Tread Method, and Also Having Capacity for Repairing Tubes. Automatic Temperature Control is a Feature. Steam is Produced by a Gas or Gasoline Burner.

As has been shown in this series, the equipment need not be great, provided the proper machine is selected. The machine takes but little room and repairs may be vulcanized while the workman is doing something else. (Editor).

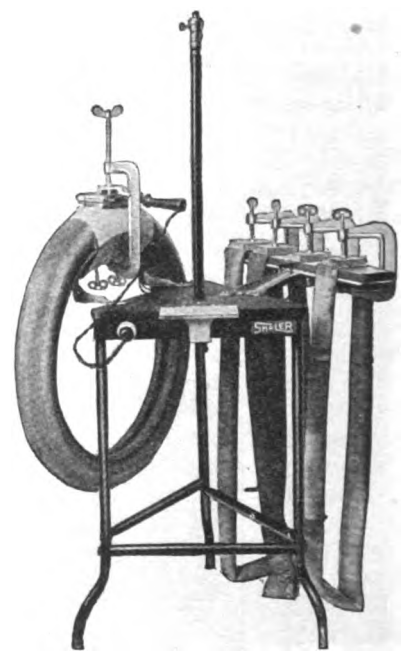


Fig. 13. Electric Vulcanizer with Automatic Heat Control and Using the Wrapped Tread Method for Casings. One of the Features is the Portable Outside Heater Which Can be Used on Tires While They are Inflated on the Wheel in Case it is Necessary to Mend a Cut or Sandpocket. Heats from City Lighting Current at Low Cost.

Digitized by Google

A Practical Milk Delivery Automobile Truck Body

WITH milk selling at from 18 to 20 cents a quart and from 10 to 12 cents of this money going to the distributor, the average farmer can easily afford to deliver his own milk, particularly if he has very many cows. In small towns in many cases one farmer can distribute all of the milk from his community in one truck. In many cases it pays to carry the milk even as far as ten miles from home if it can be delivered directly to the consumer in the city.

The writer has in mind a small community where the farmer made a speciality of carrying a loaded truck full of milk cans to a city 15 miles distant. In the city the milk was distributed to the customers over a radius of four miles by means of teams. The long haul was made by means of motor truck and it was found that the truck could easily make two trips a day.

We reproduce herewith a handy milk wagon body which is fully large enough to carry 48 cans. The body shown is designed to fit upon a Studebaker chassis and measures 10 feet long by 42 inches wide inside dimensions. In order to accommodate two tiers of cans the body measures 5 feet 4 inches in height. An extra carrying shelf is placed at each side of the body and the handles of the cans may be hooked over angle irons which are evenly spaced along the upper outside sill.

The main body sills should be made of oak measuring three by five inches while the two cross sills shown in the plan view *B* by dotted lines are made from four by two inch planks. The sides of the body should be well reinforced by a wooden ribbed top and supported by two upright members.

The tail gate and its construction is shown in Fig. *C*. One will note that this is arranged with two sets of hinges so that the upper portion can be opened downward without disturbing the cans in the lower compartment. As soon as the cans in the upper compartment are emptied, the whole back can be dropped downward.

If desired, both tail gates can be hinged at the center, the upper gate opened downward and the lower gate opened upward. For long hauls where ice is necessary, the body should be made tight and the roof or top made of three-quarter inch planks. The whole should be covered with canvas and painted with heavy white lead. In such event the upright pieces may be placed upon the outside of the canvas to give the panel design, as illustrated.

In some states where bottled milk must be sold and it is not legal for the milk to be sold from the large-sized cans, special racks may be provided. In such event three sets of shelves on the inside may be built. Free circulation should be provided for inside the body so that the cold air from the ice can circulate readily.

Nothing but one meal a day and a hole in the heel of both shoes can make some men hunt a job.

IT CAN BE DONE

Somebody said that it couldn't be done,
But he with a chuckle replied
That "maybe it couldn't," but he would be one
Who wouldn't say so till he'd tried.
So he buckled right in with the trace of a grin
On his face. If he worried, he hid it.
He started to sing as he tackled the thing
That couldn't be done, and he did it.

Somebody scoffed: "Oh, you'll never do that,
At least no one ever has done it,"
But he took off his coat and he took off his hat,
And the first thing he knew he'd begun it,
With the lift of his chin and a bit of a grin.
If any doubt rose he forbid it;
He started to sing as he tackled the thing
That couldn't be done, and he did it.

There are thousands to tell you it cannot be done.
There are thousands to prophesy failure;
There are thousands to point out to you, one by one,
The dangers that wait to assail you.
But just buckle right in with a bit of a grin,
Then take off your coat and go to it.
Just start in to sing as you tackle the thing
That cannot be done and you'll do it!

—*New York Tribune.*

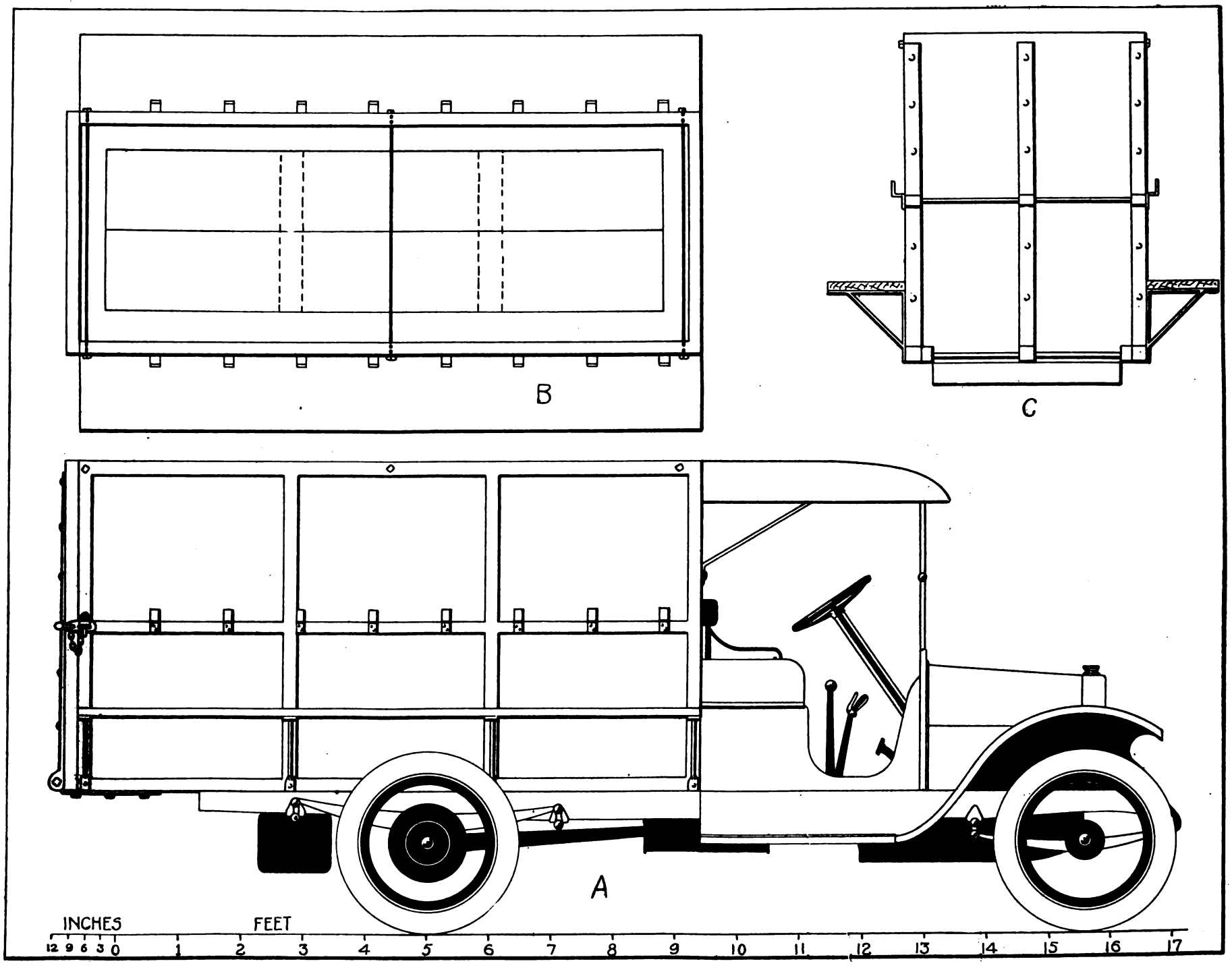
UNFORTUNATELY

Mrs. Blank could find only two aisle seats—one behind the other. Wishing to have her sister beside her, she turned and cautiously surveyed the man in the next seat. Finally she leaned over and timidly addressed him.

"I beg your pardon, sir, but are you alone?"

The man, without turning his head in the slightest, but twisting his mouth to an alarming degree, and shielding it with his hand, muttered:

"Cut it out kid—cut it out! My wife's with me."—*Public Service Chat.*



Digitized by Google

Selling Scrap Metals

How the Average Smith Can Save Money in the Disposal of His Old Iron and Steel

By G. K. BROMLEY

THERE is probably not one blacksmith in the country, no matter how small his district, who cannot make several hundred dollars or more a year by giving the proper attention to his discarded scrap metal. By scrap we mean discarded iron, steel, and metals, and hereinafter refer to it by that name as it has risen to a position in trade where it no more can carry the opprobrium that has so long attached to it. "Junk," is a word that has become a synonym for worthlessness, but is not representative of the higher latent values now possessed by scrap.

We will not deal at length with the possibilities of the business, but will present facts concerning it from which the man with the ordinary business sense can draw his own conclusions and upon which he can base his operation with more promise of success and profit than by continuing along in an indifferent manner. It is important, however, to understand the elementary facts regarding metals to handle them properly either as new stock or scrap. There are two general divisions, ferrous and non-ferrous, the former including such as contain iron and the latter those containing no iron, as copper, lead, spelter or zinc, tin, nickel, and aluminum. Brass, bronze, and many other composition metals are an alloy of copper and other basic metals.

Loss by Oxidation

The ferrous metals are all very sensitive to oxidization through contact with the air and greatly lose in value through such exposure by rusting. Their susceptibility to rust is greatly increased by the presence of moisture and it also should be remembered that loss through oxidization increases greatly with the proportion of surface area exposed, to the weight. This means that the smaller the piece, the greater the depreciation. For this reason care should be taken to keep collections of iron and steel scrap in a dry place and to make allowance for the amount of rust on the material when purchasing it for resale as scrap.

After a man has determined haulage costs to the nearest freight depot and surveyed his district to ascertain what supply is available from month to month, he can establish a fair idea of what the possibilities are and whether or not it will pay him to go beyond the immediate neighborhood for material to bring his own collections up to a carload-lot size for shipment to the larger city dealer.

It is not recommended that a blacksmith neglect his other work to give attention to his scrap of course, but his spare time devoted to sorting and grading his stocks or in picking up old machinery and scrap in the neighborhood will prove a substantial source of additional income in the course of a year. As soon as it becomes known in his neighborhood that he will handle scrap, he will be surprised by the amount of material that will be brought to his shop.

To stimulate this source of supply, and it is a highly satisfactory one as it eliminates the time and labor of going after it, good results can be obtained by posting a notice in the shop stating the minimum prices that he will pay. In figuring out such a list care should be taken in arriving at the price which will permit a large enough margin on the resale to cover all handling, haulage and to give a profit. Such prices should be from 15 to 25 per cent below the prices he expects to obtain f. o. b. shipping point.

Of course the return for these efforts will be in proportion to the time and study combined with them and the amount of material available for sale. The average blacksmith should realize that in his old horse shoes he has about the highest value so far as scrap material is concerned, for shoes are made of one of the purest forms of iron known as "wrought." In the scrap market wrought iron sells from 100 to 125 per cent more than mixed country iron, the classification in which most shipments of scrap iron come from the rural sections to the city markets. At the city markets iron is sorted into its respective grades by the large dealer who gains the larger profit by so doing.

There are really three basic grades into which scrap is divided, wrought, cast scrap and steel, and these are about all that it is necessary for the average collector to concern himself with, unless he intends to handle some large single lot of one kind or is accumulating material on a large scale, when it is to his advantage to be familiar with some of the specifications adopted by leading consumers in buying scrap.

Highest Grade of Scrap

The most important grade of scrap consumed by steel mills is known as No. 1 heavy melting steel upon which one of the leading consumers exacts compliance with the following qualitative specification:

"Must be one-fourth inch and over in thickness, nothing to exceed six feet in length, free from pipe busheling. All scrap from industrial steel. Railroad scrap in charging-box size will be acceptable under these specifications, to be free from cast iron, malleable iron, or any other foreign substance."

On cast-iron scrap, known as No. 1 machinery cast, a model specification and the one ratified by the American Foundrymen's Association, is as follows:

"This material shall consist of cast-iron scrap of first quality which posses evidence of having been machined, such as planed or turned surfaces, bored or drilled holes, or similar markings. It must be cupola size, no piece to weigh more than 100 pounds, and must not exceed 24 inches in length or width; No. 1 heavy pieces greater than one inch in section; No. 1 medium pieces one-half inch and not to exceed one inch in section; No. 1 light pieces not to exceed one-half inch in section. Scrap classified as railroad cast scrap or under any other classification, will not be accepted under this classification."

Cast scrap in the form of columns, pipes, plates and rough castings is classified under the head of rough cast and a special classification is provided for burnt machinery scrap. Broken cast-iron stock comes under the head of Stove plate and constitutes an important grade used by foundries. It must, however, be free from all burnt parts, grates, and from malleable iron and steel parts as well. Broken radiators are graded under a separate scrap-iron classification.

Scrap Classification

Malleable cast scrap is material that has undergone the annealing process, but malleable cast-iron parts of automobiles form a grade by themselves while valves, flanges and pipe fittings of every description are classed as miscellaneous cut scrap.

Limitations of space forbid the publication of the various classifications of all grades of scrap, but in the following are afforded sufficient information for all practical purposes so far as the small collector is concerned:

No. 1 Agricultural Scrap—Consisting of cast-iron parts of agricultural machinery, free from steel, malleable chilled iron, such as low-plow points, etc., and burnt iron of every description.

No. 2 Agricultural Scrap—Consisting of chilled iron parts of agricultural machinery. Must be free from steel, malleable and burnt iron of every description.

Automobile Malleable Scrap—Consisting of malleable cast iron parts of automobiles, free from steel forgings, stampings and gray iron parts.

Agricultural Malleable Scrap—This shall consist of malleable cast iron parts of agricultural machinery, excluding reaper and mower wheels and pipe fittings.

Agricultural and Heavy Busheling Scrap—Consists of 50 per cent spikes, nuts, bolts and horseshoes; the other 50 per cent heavy agricultural steel scrap, which consists of plows, wagon springs, and similar scrap; free from forks, shovels, malleable iron, etc. All to be in charging box sizes.

Bundled Hay Wire—To be put in bundles in charging box sizes; bundled in such a manner that same will not come loose in transit or in handling; material to be either black iron or steel wire, free from any copper, zinc, tinned coating or any other foreign material; also to be free from rusty stock.

Heavy Melting Steel, Agricultural—Consists of plow beams, plow shares, steel axles, shafting and other heavy steel from agricultural machinery. To be entirely free from rake teeth, sickle bars and any light, trashy material. No piece to be less than 5 lbs. in weight.

No. 1 Country Wrought—Consisting of agricultural wrought, such as rods, bolts, bars, etc., ¾-in. diameter by 6 in. long or longer, including soft steel scrap, wagon ties, wagon and buggy axles and horseshoes. All to be free from cast, malleable, hard steel, sheet iron or any badly bent or crooked shapes.

Mixed Country Scrap—Consists of iron and steel from agricultural machinery, and to be free from light sheets, tin cans, hoops, corrugated iron, bicycle and bed frames, buggy wheels, uncut traction wheels, wood tanks, sheets, cable, wire, netting, steel frames, gasoline stoves, old boilers, and any light, trashy or worthless material. No sheet iron or steel unless 3/16 in. and heavier and not larger than 2 x 5 feet. Not more than 10 per cent pipe allowed.

Unsorted Country Dealers Wrought—Consists of heavy wrought and soft steel scrap as accumulated from the country; guaranteed to contain at least 60 per cent scrap ⅝ to 4 in. round or square; flat 2 in. thick or thicker and 6 in. long or longer; may include horseshoes, but must be strictly free from cast, malleable, hard steel, limed, galvanized or painted stock. No reinforcing concrete bars.

Shoveling Steel—Consists of spikes, bolts, nuts, tie plates, blacksmith shop scrap, structural and boiler punchings; horse shoes or similar heavy shoveling steel and shoveling crop ends. All must be clean and no light or tangled scrap included.

While the foregoing classifications represent but a small percentage of the total into which scrap is graded, they cover practically all the materials which would come within the reach of the blacksmith even though he should collect material in his district, and also give an excellent idea of the specifications which govern the leading consumers in making their purchases.

By comparing the various classifications with the market prices as given below, one can arrive at a fairly good estimate of the values represented in the different kinds and grades of scrap iron, steel and metals.

These prices were current at the opening of the present month in the New York market and are given for means of reference only, as different market minimum prices obtain in various parts of the country with the differentials from shipping points governed by the freight rates to consuming centres. These prices are also much higher than would rule with the average collector of iron, steel and metal scrap as they represent prices paid to the smaller dealers by the large scrap merchants who sell direct to consumers.

Scrap and Iron Steel

Heavy melting steel	15.50—16.00
Shoveling steel	14.50—15.00
No. 1 cast cupola	20.00—20.50
Stove plate	16.00—16.50
Grate bars	16.00—16.50
Low phos. mill crops, guar....	21.50—22.50
Low phos, melting stock	20.00—21.00

Digitized by Google

No. 1 busheling	13.50—14.00	Locomotive ax. steel rerolling	29.00—31.00
Machine shop turnings	9.50—10.00	Locomotive ax. steel for forg.	32.00—34.00
Cast iron borings	10.00—11.00	Steel car wheels	17.00—18.00
Borings and turnings	8.50— 9.00	Cast iron wheels	20.00—21.00
Agricultural malleable	14.00—15.00	Steel springs	19.00—20.00
Heavy cast scrap	20.00—20.50	Sheet bar crop	18.00—18.50
Comp. sheets	13.00—13.50	No. 1 yard wrought	17.50—18.50
Bundled sheets	11.00—12.00	No. 1 R. R. wrought	18.00—18.50
Rerolling rails	17.50—18.50	Railroad malleable	15.00—15.50
Girder and "T" rails	14.50—15.50	Steel knuckles and couplers	17.00—17.50
Steel car axles	24.00—25.00	Heavy steel axle turnings	13.25—13.75

Practical Horse Shoeing

A Necessary Knowledge of the Tendons and Cords in the Lower Leg is Essential to the Smith



THE next lower articulation in the horse's foot is the *coronary joint.* It is a very simple affair, as only two bones are concerned, contrasting very decidedly with the fetlock joint with its four bones. The two bones of the coronary joint (sometimes called the pastern joint) are the upper and lower pastern bones—or, what is the same thing, the upper pastern bone and the coronary bone. (It is also correct to say the long and the short pastern bones.) The upper pastern bone has a convex surface at this joint, and the coronary a corresponding concave surface. The joint could hardly be simpler.

There are several ligaments holding the two bones in place. Naturally, the arrangement of ligaments is also simple because of the simplicity of the joint. First of all, there is the capsular ligament whose business it is to hold the joint together after the manner of an enveloping sheath. The capsular ligament of the coronary joint is, however, notable in the circumstance that it is not directly attached to either bone. Instead, it is attached to tendons and other ligaments. It is not an especially strong ligament, its usual and normal duty being a light one. There are, in addition, two side ligaments. These are attached above and below to the bones. In fact, they run on down and are attached to the coffin bone and to the two navicular bones. There are four other ligaments belonging to the coronary articulation. These all lie to the rear.

The Coffin Joint

The coffin joint is the articulation at the bottom of the foot. There are three bones involved. First, the coronary bone, the lower end of which supplies the upper surfaces for the joint. The surfaces are two convexities called condyles. We have already had a similar condition at the fetlock where the cannon bone (metacarpus) furnished two convexities termed condyles, as here. The coffin articulation is sometimes termed the pedal joint. The two lower bones—(the coffin bone and the navicular bone)—supply concave surfaces corresponding to the two convexities of the lower end of the coronary bone.

Note, now, the following particulars concerning the three joints of the foot. Taking them in order from the uppermost to the lowermost, they consist of 4, 2 and 3 bones. All the joints consist of convex and concave surfaces. The convexity or convexities belong, in each case, to the top bone or bones, and the concavities to the underneath bones. These points ought to be fairly easy to remember.

The coffin joint, like the other two, has its capsular ligament surrounding the bones of the articulation. The coronary and coffin bones have side ligaments, one on the right and the other on the left side of the bones, connecting the two and are especially strong. There are one or two other ligaments, but they need not concern us at present.

The Anterior Extensor Tendon

The *Anterior Extensor* tendon is the Latin name for the next tendon to be considered. *Anterior* has already been explained. Its meaning is *front* or *fore.* An anterior surface of a bone is the front surface. The idea conveyed by *extensor* is something that extends. Applied to a tendon, it means a tendon which operates to pull the bone forward. The *anterior extensor tendon* may now be understood to mean the front tendon which extends or pulls forward.

Another Latin name is the *extensor pedis tendon,* which means literally the tendon of the foot which pulls forward. The reader may take his choice of the two names, for both are in use.

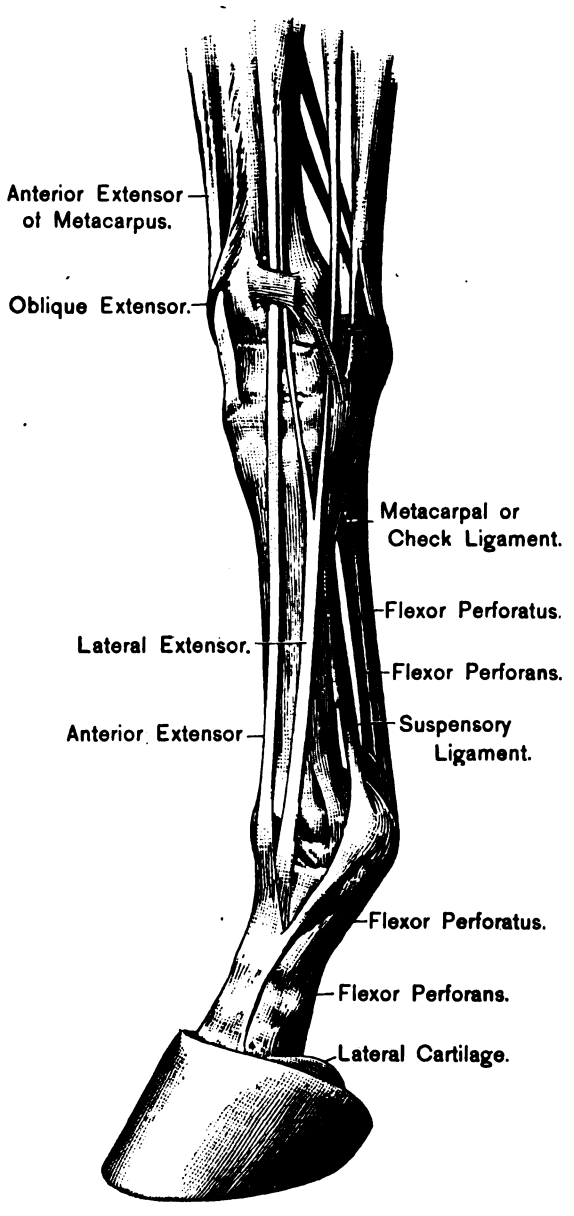
The *anterior extensor* tendon lies on the front parts of the upper pastern, the coronary and the coffin bones. In fact, this tendon comes down from above the fetlock joint. It extends along the front surface of the cannon bone, runs over the fetlock joint and on down over both the other foot joints to the coffin bone at the bottom. That this tendon extends so far up the leg need not surprise one, if one remembers that all muscles are above the knee and hock.

The anterior extensor tendon broadens below the fetlock joint to a width of perhaps 1½ or 2 inches. It is as a broad band that it continues on down over the remaining two joints. This broadening of the anterior extensor tendon is, in part, due to the fact that two other tendons coming from above join it between the fetlock and coronary joints. These are tributary tendons as it were. One comes down the foot on the right and the other comes down on the left. Both are somewhat to the rear. Each is attached to the corresponding sesamoid bone at the fetlock joint. Looking at the whole affair as the anterior extensor tendon, one may say that this tendon is attached to five of the seven bones of the foot. That is, the anterior extensor tendon is attached to the two sesamoid bones, the upper pastern, the coronary and the coffin bones. All the bones of the foot proper, except the navicular bone, are attached. It will be gathered, perhaps, that this tendon is a very important feature of the foot and so it is. The muscular mass which corresponds to it is called the extensor pedis muscle.

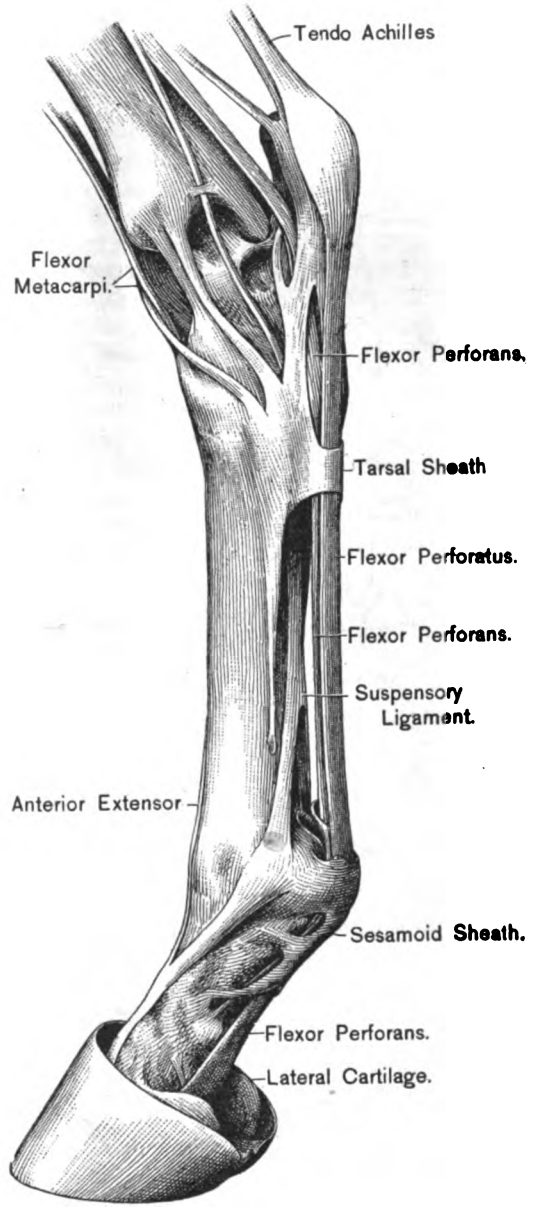
In the fore-leg of the horse, there is a special extensor tendon which is attached to the upper pastern bone. On the right fore-leg, it lies alongside and to the right of the anterior extensor tendon; on the left fore-leg, it lies, correspondingly, alongside and to the left of that tendon. That is, these special tendons on the fore-legs lie along the outer sides of the anterior extensor tendon.

[I may say parenthetically here that the reader should welcome the repetition of hard necessary words in the text as this repetition gives him repeated opportunity to get them fixed in his mind. So, he is not to expect me to avoid using a hard term—like anterior extensor tendon—if that term really has to be learned.]

There are two distinct tendons, common both to fore and hind feet, which operate to move bony parts. The *superficial flexor tendon* (the flexor pedis perforatus tendon) lies just under the skin—hence the adjective "superficial," which means *on the surface.* It is located to the rear and covers up more or less completely the second flexor tendon, which is properly termed the *deep flexor tendon.* The adjective "deep" refers to the fact that it is deep below the surface. There



Tendons of Front Leg.
Outerside and Front View.



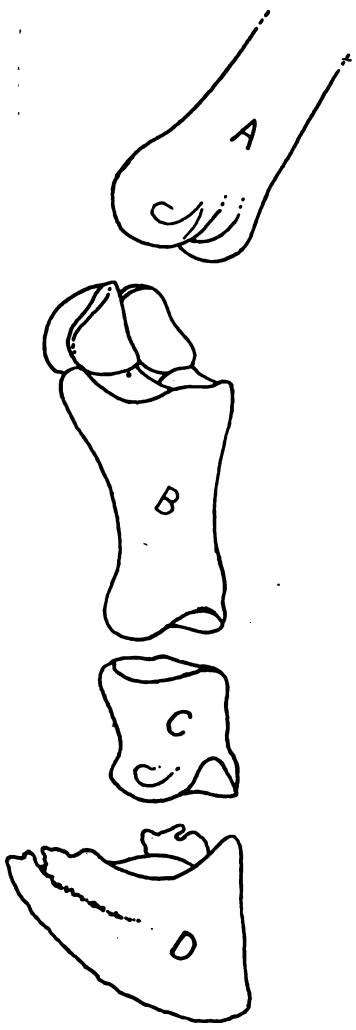
Tendons of Hind Leg.
Innerside and Rear View.

Digitized by Google

is another name, the flexor pedis perforans tendon.

The Latin names contain some significant information about these two flexor tendons. The word "perforatus" means *perforated;* while "perforans" means *perforating.* The superficial flexor tendon is, accordingly, a perforated tendon, and the deep flexor tendon is a perforating tendon. And this is an exact statement of fact. The superficial flexor tendon is, indeed, perforated and the perforating thing is the deep flexor tendon. The one tendon passes through the other. This is a notable and curious matter and invites our attention. The point at which the one tendon passes through the other is in the rear of the fetlock joint between the two sesamoid bones. The superficial flexor tendon is, at this point, tubular in form; and here the deep flexor tendon passes through the tube and consequently through the other tendon.

The one is perforated, as it were, and the other perforates it, as it were. The superficial flexor tendon divides into two parts as it continues on down below the short tubular part. This branching permits the tendon to have two points of attachment to each of the two bones which it flexes. These two bones are the upper pastern bone and the coronary bone. When the tendon is pulled by the muscle to which it is attached higher up, both these bones are simultaneously drawn back.



Shape of the Bones of the Foot. Each Bone is Shown Away from the Adjacent One so as to Show the Articulation: A, Cannon Bone; B, Upper Pastern Bone; C, Coronary or Lower Pastern Bone; D, Coffin Bone.

The reader may think it pretty hard sledding along here. Let me say then, by way of encouragement, that the tendons and the way they are arranged and other similar matters are among the most important with respect to horse-shoeing. For example, the two flexor tendons often thicken and shorten because of some injury. The result is that the upper pastern and the coronary bones are, one or both, drawn backwards when the muscle is at rest. The foot is thrown more on its toe and becomes stubby or steep-toed. We have here something to which the horse-shoer should be alert. So, the reader need not feel that a good deal of information of a difficult nature is being unnecessarily put before him.

There are hard spots in a horse-shoer's education. The sensible thing to do is to put enough attention on the hard spots and soften them up. When one rolls a lemon preparatory to making lemonade, it resists pretty strongly at first; but after a little, it starts in to soften, and then it gets soft rapidly. So it is often with a hard piece of reading. Work at it seriously, seek out all the points, and persevere. It will often happen that soon the hardness passes off and everything becomes fairly easy.

If the horse-shoeing job were so easy that anybody and everybody could learn it while he is smoking a pipe full of tobacco, then there would be but little need for men to set up shops, as the drivers could soon learn to do their own work. Other things being equal, a hard business to learn is a better business than one easy to learn, as the difficulty tends to preserve the business to the one who already understands it.

The deep flexor tendon (*the flexor pedis perforans tendon*). Some information as to this tendon has already been supplied. It is down beneath other tissues and is accordingly said to be "deep." It passes through the short tubular section of the superficial flexor tendon, and so is termed "perforans," i. e., perforating. It runs down from muscular tissue above the hock or knee along the rear of the cannon bone. Here it is like a cord, being fairly round. It lies below the superficial flexor tendon and above a ligament belonging to the sesamoid bones. At the fetlock, it, as has already been described, passes through the ring section of its companion tendon. It now flattens and becomes fairly broad, and after passing over the navicular bone, "as over a pulley," secures attachment to the lower surface of the coffin bone. It operates to move this bone.

News from Pennsylvania

A Chat with a Smith That Shoes Horses Almost as Large as Elephants

BY JAMES F. HOBART

SOME years ago, there were five horse-shoeing blacksmith shops located almost within a single block in Homestead, Pa. Today, there are two shops, and they are a-plenty. One of these shops, that of Messrs. H. C. Todd & Brother, used to run three fires. Now, one fire is more than enough both for the shoeing and the wagon work and with the latter, the shop seemed to be jammed, both inside and out.

This shop is well, even lavishly, equipped with tools, with drill press and with band saw, jointer, circular saw, hub borer and several other minor tools which the writer did not examine closely. But the feature of this shop is the splendid lighting of the shoeing end. The shop is located in a long, narrow room, originally intended for a store in a city block. High above the smith's head, attached to the ceiling and almost vertically above the anvil of the first fire in the shop, is a 500-watt incandescent electric light which makes shadow-chasing something unknown in this shop.

A big two-horse truck was undergoing repairs at the time of the writer's visit, and several baggage trucks were being overhauled, this shop doing most of the railroad work from the neighboring railroad station. Outside of the shop, several vehicles of lighter weight were lined up for attention, but only three horses were in evidence during the writer's visit, two horses going out and one being led in for shoeing.

Elephant's Shoes

But, those horses surely were big ones, and the shoes in the shop showed it! All around the edge of the slack tub, even disputing location with a few pairs of tongs, big shoes were hanging, some No. 7, but most of them No. 8! "Are you shoeing elephants in this shop?" the writer asked of Mr. Todd—"Seems like it by the shoes, don't it"—smilingly replied Mr. Todd as he busied himself at charing a bunch of coal preparatory to doing a piece of automobile work.

"Yes, the shop does a lot of automobile work," said Mr. Todd in reply to a question. "The garages and repair shops send most of their forging work here and a good many machines are sent here direct when smith work is needed. No, I never do any overhauling. Might go into it if I wanted to. There's money in it all right, but I don't intend to take it up even if lots of auto owners do keep asking us to do so. I'll do their forging work, but I won't go into overhauling autos. I don't like the work. An old wagon is bad enough, but automobile work is too all-fired dirty!"

"You just bet that nails and shoes are high," replied Mr. Todd to a question. "And you are sure of it when some of these big horses go out with a good-sized part of an iron mine on their huge hoofs. But I got out of it pretty well during the war. I always carry a pretty good stock, and just before things went sky-high in price, I stocked up with nails enough to last me until prices get a bit lower. Why, I haven't bought a nail for two years, and have about 23 boxes yet, up stairs, sticking around under the rafters. They will last me a good while yet."

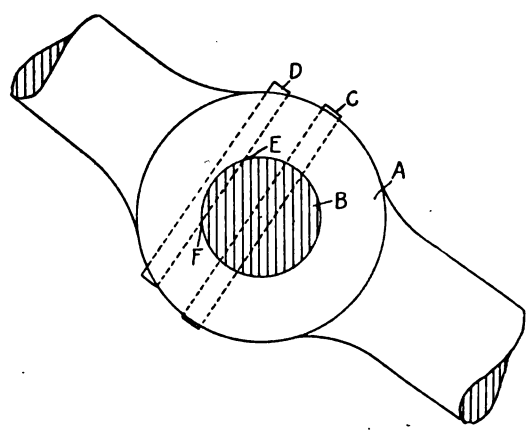
"I didn't come out as well with shoes, for had no place to store them, but I put in all that there was room for, and after they were gone, I had to pay seven cents a pound, same as the rest of the smiths. That is a pretty stiff price, but when old shoes are worth from a cent and a half to two cents per pound, it helps out a little. I wanted to keep my old shoes, but the storage space got full to overflowing and I had to sell a little sooner than I liked to. But I got a pretty good price for the old shoes after all.

"It beats all, though, how horse-owners do have the old shoes reset! Shoes which would have been thrown away three years ago, are now reset as long as they can be made to stay on the hoof, and I wonder if some guy won't work up a scheme for putting two light old shoes on a hoof, instead of one heavier shoe?"

Pump Handle Pins

A farmer, who owned one of the useful water lifts known as a "People's Pump" in which the handle is squared upon the short shaft, was very much annoyed by the rattling of the handle upon the squared portion of the shaft. He had allowed the handle to become loose very slightly and had paid no attention to the slight motion between handle and squared shaft. At the start, the tightening of the nut upon the end of the shaft, or the driving in of a shim between handle and squared shaft, would have prevented the trouble.

But the farmer hadn't taken the trouble to make the small working repairs which would have saved so much labor and aggravation later. In fact, to speak accurately, the farmer had not realized what it meant to have a bit of looseness in the pump—or in any other machine—and to let the looseness "go and grow." But he found out, and now, he looks after the little loosenesses in his machinery just as carefully as he looks after and attends to the first little bodily



How the Pump Handle Was Pinned.

Digitized by Google

twinges which tell him to "look out for his liver!"

The farmer got very tired of the pump rattling and took it to a machine shop where they bored a round hole through the handle, as shown at *B*, also through the other casting which carried the plunger-rod. So far, so good, but then the machinist made a big mistake. He put a quarter-inch pin *C*, right through the center of the 1¼-inch shaft *B*, and the handle hub *A*; did likewise with the plunger lever, and sent the farmer home with his pump free of all rattle. For about an hour, the pump worked most beautifully, then, all at once, the handle pin *C* "let go" and sheared right off between shaft *B* and casting *A*. The farmer discovered the trouble and put a bit of pitchfork line in place of the pin, and the pump worked a little longer, then the pin through the plunger crank sheared off in like manner.

The farmer returned the pump to the machine shop and soon as the foreman saw the job, he called the man who had mended the pump and said: "Here! Fix this pump right, and do it right away, too. And don't charge him a cent either. You, John, should know enough when putting in a pin to work under the stress it must carry in this case, to give the man something besides a 'wire cutter,' for that is exactly what the device amounts to as you have arranged the pin. Drill another hole at *D*, put the pin so it bears against the shaft as much as ⅞-inch from *E* to *F*."

"With the pin placed at *C*, it is in 'double shear' and has two surfaces to hold, each having an area of 0.049 square inch, or 0.098 square inch in all. With the pin arranged at *D*, there is a section of metal to be sheared off which is about ¾-inch long ¼-inch wide. This gives an area of ¾ x ¼ = 3/16 or 0.1875 square inch, about four times as much surface; 3.8 times as much, to be exact!"

The farmer took this lesson for all it was worth and put it in practice on his other farm machines and now he never has any trouble from the shearing off of pins and says that a pin put in, as shown at *D*, will stand almost as much as a regular key. And it will, provided that it does not weaken the casting *A* too much. Although a pin at *D*, does not weaken that casting any more than if it were placed at *C*, it surely does weaken the casting somewhat.

Therefore, when tempted to make an extra strong job by putting in a very large pin, consider whether or not the hole which must be drilled for the pin will not weaken casing *A* to the extent that it will "let go" before the heavy pin. The strength of both pin and casting, should be so well calculated and proportioned that one will be as strong and no stronger than the other. When that has been done the fastening of shaft to casting has been made as strong as is possible.

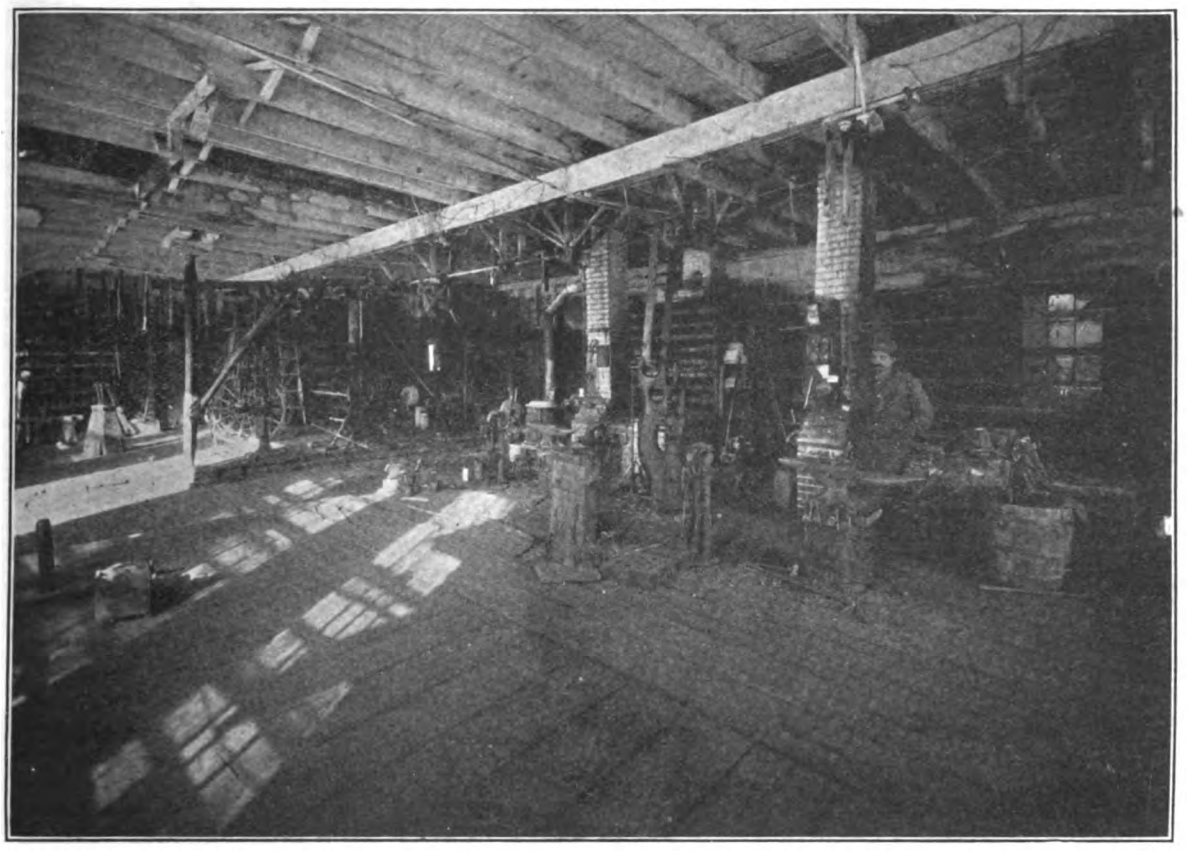
Two Prize Photo Entries

WE are sorry that we are able to reproduce only two photographs this month in our prize contest, but we trust that before our next month's issue goes to press we will receive more. We would suggest that every reader who owns a blacksmith shop send us a photograph of it to be entered in the prize contest. It costs nothing to enter the photograph and everyone stands an equal chance of winning a prize. In any event, the original photographs will be returned as soon as they have been reproduced in the magazine and with the photograph each entrant will receive a half-tone cut which he can use upon his letter or bill heads or envelopes, as he chooses.

The cuts themselves are worth from two dollars and fifty cents to ten dollars, therefore, in themselves, they are practically prizes, so that each reader receives this kind of a prize if he enters a photograph of his shop.

You do not have to be a regular subscriber to enter your photograph and all it costs is the price of three cents postage in sending us the picture. Practically any size picture can be used from the smallest Brownie to the largest studio camera. Of course the clearer the photograph, the better it will reproduce in the magazine.

If you have any sort of a photograph of your shop, put your name on the back of it and send it to us together with a little note telling us about the shop and the work which you do.



Prize Photo No. 12, from Mr. A. W. Hubbard, of Iowa. No Letter Received.

PRIZE PHOTO NO. 13

From A. Cullander, Mississippi.—I have been a reader of your paper for many years and have followed the blacksmith trade for 26 years. I am still in the business, but only in a small way for the machine shop, which we have recently added and of which I am sending a photograph, occupies most of my time.

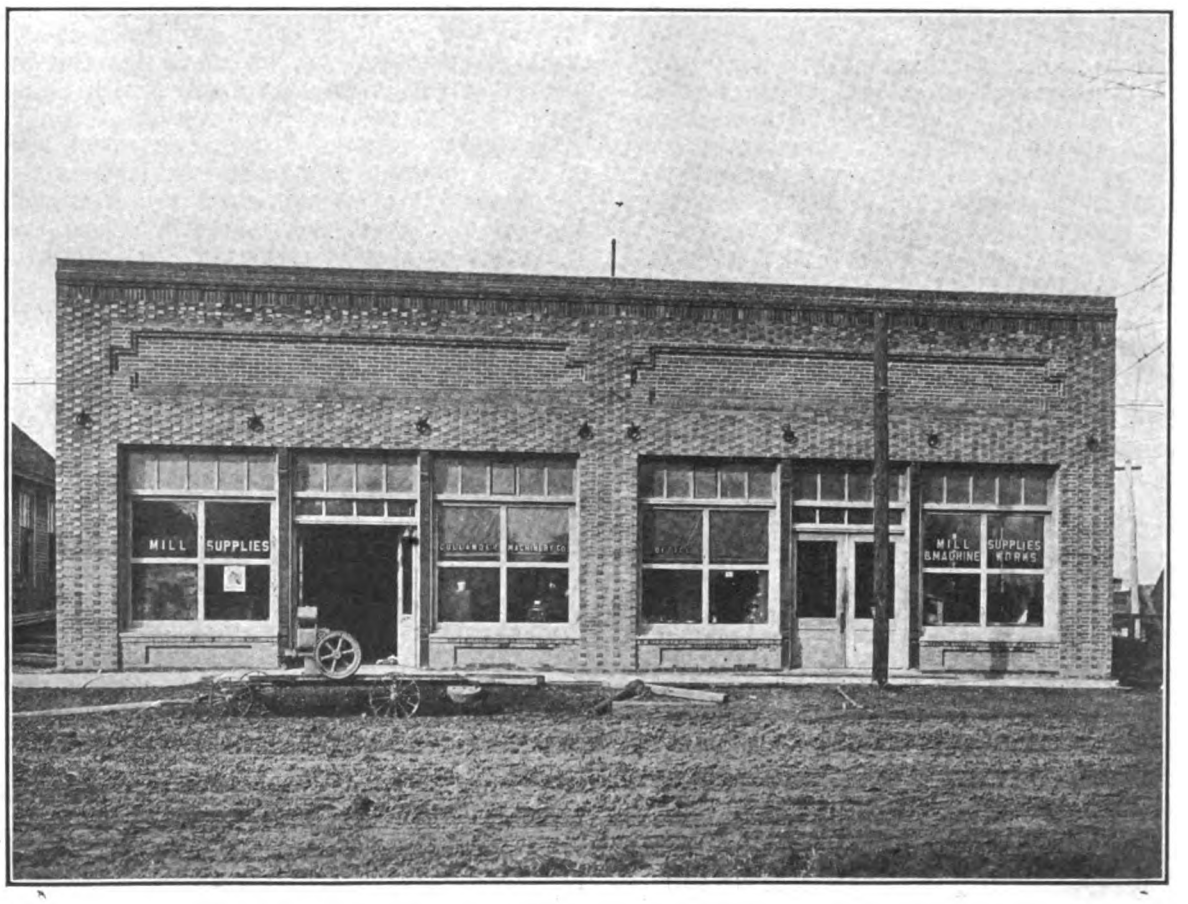
We started here about 12 years ago in a small wooden building, 30 by 60 feet, and have grown to where we now occupy our own brick building which is 60 by 120 feet. Even now, this larger building begins to look small for us and in a short time it will have to be enlarged.

I think that the first part of blacksmith equipment to be purchased is a pair of scales. I have done business with and without scales and find that scales are necessary.

At this shop we divide iron work roughly into classes. In the first class are stock bolts, etc. For instance, for a bolt, ¾ by 12 or up to any length with regular head and threads, we charge ten cents a pound. Flat bars of the same size, cut into short lengths sell for 10 cents a pound.

In the second group comes iron which is bent into shape or drilled. Work such as window grates or screens, etc., falls into this class and for it we charge 15 cents a pound.

For horseshoeing No. 1 to 4, smooth shoes, we charge $2. For shoes of this size with calks we charge $2.50. For refitting, $1.50. For setting tires on wagons, $4.00 per set up.



The Cullander Machine Company's Shop.

Digitized by Google

THE BLACKSMITH & WHEELWRIGHT

The Pioneer Journal of Its Class in the World.

Member of the Audit Bureau of Circulations.

PUBLISHED MONTHLY BY

M. T. RICHARDSON COMPANY,

71-73 MURRAY STREET, NEW YORK.

POST OFFICE BOX, 654. TELEPHONE—7377-7378 Barclay.

CHICAGO OFFICE, Garland Building, 58 East Washington St.

Entered as second-class matter at the Post Office in New York City.

M. T. RICHARDSON, President and Treasurer — F. R. WHITTEN, Secretary

M. T. RICHARDSON, Editor

FRANK L. AVERY, Managing Editor

F. R. WHITTEN, Advertising Manager — H. F. LUDINGTON, Western Representative

GEO. A. SMITH, Eastern Representative

FRANKLIN MYERS, Art and Copy Dept.

FOREIGN AGENTS:

NEW ZEALAND

MR. R. HILL, Matlock House, Davenport, Auckland, New Zealand.

GREAT BRITAIN

ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance.....$1.00
One Copy, six months, in advance.....60 cents
Single Number.....10 cents
Canadian subscriptions.....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English Money.

Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

ADVERTISING RATES SUPPLIED ON APPLICATION.

SPECIAL NOTICE

Subscribers failing to receive their magazine regularly will favor us by giving us notification to that effect.

CHANGE OF ADDRESS

Subscribers who desire the address of their paper changed should send us the old as well as the new address.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

Our Editor's Letter

I DOUBT if there is a state in the Union into which the BLACKSMITH AND WHEELWRIGHT does not enter, so consequently I receive letters from practical every part of the country. It is interesting to find that letters arrive in waves, so to speak, from the various sections. By this I mean to say that one one day I will receive half a dozen from the Pacific coast, but none from the eastern section. Then for weeks at a time, the West will keep quiet while the Central States lick the postage stamps.

I want to receive, this month, a letter from each locality so that I can publish an "All Over the Country Department," in an early issue. Just a short note telling about how business is going on in the various sections. I think such a collection of letters might be made a very interesting feature even if each reader simply wrote a post-card with the line—"business is good"—or "business poor but picking up," or some such a line.

This sort of a department will be interesting in the same way that a weather map is, it will show existing conditions and if carried out fully, perhaps four times a year, it will give all of us something to work on. With such data it may be possible to work out some plan whereby business may be kept more normal.

I wish that I could make all of you realize how much you can better your condition if you all work together for the same end. Suppose, for instance, one of your hands decided to work for itself (if such a thing were possible), and it tried to hammer a drill. Then the other hand, not wishing to hold the tongs, decided to make an entry in the ledger. At the same time one foot decided to go home for dinner, while the other foot tried to go in the opposite direction with the intention of collecting an overdue bill.

You may picture to yourself those conditions and try to figure out how much work you could do if such a thing happened. Each member of your body might be intent upon a very laudable enterprise, but nothing would be accomplished. To a certain extent every blacksmith in the country is the member of a body, perhaps he can get along fairly well by himself, but if all the members work together, then success is certain.

If we all wait for someone else to start something—that something is seldom started—if we wait half-way up the hill of life for someone to come along and help pull us to the top, we usually wait until our whiskers are long and white—then someone comes along and gives us a shove toward the bottom.

Evidently, then, it is up to each of us as individuals to help each other, to pull together and by so doing get to a point where we can look back with a feeling of satisfaction over our past rather than forward with a feeling of envy toward someone who has succeeded.

The Prevention of Accidents

TOO often in our daily papers we read about how Mr. Smith or Jones or Mumford has just lost his fingers or hand in a serious accident which might have been prevented had he used a little forethought. In many cases the only happy thought about the whole affair is that the unfortunate man is protected by accident insurance or by the Employers' Liability Act.

No amount of money can compensate for the pain and misery of the accident, in fact, many of us cannot afford the premiums for accident insurance to such an extent that our protection is complete. The happy solution is to prevent accidents, but should those accidents occur, then we must know how to remedy matters to the best of our ability, to eliminate the attendent pain and to save life if the accident is serious.

Even the casual job holds forth perils. Tomorrow you may pick up an old horseshoe and scratch one of your fingers with the metal. The cut may annoy you because it bleeds, but there is little or no pain and soon it is forgotten and you go about your regular work without even taking the trouble to wrap a cloth around the injury.

In a day or so, however, you notice that the scratch does not heal but begins to inflame slightly, then the finger swells up and by the time a doctor is consulted blood-poisoning has developed. Possibly the finger has to be removed, possibly the hand. All of this trouble because of a scratch.

A live coal may blow from the forge upon the back of your hand while you are holding some work with the tongs, the injury may cause you so much pain that you cannot do good work for the rest of the day. You suffer a loss in time and endure pain as well, in many cases unnecessarily for by proper attention, the burn will give little or no pain after the first few minutes.

Accidents in general, their prevention and first aid methods will be the subject matter for an article to be published in our August number and it will pay the smith to keep the magazine handy in his shop.

Does It Mean Peace?

WITH the signing of the Treaty, Peace is once again restored to the world, but the question arises; does a pen and ink signature change the character of a nation?

Germany has protested every point in the Treaty, has been unwilling to accept any responsibility, unwilling to pay for the damage she has caused, and unwilling to bring the guilty parties before a tribunal. She has said that she signs under protest and candidly admits that she does not intend to conform to the conditions outlined. She is like a disobedient child who says he is sorry even while planning a fresh outrage in his mind. She is like a pile of soft coal afire at the center, a fire that is not evident except for a thin, almost invisible cloud of smoke, but a fire that threatens to break forth at any minute.

We must always bear this fact in mind and remain prepared at all times to enforce the law. We cannot rest in security for as soon as Germany regains her strength she will, undoubtedly, throw off her bonds and start out in quest of more trouble.

The present form of German government claims to be one elected by the people and to represent the people. If we accept this as true, and if we are willing to grant that the present government wants peace, the question arises: Why were the interned war vessels at Scapa Flow destroyed by the people? In itself this act was a breach of faith and contrary to all international law, yet it was countenanced by the government even while preparations were being made to sign the Peace Treaty. Remember, this is only the slight film of smoke above the coal fire!

On every hand we hear the argument—"the terms were too harsh," even if this argument were admitted to contain reason, and we do not, why does Germany refuse to conform to any terms? Why does she break faith and destroy war material which she already has and the surrender of which would serve to pay in part the indemnity? If a person is willing to pay only half what he owes, then the only way to collect in full is to charge double prices. No! The war terms given to Germany are not too harsh, but she will not pay, for it is not her nature.

Germany has taught us how she respects treaties, "A scrap of paper," was the Belgian treaty, given and accepted in good faith by that little country, yet broken without reason. What then is the present Peace Treaty to Germany, a treaty signed under protest?

The world must keep prepared for at the least sign of weakness, the criminal will again make war. Fear of might is the only thing that Germany respects; now that we are awake, let's keep awake.

The Prize Photo Contest

IN this issue we reproduce two more pictures which have been entered in the prize photograph contest. Time passes very quickly and soon the contest will be closed, so it is about time for you to send us the picture of your shop. Just remember that it does not cost you anything to enter the photograph and as soon as the picture has been reproduced, your photograph is returned to you, undamaged, just as you sent it to us.

In addition to the original photograph, you will receive, post-paid, the half-tone from which the reproduction was made. This cut in itself is worth from three to five dollars, sometimes more and you can use it for printing bill heads or reproducing the picture of your shop on letterheads. If you do any advertising, you may have the picture printed on post-cards.

So you see you really receive a good prize whether you win or loose in the contest—but then, you may be the man to receive the cash prize as well. Anyway you look at the contest it is a case of "Heads, you win—tails, you cannot lose."

Send us that photograph!

An Article That Is Different

IN this issue we print an article that deserves particular consideration of blacksmiths; we refer to that which deals with Scrap Metals. The writer, whose business it is to keep in touch with metal markets, is well informed and gives many valuable suggestions.

Undoubtedly the business of "Junk dealing" is a lucrative one. Every state boasts of at least one man who has made a fortune in scrap metals. In many cases the fortunate man started in business with a wagon and an aged horse, collecting junk from house to house.

By a careful sorting of his scrap metals, the average smith in a short time may be able to salvage considerable of value and sell it for more cash than he could otherwise. Read the article carefully, it may be worth money to you.

Digitized by Google

The Rock Drill Blacksmith

Part XI—Forging and Welding Solid and Hollow Rock Drill Steel Stock

Copyright, J. F. SPRINGER

THE mode of operation of the forge described in our previous installment, is quite simple. A fire is started and built up even with the top of the concrete or cement hearths. Then crushed coke is added and packed down until the top of the coke is, say, half an inch above the hearth level. The bits are then laid in place, side by side. Two layers may be put in place, one on top of the other.

Certain variations occur to the writer, which may prove useful. The cylindrical form may be replaced by a box-like shape. That is, the top will be a rectangle in form. The fire-box may be so arranged as to have a broad hearth in front where the bits are to be placed, and a narrow hearth to the rear. The bottom of the fire-box may, it would seem, be advantageously tilted in the direction of the door for the purpose of facilitating cleaning out the ashes, etc. Or, the floor may be tilted so as to descend to the rear, where a long narrow door could be hinged from above, this door providing for the withdrawal of ashes. The advantage of using the cylindrical form of steel sheathing seems to consist mostly in the fact that it may be easily purchased. Of course, this is something to be determined at the time.

The sheet steel shell may, if desired, be entirely dispensed with in the following way: A wooden form of the size and shape wanted may be set up and a forge built up of concrete and "plums." "Plums" is the word used by contractors to designate rather big stones imbedded in a mass of concrete for the purpose of cutting down the expense for cement, etc. They are often used, and used properly, in foundation work. The idea is to fill up space with big pieces of rock that cost but little and reduce the amount of concrete. In the present case, a large part of the base of the forge, 27 inches of depth, may be filled with "plums."

It is assumed that the complete wooden form is in place, including the trough-like arrangement for the fire-box space. It makes no difference whether it is circular or rectangular. Concrete is filled in, say, to the depth of 15 or 16 inches. Then the "plums" are put in, one or two at a time. They need not be placed as a mason would build a wall. Such careful placing is entirely unnecessary. The pile should be able to stand up without tumbling, until the concrete has set.

Care may very well be taken, however, that no "plums" touch the wooden form or come nearer than, say, 1½ or 2 inches of it. When the concrete has, later on, hardened, there will accordingly be a layer of true concrete all round the sides. Likewise, the tops of the "plums" should be kept below the level desired for the hearths. A 2-inch allowance will be a good one.

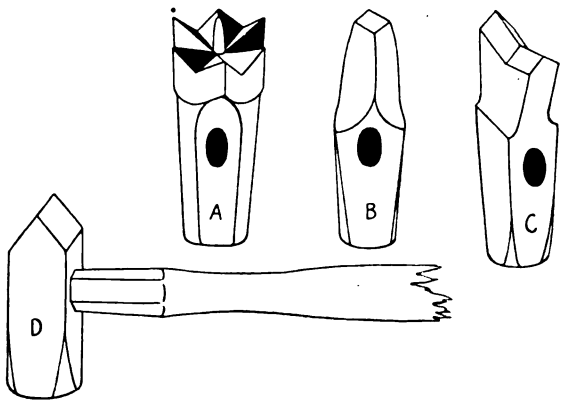
It may be found that the 15 or 16 inches of concrete has risen all the way or nearly all the way to the hearth level. If not, more concrete, and perhaps more of the "plums," may be added. A caution or two as to the use of "plums" may be usefully included here. First, it is desirable that the individual stones be sound. A stone that is about to crack in two or which is weak will mean a possible point of weakness in the resulting mass when the concrete has hardened. Such a weak point may or may not be of importance. The smith may judge at the time. It will be well not to take too many chances.

Further, each stone should be clean all over. If necessary, they should be washed in water containing no grease, or by means of live steam. If a stone is put in that has even a thin coating of clay or loam or other similar material here and there, these spots will prevent the concrete from clinging to the stone. The clay or the dirt interferes with the desired clinging effect. A forge built in this way ought to cost but little for cement. A good big stone may be used, if available, for the central core.

Hollow drill steel comes in several different forms—hexagon, octagon, cruciform, etc. This means that the cross-sections will have an outline of the shape of a hexagon, etc. The accompanying figure will make certain forms clear. It should be remembered that this steel with its central hole is weaker than the same size of solid steel when used similarly in drilling.

The hole will ordinarily not have a diameter smaller than ¼ inch. In fact, the stock steel should preferably be treated for this minimum diameter. This may be done by noting whether a ¼-inch steel ball may be passed through without difficulty. On the other hand, the diameter should at no point exceed ⅜-inch. It is desirable, not to say necessary, that the hole, be fairly central. That is, it should have its center not more than 1/32-inch from the true axis of the bar. Within, the hole should be free from sharp corners. These requirements may be realized in hollow stock generally.

Naturally, when two lengths are, for any reason to be welded together, the same requirements are to be regarded as applying to



Tools for Sharpening Hollow Drill Steel: A, Dolly; B, Gouge; C, Quarter Dolly; D, Spreader. Reproduced from Sullivan Machinery Co.'s Book.

the work after the blacksmithing is done. If any deviations occur, it will be well that the smith consult the superintendent having the drilling in charge as to the permissibility of the variations.

So then, when welding and forging hollow steel, the smith must generally be on his guard not to destroy sizes and forms; but, if he does, to restore them before he considers the job as finished. Similar remarks apply to solid steel, but naturally not to the same extent, the case being simpler.

To forge a bit from new stock, one first cuts the stock across and squares up the end that is to become the face of the bit. The chisel is a proper tool for the foregoing. The end is now heated for the purpose of upsetting. The amount of steel involved in this heat may not be more than 1½ inches. If the length is only one or two feet long, it may readily be upset by striking the hot end down on the anvil, holding the length vertical while doing so. If the piece is too long for this procedure, it may be laid horizontal and upset at the side of the anvil.

The diameter produced by the upsetting is to be somewhat less than that desired in the finished bit. The taper should be such as to agree fairly closely with that demanded in the finished work. For a good deal of work the length of the tapered part will be distinctly less than the diameter of the completed bit.

As an example, illustrative of the foregoing allowances, consider the case where a bit is to be given a finished diameter of 1¾ inches. When upsetting, the diameter may properly be made about 1½ inches. The length of tapered bar may, in the generality of cases, be made 1¼ inches.

If the bit is being made from hollow stock, the next thing will be to punch out the hole. The hand punch is a proper tool. The hole is to be given sufficient size to receive the pin on the dolly. This tool is now employed simply for the purpose of marking the work. That is, it is applied to the face of the work and its pin made to enter the hole. It is brought to proper position, when a sharp blow will cause it to mark locations.

Ordinarily, there will grooves to be made between cutting edges. The gouge may be used to make them. The cut is made by starting at the circumference and working in to the center. The depth of the cut at the beginning may be made one-half the depth of the tooth when finished. The cut is made shallower and shallower as the hole in the center is approached. In fact, the aim is to manage the cut so that it will just run out to no depth at all just before the hole is reached. The smith aims to have a flat uncut ring ⅛-inch wide all round the hole.

The gouge is used on steel that is heated only to a moderate color—say, dull red—the smith being careful that the hardening color is not reached. The object in using a low heat is largely to insure a clean cut with the gouge. Naturally, less muscle is needed with a higher heat, but the work will probably suffer, a ragged cut being the thing to expect.

The hole for the dolly pin is now punched out again. Then the work is reheated, the purpose now being to give a more exact form to the cutting face with the aid of the dolly. The heat should be moderate—say, a medium cherry red. In any case, the work should not be heated to the point where scales begin to form. The forming is not to be completed, however, at this operation. The reason for avoiding a finish is that the result of the hammering to force the dolly would likely upset the bit too much.

It is assumed that the style of bit is a rose that has six or more radial cutting edges. So, then, instead of seeking to shape all the edges in a single operation, the smith is to be content with striking the dolly, say, half a dozen good blows and then using the quarter dolly—sometimes called the fishtail dolly. It will reach clear across the face, but will deal with only two of the grooves. That is, at each setting of the quarter dolly, it will enter two radial grooves which together make up a diameter.

The smith works with this tool, changing its position between blows so as to work round and round the face of the bit. But this is not to be done, generally, without interruption, as the continued use of this tool would doubtless tend to put the face out of shape. So, then, the smith is to interrupt its use now and then and employ the full-faced dolly to correct any small deviations that may have occurred.

Between the cutting edges of the rose-bit face, but on the sides of the taper, grooves are now to be cut. These are really prolongations of the radial grooves in the face, only they are on the sides and not on the face. Their function is, in part at least, to permit the chips of rock cut by the face to find their way to the outside of the bit. When the bit is in action, these chips are forced away from the center by the slant of the radial grooves. Arrived at the ends of the radial grooves they pass up along the side grooves now occupying our attention.

These side grooves, six or more in number, will be deeper or shallower as the size of the bit may require. Possibly, also, the character of the rock may call for variations as to depth. They are to be of a size to perform their duty of passing the rock chips. For an ordinary case, with the face diameter 1¾ inches, a depth of ¼ or ⅜ inch may be just right.

These cuts may be termed dust grooves. It is exceedingly important that they be big enough to pass the chips. If they are too small, then it is necessary that the face should break them to a size small enough to permit their escape. Naturally, when the drill face is engaged in this useless work it is more or less prevented from doing its proper work. In fact, an accumulation of chips unable to escape will tend to cushion the proper blow of the bit face on the rock.

To maintain the gage and to keep the

Digitized by Google

teeth flat, a small-sized flatter may be employed. The grooves may be cut with a cold chisel or with a spreader. The work is heated, say, to a medium cherry red. Finally, the face is finished with the dolly in such way as to have sharp cutting edges all the way out to the outer rim.

Other forms than the rose bit will naturally require variations in treatment. The foregoing directions, though applying especially to the rose form, will give the general mode of procedure.

Re-Sharpening

The operation of re-forging and re-sharpening the cutting face of a rock drill bit is called re-sharpening, although it is mostly work done with forging tools. The drill steel is set, after having been properly heated at the bit end, with a suitable arrangement to resist blows against its face. There are several ways to provide the necessary resistance. The shank end is set against it and the quarter dolly used to form the face over again. A medium cherry red is a suitable temperature.

Intelligent use of the quarter dolly will enable the blacksmith to reform the face of the bit up to within, say, 1/4 or 3/8-inch of the very edge. The sides of the bit are now hammered in towards the center in order to make them re-take their proper position. A sharpener's cross pean hammer is a proper tool to use for this work.

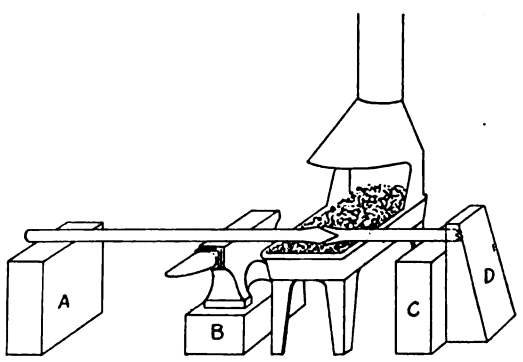
The corners having been brought up, the face of the hammer is now employed to smooth them. The full dolly is next used. It is applied to the face of the bit and a true form given. A flat is employed on the sides to produce the correct gage. Attention is to be given the side grooves (the dust grooves) to see that they have the proper dimensions.

Welding Hollow Steel

It will at times be necessary to weld together two lengths of hollow drill-steel. The special difficulty consists in doing the welding without stopping up or dislocating the hole in the region of the weld. The strength of the finished weld is also important.

To weld hollow stock, it will be well in the first place, to arrange things in the shop especially for the job. It is desirable to provide for easy handling of the work when it is to be shifted from the anvil to the forge and back again. Further, the total length of the work being considerable, it will be necessary to support one or both ends. This support will probably be needed both when the parts to be welded are on the anvil and when in the forge.

A very convenient arrangement, suited especially to cases where the forge fire is in a pan standing on legs out in the shop—that is, where there is open space to each



How Hollow Drill Steel May Be Supported for Welding: A and C, Supports; B, Anvil; D, Abutment. From Sullivan Machinery Co.'s Book.

side of the fire. The anvil may then be set alongside the forge pan. The idea is to lay the work across both pan and anvil. Then, when it is necessary to shift it to bring the joint into the fire or onto the anvil, it will only be necessary to move the work in the direction of its length, without shifting it at all.

There will be little or no difficulty in arranging supports for the ends. These arrangements make it easy not only to shift the joint into and out of the fire, but also to turn it during the heating and forging.

In carrying out the welding procedure, it will, according to the method about to be described, be necessary to hammer the work at one end to drive one part of the joint against the other. It will be necessary, accordingly, to provide some kind of resistance at the end other than the one at which the hammer is to be used. A heavy block of metal properly placed may meet the requirements very well.

The ends to be joined are now prepared. Both are to be upset somewhat and then squared. The one is given a cold-chisel edge. This is a double bevel. A proper angle for the double bevel will be 75 degrees. The end which is to form the other half of the joint and which has already been upset and squared is now split along a diameter and the two sides spread to form a V-groove. The angle in this groove is to be slightly larger than the angle of the double bevel. Thus, if 75 degrees be the angle of the double bevel, the angle of the V may properly be made 80 degrees.

The depth of the V—from the top of the V to its point—is to be about equal to the length of bar devoted to the chisel edge; so that when the chisel end is inserted in the groove end, the joint will have the right amount of metal everywhere to produce the proper diameter of rod when the job is finished.

The purpose in giving the chisel edge a somewhat sharper angle than the V is to provide against a possible rebounding action when the sledge is used to drive the joint together lengthwise. With the sharper chisel edge, actual contact is limited to the region of the very edge. This will either stick or not when the sledge strikes on the distant end. There will probably be no rebound.

After the two ends are shaped in accordance with the foregoing directions, the holes are to be opened. This may be done with a tapered piece of steel. This punch should be so tapered as to open the holes to a double diameter at their mouths and yet not effect this result too abruptly. The preparations are now in such shape as to permit welding to begin.

The two bars are arranged with the prepared ends together and in the fire, the bars extending out and resting on the supports. The outer end of the bar with the groove may also be set against a resistance of some kind, as a block of metal. The two ends forming the joint are now slowly turned as the blast is operated, the object being to produce an evenly distributed welding temperature.

A high-welding heat is not sought, but a low one. Whatever welding compound is used may be sprinkled on at this time. When it is judged the heat is right, a few rapid and light blows are struck with a small sledge on the outer end of the bar having a chisel edge with the object of making the edge stick in the bottom of the V-groove. It will be noted that all this can be done while the joint is still in the fire.

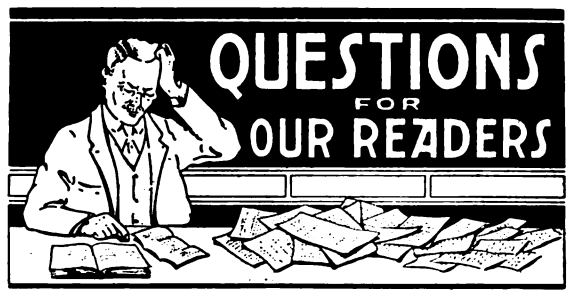
When the two bars stick, the work is shifted lengthwise to bring the joint onto the anvil, provided the joint is still sufficiently hot for welding. If not, then heat it up a bit. The sides of the V are hammered down onto the sides of the chisel edge, the smith taking care to work from the point of the V to the top of it, and not in the reverse direction. Otherwise, slag or other foreign material may be imbedded or otherwise caught in the weld.

The authority I am following here does not specify that the scarf surfaces should be rounded in such way as to present bulge to bulge. Nevertheless, I caution the smith as to this. In practically all kinds of welds, the edges which come into contact should be made convex towards each other, if it is at all possible so to prepare them.

In order to understand what is meant by "convex," one has only to consider a tea-cup. Its bottom will be rounded inside and outside. The hollow (inside) part is concave, and the bulging (outside) part is convex. When two convex surfaces are brought together, they have only a little contact. That is just what is wanted when the welding starts. Then, if the hammer begins at a point so located that the result of the hammering will be to force the two surfaces together at the region of contact, the welding will start right.

The smith now hammers on all sides but close up to the starting point, and continues to work away from it only in a gradual manner. The weld is consequently closed little by little from the first point of contact out. This will tend to force out any foreign material instead of trapping such material. In other words, this mode of procedure tends to produce a clean weld and assist the welding compound. The lesson to learn and apply to the welding of drill rod is to round the surfaces that are to come into contact. In the present case, the sides of the V may very well be bent back in order to produce convex surfaces on the inside.

It may be difficult to round the sides of the chisel end. However, they may be rounded across the bar. I would advise, then, that the smith at least bend the sides of the V and round cross-wise the sides of the chisel end. However, he is still to make sure that when the chisel edge is inserted in the V groove there will be contact only in the region of the very edge of the chisel.



Second Hand Planer

From Geo. MacDonald, Connecticut.—I am in need of a cabinet planer and would like to find a good secondhand, small one, cheap, for cash.

Power Hammer for Shop

From B. H. Brooks, Texas—Will some brother tell me the best make of power hammer for a small shop? Also what is the best process for sharpening or rolling discs cold?

Pre-Heating Torch

From C. C. Richter, Iowa.—Will some one of my brother readers kindly explain how to make a pre-heating torch in which I can use kerosene under air pressure for fuel?

A Saw Table?

From Chas. Jenkins, Canada.—Will some brother be good enough to tell me through the columns of the Blacksmith and Wheelwright how to build or make a small saw table or stand for a circular rip saw with tilting table and give full measurements and also how fast the saw should run. How many R. P. M., say, on a ten or twelve inch saw for use in a small country shop.

Infected Hoof

From Charles P. Jenkins, Canada.—I would like to know if anyone can tell me how to cure a hoof trouble which has existed about two years. About two years ago this horse picked up a two-inch nail which entered the hoof just under the frog on his front foot.

The resulting hole heals over at times, but soon breaks open again and pus forms. I have poulticed the foot for two months at a time and have poured all kinds of oils and liniments into the hole, but cannot heal it or dry it up.

I have never pared or dug out the hole to the bottom. I think that the nail must have entered a bone or some joint about half way between the point of the frog and the back.

A TAILOR'S SIGN

The tailor's sign in a little inland town was an apple, simply an apple. The people were amazed at it. They came in crowds to the tailor, asking him what on earth the meaning of the sign was.

The tailor, with a complacent smile, replied:

"If it hadn't been for an apple, where would the clothing business be today?

Digitized by Google



A Lifting Jack

From Charles Nelson, Illinois.—I have been at the blacksmith trade for 15 years and still am interested in it. I own my own home and the shop which is located in a small town of about 500 population, with a good farming country around it.

My shop is 50 by 22 feet and it is well equipped. For power I use a gasoline engine and the shop is equipped with a trip hammer, a 34-inch bandsaw, 24-inch planer, cold tire setter, emery wheel stand, cold shear, disc sharpener, 50 and 100-pound vises, together with many small tools, a good stock of steel and wood.

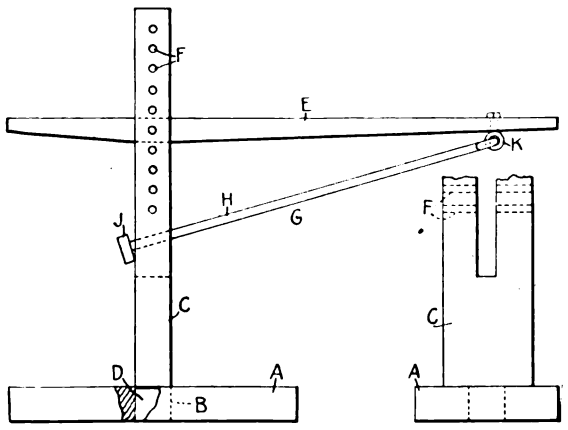
I have one competitor, but we get along finely and treat each other right. If I have a "dead beat" on my books, I tell him about it and he does the same thing for me. So you see it is possible to have a kind of local union even in such a small town. I think the trade would be better off if they would get together and be more sociable.

Let me tell the boys how to make a lifting jack which I think is one of the most useful tools I have ever seen.

First, take a piece of wood, *A*, 2 x 8 inches and about 16 inches in length and bore a 2-inch hole, *B*, in the center of it. Next, get a board, *C*, 2 x 5, 26 or 28 inches in length, according to the height of the lift and cut a tension, *D*, in it so as to fit the center of the 2 x 8 piece.

Next, bore a 1⅛-inch hole in the 2 x 5, about 6 inches from the tension and then saw out to the end (the top). In the sides of this piece, bore a number of holes, as required and as shown at *F* in the illustration. After this is done, the lever arm *E* should be made (of one-inch stock).

The locking rod *G* is made from ½-inch



rod and is fastened to the lower side of the lever *E* by means of the eye bolt *K*. This rod should be about 24 inches long and on the other end a piece of ⅜ x 1¼-inch iron should be welded, this is placed between the fork of the upright and when the weight of the axle or carriage is rested upon the lever arm, this piece of iron locks against the upright.

A Daily Record Sheet

From R. W. Hodgson, Canada.—I am sending you herewith a sample sheet of my daily record which should be of interest either to the blacksmith or the repairman. I have worked out this system after two years of actual practice and have tried many others, but do not find that they are so simple or answer the purpose as well as this one.

Every transaction during the day can be entered on this kind of a sheet and when it is done you have a record of all the work on one sheet, then all or any particulars can be posted to the ledger as required or the daily totals on the sheet can be entered in a book kept for that purpose alone, which will show the total sales, cash paid and received, and give a good analysis of the amount of work to be done.

Together with this, one should keep a pad or job sheet on the desk upon which one can enter the material and labor for any jobs, or any particular job can be kept track of in detail. In many cases such a job sheet saves trouble because when the customer wants further information the sheet is on hand for further reference.

DAILY RECORD AUG 3

NAME	PARTICULARS	WORK VALUE	SALES ?	SALES @	CASH R	CASH P

The following items should be carefully noted. First, Work Value. This includes the total amount of the job. Under Sales the cash received or charged is noted. Under the heading Cash, simply the cash received or the cash paid out. In order to make everything clear this form allows room for all entries.

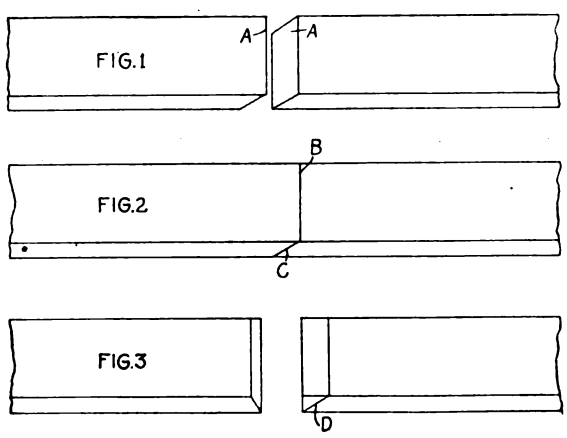
When a job is done, the name and particulars as well as the amount of the charge is entered. When it is delivered, it is extended into the sales and cash columns or if the work is delivered later on in the day or a day following, a new entry is made giving the name and stating whether the particulars were entered in the sales column.

Work that is not delivered when finished is entered on a slate or a pad or a special book, together with the particulars, etc. If any one pays cash on account of a former credit, it is entered in a similar manner in the cash received column. Cash paid out for a similar reason is likewise taken care of. By taking the cost value of materials used each day or week, the turnover or work done as well as the gross profit are determined.

Welding Springs

From J. M. Pigg, Oklahoma.—I have been a reader of the BLACKSMITH AND WHEELWRIGHT for a long time and have obtained from it many good ideas and methods for doing different classes of work. All of this time I have felt that I am the "little fellow" and have kept quiet.

At various times I have seen unsatisfac-



tory spring welding jobs, and at times I have read of methods which do not seem correct, so I wish to write about my method, which I think is the right one. But first let me tell of the general method used.

Oftentimes a spring is brought into the shop where the smith is very rushed with work and the smith wishes to do the job in the quickest way possible so he prepares the spring, as shown at *A*, in Fig. 1. Then he makes the weld, as shown in Fig. 2. The weld may be good, but when a severe strain is put upon it, the leaf snaps, usually at either *B* or *C*, and when the work is brought back to the smith he can say that it did not break at the point where he welded it. He can easily turn the spring over and show where the weld came, as at *D* in Fig. 3, and prove that the weld held all right.

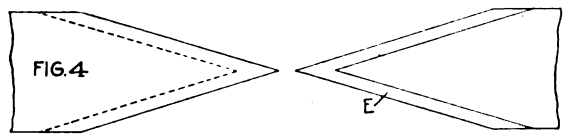
I have a good reputation in this town as being a spring welder and I use the following method in welding springs:

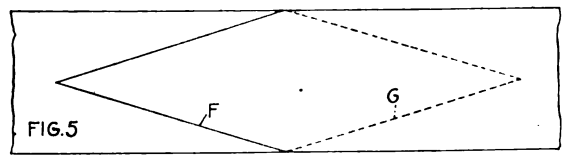
First, I heat the broken spring leaves and bring them both to a point, as shown in Fig. 4. Then I bevel the top side of one, as shown at *E*, and the bottom side of the other to correspond so that they will fit together and lap somewhat, as shown in Fig. 5.

After this is done, both parts should be heated to a bright cherry red and polished with a steel brush or any kind of a scraper. Then the welding compound is applied and the parts put back into the fire until they are heated to a good yellow heat. The color should extend back the length of the lap on both pieces. A clean fire is essential.

As soon as both parts are heated, they should be removed quickly and placed together, as shown in Fig. 5. The work, until the weld is completed, should be done at top speed. With quick strokes of the hammer pound down, first the points, then the center.

The spring is now double thickness, or nearly so, at the center, so strike it with the hammer to knock out the curve and again put it in the fire. Use plenty of borax and heat it to a yellow heat, then work it down





to the correct thickness, finish so as to leave no hammer marks.

As a final operation the spring must be shaped. I bend the leaves so that each one stands open and away from the next one to it, from ¼ to ¾ of an inch, depending upon the length of the leaf. The edges of the leaf should then be rounded off, since this adds to the strength.

Springs should never be heated to a white heat, they will not weld so easily, and they will be destroyed. If the leaf is heated too much, it might just as well be thrown into the junk pile.

If my method of welding is used, practically all of the strain falls upon the spring at the points *F* and *G* in Fig. 5, and since the welded line is at right angles to the strain, there is practically no danger of breakage at the weld.

I charge 75 cents for each Ford leaf that I weld and one dollar for larger jobs, yet I get the work just the same. If any of the other readers have a better method, I wish they would write about it, for I am always willing to be shown.

From the Northwest Corner

From E. Nord, Washington.—My shop is located in the best and richest farming country of the United States and I always have lots of work all the year around. I obtain good prices and do considerable automobile work such as welding springs and relining brakes.

My shop is hardly large enough at present and I intend to build an addition to it of

Digitized by Google

about 20 feet. I have more horses to shoe than I can attend to, and I also do considerable tractor work. This is the first letter I have ever written for the paper, though I have read it for a number of years.

Prices from New England

From A. D. Keen, Maine.—I have just read the requests for price lists which you published in your June issue, and since I have not seen any lists from this section, you may be interested in those which I am getting.

Shoeing, Numbers 0 and 1, new	$1.25	Resetting tires..	1½	" 3.00 "
Resetting, Numbers 0 and 1	.80	" "	2	" 3.50 "
Shoeing, Numbers 2-3-4, new	1.50	" "	2½	" 3.75 "
Resetting, Numbers 2 and 3	.90	" "	3	" 4.00 "
Resetting, Number 4	1.00	" "	3½	" 4.50 "
Shoeing, Number 5, new	2.00	" "	4	" 5.00 "
Resetting, Number 5	1.50			
Shoeing, Number 6, new	2.50			
Resetting, Number 6	2.00			
Shoeing, Number 7, new	2.75			
Resetting, Number 7	2.00			
Shoeing, Number 8, new	3.25			
Resetting, Number 8	2.25			
Resetting tires.. ¾:⅞:1-inch,	$2.25 per set			
" " 1⅛ "	2.50 "			
" " 1¼ "	2.75 "			

New tires, up to ⅞ x ¼-inch, $6.50.
New Spokes, from 25 to 30 cents each.
New Rims, ⅞-inch, $6.50 per set.
New Buggy Shafts, $2.25 each.

I wish that more of the smiths from this section would send in prices, so that we could have a more uniform scale of prices. I doubt if many of the smiths are really obtaining the money that really belongs to them.

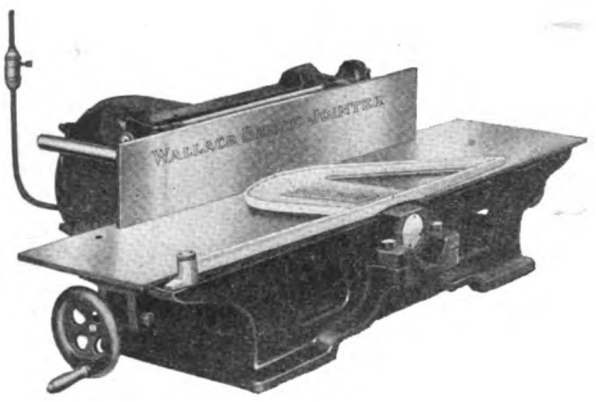
SPARKS AND SHAVINGS



Bench Type Jointer

A very interesting new machine has been successfully developed by an enterprising concern of Chicago, J. D. Wallace & Co., Station C, Chicago, Ill., whose Portable Bench Machines have become so popular among mill workers and wood workers in general.

Known as the 6-inch Wallace Bench Jointer, similar to the 4-inch Wallace Bench Planer and retaining all of the features that have enabled its smaller predecessor to win its way into the majority of well-equipped woodworking shops, this new machine is noteworthy because



of its exceptional power. It is capable of developing three times the power possible with the smaller machine; and, when it is recalled that the 4-inch model has more power per inch of knife than can be obtained from any belt-driven jointer of 3 to 5 horsepower, the effectiveness of the new 6-inch Wallace Bench Jointer is apparent.

Despite its greater size and power, the machine can easily be picked up by one man and carried wherever there is work to be done; and as it is equipped with its own motor, lamp cord and plug all ready for operating at any time from an ordinary lighting circuit, it represents a definite advance in woodworking machinery.

In many woodworking shops a considerable amount of time is consumed by workmen walking back and forth from their benches carrying small work to the big stationary jointer. From the standpoint of economy of the new Wallace product is effective because it enables the workman to do the bulk of the small planing right at his bench, thus saving considerable time and releasing the big jointer for major operations.

An especially interesting feature is a new fence that has been developed in connection with this new machine. This fence is mounted on the motor and slides backward or forward on rods rendering it more quickly and accurately adjustible than any ordinary machine. The fence is also designed so that only a fraction of an inch is lost on the table when the fence is set for beveling.

In examining this new machine one's attention is instantly arrested by the novel manner in which the motor is applied. The cutter head can be easily taken out and other heads inserted in only a few seconds. Tables are arranged to slide backward to permit the use of these special heads or forward so as to work with the narrowest possible throat opening a feature that will prove especially desirable when the machine is doing small or very close work.

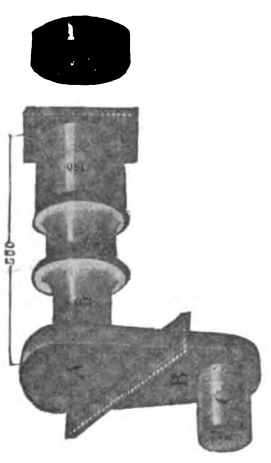
Ball Bearings are used on all motor and cutter head bearings, thus eliminating friction and prolonging the life of the machine.

An extremely ingenious and apparently very efficient arrangement of the flap and shutter guard has been effected by mounting the shutter guard on the cutter head bearing rather than in grooves.

Many of our readers have felt the need of a bench type jointer of this size and power, one they could place at the workman's elbow and thereby do away with all unnecessary walking to and from the big stationary machines. Others have realized the great amount of time and labor that such a machine would save through the elimination of costly hand fitting, trimming and jointing. All of these objects would seem to have been obtained in the new 6-inch Wallace Bench Jointer.

Laffitte Welding Plates

Welding problems are made easy with the use of the Laffitte Welding Plates, which are made in two grades: heavy for material ½-inch in thickness and



over, and light for material under ½-inch in thickness. The plate is 4 x 8 inches and is chequered so that a piece of any size can be broken off by hand without loss or waste. One plate is sufficient to make from half a dozen to one hundred welds, so that the cost is practically nothing when the saving is taken into account. The chemical action of the plate is said to increase instead of decrease the strength of the weld.

Metal can be welded at a low heat. The plates are used in a simple manner, the two parts to be welded are heated to a cherry red if steel, or a white heat if iron, and a piece of Laffitte Plate of sufficient size then placed between the two parts. Then the parts are pressed together until the plate fuses, then hammered lightly and completed in the usual way. The piece may then be reheated to any desired heat without endangering the weld.

A feature of a "Laffitte" plate weld is the fact that a homogeneous weld is secured. It is not merely stuck on but becomes a solid piece, with the strength of the original. In many cases the strength is materially increased as with steel castings.

These Laffitte Welding Plates are used extensively by large industrial companies in this country and abroad. The plate welds iron to iron, iron to steel, steel to steel, machinery steel, crucible steel, tool steel and steel castings. Blacksmiths will find these plates effect great economy in their shop operations. There is no equipment necessary, nor does it require any change in method.

The Laffitte Welding Plates are handled everywhere by all active dealers, and the manufacturer, The Phillips-Laffitte Company, Pennsylvania Building Philadelphia, Pa., will be glad to furnish samples on request.

Absorbine

If your horse has anything wrong with him, you are naturally looking for something to get him going sound. Have you tried *Absorbine?* This remedy has been on the market for over a quarter of a century and is constantly making new friends as well as retaining the old ones.

Mr. W. J. McManemon, South Weymouth, Mass., writes under date of February 12, 1919, "I became acquainted with *Absorbine* in 1898. I have used a great deal of it in the past twenty years and have been helped out of many tough spots by its use."

Absorbine does not blister or remove the hair and the horse can be used during treatment. Wind puffs, strains, sprains, bursitis, bog spavin, capped hock, swollen tendons, all are promptly reduced by the use of this valuable remedy which should be in every stable. Special instructions for treatment of your case will be sent upon application. W. F. Young, P.D.F. 55 Temple St., Springfield, Mass.

Advertising Cap Free

If our readers will refer to the advertisement of the Corona Mfg. Co., of Kenton, Ohio, which appears in this number of the BLACKSMITH AND WHEELWRIGHT, they will find that they can obtain free of charge, a cap which we understand is made of the best material and to carry simply the advertisement of the company's product, "Corona Wool Fat Compound." All that is required of the reader is the filling in of the coupon which appears in the advertisement. Therefore, we trust that our readers will avail themselves of this opportunity.

Rego Welding and Cutting Equipment

The Rego Cutting and Welding equipment is manufactured and sold by the Bastian-Blessing Co., West Austin Ave., at LaSalle St., Chicago, Ill. These outfits have been on the market for only a short time and are meeting with tremendous success.

The popularity of this apparatus is due primarily to their remarkably efficient design. In the Rego torch the flashback, which is the bane of the welder's existence, has been eliminated. The design is distinctly different and the gas is carried to the mixing chamber in such proportions that the acetylene is under slightly greater pressure than the oxygen.

So well is the mixture regulated that a truly neutral flame is the result. There is practically no danger of burning or carbonizing the work when making welds. The company manufactures a great number of torches both for welding and cutting and yet the apparatus is not high priced.

Justrite Plow Blade Sharpener

In every modern blacksmith shop, machines are taking the place of men and where a job can be done by machine it can be done cheaper and at a greater profit than by the old-fashioned method. The Strite Governor Pulley Co., 307-309 South Third St., Minneapolis, Minn., is manufacturing a machine that well deserves investigation by every blacksmith for the simple reason that this machine can be used for a great number of tasks. It is termed a "plow blade sharpener," but in reality can be used for working down to a sharp, smooth edge, practically any kind of sheet metal such as plow blades, road scrapers, shovels, knives, or mower teeth.

The device is mounted upon a heavy stand and driven by a flat belt through tight and loose pulleys. It consists of an anvil upon which the work is placed and a reciprocating roller arm acting under pressure. The power required for operating this machine is but two horsepower and the manufacturers claim that the device will pay for itself within a few weeks. After that time the profits are practically 100 per cent.

National Fifth Wheels

Wheelwrights and blacksmiths who do wagon repair work or wagon building should acquaint themselves with National fifth wheel, manufactured by the Lancaster Foundry Co., of Lancaster, Pa.

We understand that this device is of special design, in that the perch, which is made of wrought iron, is of one-piece construction. The feature of this wheel is that it permits a remarkably short turning radius.

This concern also manufactures other wagon fittings and smiths should write for details and prices for orders can be filled at very short notice.

Welding Compound

N. D. Doxey, of Elmira, N. Y. manufactures an interesting welding product known as Anchor Welding Compound, and which he claims completes a job without unnecessary hammering. So sure of his claims, is he, that any of our readers who care to try the compound may obtain a free sample. Write for the trial package.

Birch Automobiles

Never before in the history of the country have automobiles been so easy to sell. Practically every manufacturer in the United States has sold his product up weeks or months in advance. The prospective purchaser feels grateful to the agent who takes his order.

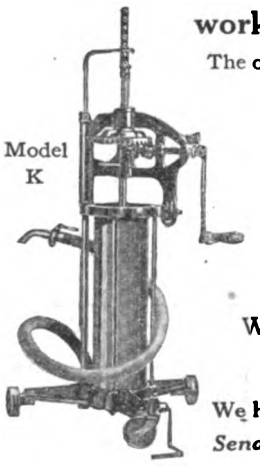
Such being the case, the sale of automobiles is a very easy matter, no sales arguments are necessary, and the smith who carries the agency need do but little aside from collecting the commissions. We should advise our readers to write the Birch Motor Cars, Dept. 545, 81 East Madison St., Chicago, Ill., for their attractive offer.

This company are in the market with exceptional bargains in automobiles, both four and six-cylinder machines one of which the agent may obtain by but little effort.

Ekern's Portable Garage Grease Guns

work the heaviest grease as well as oil.

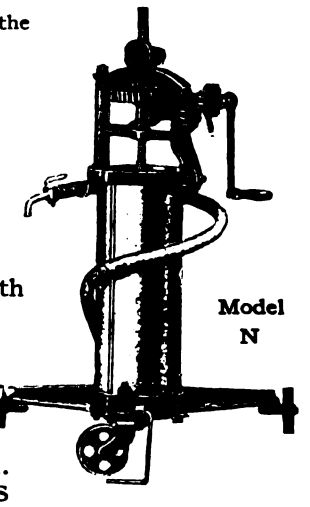
The only hand-operated guns on the market that will do this.



Model K

Quick, Clean,
Saving,
Always Ready,
Easy to Operate.

We back the jobber with our guarantee.



Model N

We have other shop devices.
Send for complete Catalog.

McPaco Co.

Department B
1412-14 South Michigan Blvd.
CHICAGO - ILLINOIS

Digitized by Google

H-B Tempering Process

Hits the nail on the head, where practically all Blacksmiths fall down,—Tempering of Steel.

Write for particulars. We can convince you.

You cannot afford to be without this invention. Once tried, always used.

Manufactured by the

H-B TEMPERING PROCESS CO.
CLEARBROOK, MINN.

IT MAY BE

further around the corners of a square deal, but the road is safer.
We have never over-praised the ability of the

Kerrihard Power Hammer



We prefer to leave many of its good points unspoken—as a pleasant surprise to the purchaser.

It does the work of four men.

Write for full particulars.

THE KERRIHARD CO., Kerrihard Sta., Red Oak, Ia., U.S.A.

DON'T JUNK YOUR WEAK TIRE
and lose from $5.00 to $35.00 worth of milage. Strengthen it on the "inside" and use it from 1000 to 4000 miles longer—**Save that money.**

MAXOTIRES
MAKE ALL TIRES TROUBLE-PROOF

They prevent blowouts (even at rim), punctures, stone bruises—taking grief out of motoring. Are reliable. Dealers *re-order* them in Car Load shipments.
Free MAXOTIRE catalog and name of nearest dealer costs only the price of a postal card and may save you hundreds of dollars.

K&W RUBBER COMPANY
50-60 Channing Street DELAWARE, OHIO
RELIABLE—ESTABLISHED 1908

ENDS FORD CRANKING

A remarkable new attachment for Ford cars and trucks which enables anyone to start the motor from the seat, without getting out to crank, is being offered on free trial by the Bear Mfg. Co., 307 Bear Bldg., Rock Island, Ill. This simple device spins the motor and never fails to start the engine instantly. It should be on every Ford. Easily and quickly attached. No mechanics needed. If you want to try one without any obligation to purchase write them today.

Do you want anything? Is your shop for sale, or do you want to buy a shop or hire a man? If so, a "Want" advertisement in THE BLACKSMITH AND WHEELWRIGHT will bring you good results. See terms at the head of the "Want" Department on another page.

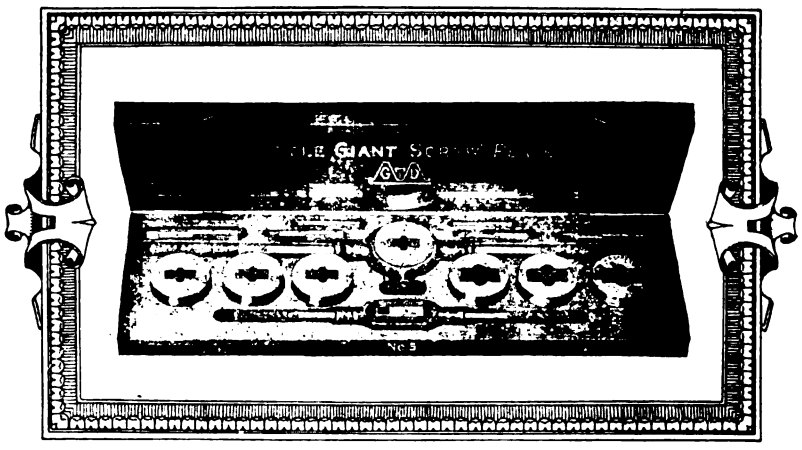
Change of Ownership.

Our readers who are familiar with the Red Head Vitristone Spark Plugs will be interested in knowing that the Emil Grossman Mfg. Corp., Brooklyn, N. Y., has sold out all patents, machinery and good will of this spark plug to the Red Head Spark Plug Corp., of 261 Broadway, New York City, and this latter corporation, which has factories in Newton, Pa., and New York City, will manufacture the product exclusively in the future.

Magneto and Electric Repairs.

Our readers should bear in mind that the Magneto Sales Co., of 1779 Broadway, New York City, maintain a force of thoroughly expert repairmen to overhaul electrical equipment such as magnetos, coils starting motors and lighting systems.

This concern also carries in stock a complete line of parts for practically every standard electrical device for automobiles manufactured in the starting, lighting and ignition systems.



The busiest motor year

This is the greatest motor car year in the country's history. Thousands of new motorists are already trying out their first cars.

Are you ready for all the repair work that is surely coming in the next few months?

Perhaps the rush is already on: then you know the importance of getting jobs done quickly and well. You know how often repair work can be speeded up with a handy

G T D
Look for the trademark

SCREW PLATE

The motorist's first repair visit to you is often a matter of Chance. If he gets the perfect work you can give him with G T D Tools, his patronage is yours as long as he is a car-owner, and one regular patron is worth a dozen transients.

"LITTLE GIANT," "O. K.," "GREEN RIVER," "LIGHTNING."
The Screw Plates that save you dollars.

Our booklet shows cuts of special Screw Plates for all kinds of auto repair work. Write us or ask your dealer for it.

GREENFIELD
TAP & DIE CORPORATION
Greenfield, Massachusetts, U.S.A.
World's Largest Manufacturers of Screw Cutting Tools

Digitized by Google

Index to Advertisers

Adjustable Wagon Tire Mfg. Co., tires, Front cover
Aetna Nut Co., horseshoe calks.....Front cover
Akron-Selle Co., gears.....4th cover
American Calk Co., calks.....Front cover
American Horse Shoe Co., horseshoes..... 2
Arti-Borax Compound Co., welding compounds 6
Armstrong Mfg. Co., bolt dies..... 27
Armstrong-Blum Mfg. Co., punches and shears .....Front cover
Barcus Mfg. Co., horse stocks..... 25
Barnett, G. H., files and rasps.....Front cover
Bear Mfg. Co., automobile accessories..... 21
Bertschy-Bermo Co., welding plants..... 26
Bicknell Mfg. & Supply Co., punches and shears, spark plugs 27
Birch Motor Cars, automobiles..... 27
Bradley, C. C., & Son, shaft coupler..... 26
Brooks, The, Machine Co., welding outfits... 25
Bryden Horse Shoe Works, horseshoes, Front cover
Buffalo Forge Co., blacksmiths' tools..... 7
Burden Iron Works, horseshoes.....3rd cover
Butterfield & Co., taps, dies and screw plates.. 8
Campbell Iron Co., supplies..... 26
Canedy-Otto Mfg. Co., blacksmiths' tools 2nd cover
Capewell Horse Nail Co., horse nails..Front cover
Champion Blower & Forge Co., blowers..... 3
Champion Tool Co., blacksmiths' tools..... 6
Chase, L. C., motor topping..... —
Columbus Anvil & Forging Co., anvils..4th cover
Columbia Forge & Iron Co., anvils..... 24
Corona Mfg. Co., The, wool fat compound 4th cover
Cortland Welding Compound Co., welding compounds 24
Crane Puller Co., pullers..... 1
Cray Bros., blacksmiths' tools..... 25
Crescent Machine Co., woodworking machinery 27
Diamond Calk Horseshoe Co., horseshoes..... 23
Doxey, N. D., welding compounds..... 8
Eberhard Mfg. Co., iron castings..... 5
Edwards, C. D., Mfg. Co., shears..... 25
Electric Blower Co., blowers..... 27
Electric Wheel Co., wheels..... 26
Empire Mfg. Co., wheels..... 8
Felton, Sibley & Co., paints..... 1
Firestone Tire & Rubber Co., tires..... 28
Fisher & Norris, anvils and vises..... 8
Franklin Steel Works, toe calks.....3rd cover
Giant Grip Horseshoe Co., horseshoes..... 26
Gogel Mfg. Co., tire heaters..... 26
Greb Co., grip pullers..... 6
Greenfield Tap & Die Corporation, screw plates and blacksmiths' machinery..... 21
Gwilliam Co., ball bearings.....4th cover
H. B. Tempering Process Co., tempering process 21
Hart Mfg. Co., stocks and dies.....4th cover
Harvey Spring & Forging Co., auto springs 1
Hay-Budden Mfg. Co., anvils.....4th cover
Heller Bros., horse rasps, tools, etc..... 8
House Cold Tire Setter Co., tire setters, hollow and spoke augers .....4th cover
Jenner, H. W. T., patents..... 23
K. & W. Rubber Co., tire reliners..... 21
Kerrihard Co., hammers 21
Lancaster Foundry Co., fifth wheels..... 1
Little Giant Co., hammers..... 28
Linde Air Products Co., oxygen..... 8
L. S. P. Calking Machine Co., calking machines .....3rd cover
Macgowan & Finigan Cordage Co., hammers, 25
Ness, Geo. M., Jr., steel stamps.....Front cover
New Era Spring & Specialty Co., springs 4th cover
Nicholson File Co., files and rasps..... 24
Ottawa Mfg. Co., engines..... 26
Parker, C. L., attorney.....4th cover
Parks Ball Bearing Machine Co., woodworking machinery 27
Paro, H. G., Co., grease guns..... 20
Peck, Stow & Wilcox Co., pincers..... 28
Phillips-Laffite Co., welding plates.....3rd cover
Phoenix Horseshoe Co., horseshoes and toe calks 4
Porter, H. K., bolt clipper.....4th cover
Prentiss Vise Co., vises.....4th cover
Plymouth Foundry & Machine Co., punches and shears 28
Prest-O-Lite Co., Inc., gas..... 8
Rosewater Electric Co., blowers..... 6
Rowe Calk & Chain Co., horseshoe calks, Front cover
Sheldon Axle & Spring Co., axles.....2nd cover
Sherwood, W. L., woodworking machinery... 25
Standard Horse Nail Co., horseshoe nails 4th cover
Star Mfg. Co., agricultural implements..... 25
Sterling Tire Corp., hoof pads..... 24
Stokes Bros. Mfg. Co., rasps.....Front cover
Strite Governor Pulley Co., plow blade sharpeners 22
Thompson Tuyere Iron Co., tpyere iron, 4th cover
Union Horse Nail Co. horse nails.....
Universal Wheel Compressor Co., wheel compressors ..... 4th cover
West Tire Setter Co. tire setters, hammers... 27
Wheel B. Top & Hardware Co., supplies.... 27
Whisler Mfg. Co., nut splitters, jointer heads 27, 4th cover
Witte Engine Works, engines 27
Young, W. F. Veterinary remedies..... 25

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co. 25

Anvils
Columbus Anvil & Forging Co.....4th cover
Columbus Forge & Iron Co..... 24
Fisher & Norris 8

Attorneys.
Hay-Budden Mfg. Co.....4th cover
Parker, C. L.....4th cover

Automobile Accessory
Bear Mfg. Co. 21

Automobiles
Birch Motor Car Co..... 27

Automobile Springs
Harvey Spring & Forging Co..... 1

Axles
Sheldon Axle & Spring Co.....2nd cover

Ball Bearings
Gwilliam Co. .....4th cover

Blacksmiths' Machinery
Greenfield Tap & Die Corp..... 21

Blacksmiths' Tools
Buffalo Forge Co. 7
Butterfield & Co..... 8
Canedy-Otto Mfg. Co.....2nd cover
Champion Blower & Forge Co..... 3
Champion Tool Co..... 6
Gray Bros. 25
Heller Bros. Co. 8
Nicholson File Co. 24
Peck, Stow & Wilcox Co..... 28

Blowers
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3
Champion Tool Co. 6
Electric Blower Co. 27
Rosewater Electric Co. 6

Bolt Dies
Armstrong Mfg. Co. 27

Bolt and Rivet Clippers
Porter, H. K.....4th cover

Calking Machines
L. S. P. Calking Machine Co.....3rd cover

Calks, Horseshoe
Aetna Nut Co.....Front cover
American Calk Co. .....Front cover
Diamond Calk Horseshoe Co..... 23
Rowe Calk & Chain Co.....Front cover

Calks, Toe
Franklin Steel Works .....3rd cover

Catalogue and Reference Book

Chisels
Champion Tool Co..... 6
Peck, Stow & Wilcox Co..... 28

Chucks
Buffalo Forge Co. 7

Disc Sharpeners
Little Giant Co. 28

Engines
Ottawa Mfg. Co..... 26
Witte Engine Works 27

Farriers' Tools
Barnett Co., G. & H.....Front cover
Champion Tool Co. 6
Heller Bros. Co. 8
Peck, Stow & Wilcox Co..... 28

Files and Rasps
Barnett Co., G. & H.....Front cover
Nicholson File Co. 24
Stokes Bros. Mfg. Co.....Front cover

Forges
Buffalo Forge Co. 7
Champion Blower & Forge Co..... 3

Gas
Prest-O-Lite Co., Inc..... 8

Gasoline Engines
Witte Engine Works 27

Gears
Akron-Selle Co. .....4th cover

Grease Guns
Par, H. G., Co..... 20

Grip Pullers
Greb Co. 6

Hammers
Champion Tool Co. 6
Kerrihard Co. 21
Macgowan & Finigan Cordage Co..... 21
Little Giant Co. 28
Peck, Stow & Wilcox Co..... 28
West Tire Setter Co..... 27

Hollow Augers
House Cold Tire Setter Co.....4th cover

Hoof Nippers
Champion Tool Co..... 6

Hoof Pads
Sterling Tire Corp. 24

Hoof Parers
Champion Tool Co. 6

Trucks
Akron-Selle Co. .....4th cover

Hoof Shears
Champion Tool Co. 6

Horseshoes
American Horseshoe Co. 2
Bryden Horse Shoe Works.....Front cover
Burden Iron Works .....3rd cover
Diamond Calk Horseshoe Co..... 26
Giant Grip Horseshoe Co..... 26
Phoenix Horseshoe Co..... 4
Rowe Calk & Chain Co.....Front cover

Horseshoe Calks
Diamond Calk Horseshoe Co..... 23
Rowe Calk & Chain Co.....Front cover

Horseshoe Nails
Capewell Horse Nail Co.....Front cover
Standard Horse Nail Co.....4th cover
Union Horse Nail Co..... —

Horse Stocks
Barcus Mfg. Co..... 25

Iron Castings
Eberhard Mfg. Co..... 5

Jack Mfrs.
Rowe Calk & Chain Co.....Front cover

Kerosene Engines
Witte Engine Works..... 27

Lawn Mower Grinders

Motor Topping
Chase, L. C..... 2

Nut Splitters
Whisler Mfg. Co..... 27

Oxygen
Linde Air Products Co..... 8

Paints and Varnishes
Felton, Sibley & Co..... 1

Patents
Jenner, H. W. T..... 23
Parker, C. L.....4th cover

Pincers
Peck, Stow & Wilcox Co..... 28

Plow Blade Sharpeners
Strite Governor Pulley Co..... 22

Pullers
Crane Puller Co..... 1

Punches
Champion Blower & Forge Co..... 3

Punches and Shears
Bicknell Mfg. & Supply Co..... 27
Peck, Stow & Wilcox Co..... 28
Plymouth Foundry & Machine Co..... 28

Schools

Screw Plates
Butterfield & Co..... 8
Buffalo Forge Co. 7
Champion Blower & Forge Co..... 3
Greenfield Tap & Die Corp..... 21

Shaft Coupling
Bradley, C. C. & Son..... 26

Shears
Edwards, C. D. Mfg. Co..... 25

Shock Absorbers

Spoke Augers
House Cold Tire Setter Co.....4th cover

Springs
New Era Spring & Specialty Co.....4th cover

Starters

Steel Stamps
Ness, George M., Jr.....Front cover

Stocks and Dies
Butterfield & Co..... 8
Champion Blower & Forge Co..... 3
Hart Mfg. Co.....4th cover

Supplies
Campbell Iron Co..... 26
Wheel B, Top & Hardware Co..... 27

Swages
Champion Blower & Forge Co..... 3

Tempering Process
H. B. Tempering Process Co..... 21

Tires
Firestone Tire & Rubber Co..... 28

Tire Bending Machines
Buffalo Forge Co. 7
Champion Blower & Forge Co..... 3

Tire Coolers

Tire Heaters
Gogel Mfg. Co. 26

Tire Reliners
K. & W. Rubber Co..... 21

Tire Repair Outfits

Tires
Adjustable Wagon Tire Mfg. Co...Front cover

Tire Setters
Buffalo Forge Co. 7
House Cold Tire Setter Co.....4th cover
West Tire Setter Co..... 27

Tire Shrinkers
Buffalo Forge Co. 7
Champion Blower & Forge Co..... 3

Tongs
Champion Tool Co..... 6

Tool Grinders
Phoenix Horseshoe Co..... 4

Tuyere Irons
Buffalo Forge Co. 7
Champion Blower & Forge Co..... 3
Thompson Tuyere Iron Co.....4th cover

Veterinary Remedies
Young, W. F..... 25

Vises
Butterfield & Co..... 8
Fisher & Norris..... 8
Prentiss Vise Co. .....4th cover

Wagons
Akron-Selle Co. .....4th cover

Welding Compounds
Anti-Borax Compound Co. 6
Cortland Welding Compound Co. 24
Doxey, N. D..... 8

Welding Outfits
Brooks, The, Machine Co..... 25

Welding Plants
Bertschy Bermo Co. 26

Welding Plates
Phillips-Laffitte Co. .....3rd cover

Welding Supplies
Linde Air Products Co..... 8

Wheel Compressors
Universal Wheel Compressor Co.....4th cover

Wheel Dishers
Crescent Machine Co..... 27

Wheels
Electric Wheel Co. 26
Empire Mfg. Co. 8

Wheels (Fifth)
Lancaster Foundry Co. 1

Woodworking Machinery
Buffalo Forge Co. 7
Crescent Machine Co. 27
Parks Ball Bearing Machine Co..... 27
Sherwood, W. L. 25

Wool Fat Compound
Corona Mfg. Co. .....4th cover

Wrenches
Champion Tool Co. 6
Peck, Stow & Wilcox Co..... 28

Northwestern Horse Nails

The Northwestern Horse Nails have been on the market for many years. These nails are made of the best quality material. They are perfect in form and finish and will hold the shoe firmly to the horse's foot. The reinforced point makes this nail an easy one to drive and a safe one to use. Write for samples and descriptive circulars to the Union Horse Nail Co., Chicago, Ill.

A New Vice President

Mr. F. G. Echols, for many years general manager of the small tools department of Pratt & Whitney Company, of Hartford, Conn., has accepted a position as vice-president of the Greenfield Tap & Die Corporation, of Greenfield, Mass.

New Branch Offices.

In order to keep more closely in touch with the trade, the Edgar C. Guthard Company, Chicago, manufacturers of the Billmont Master Wrench, has opened the following branch offices:

Minneapolis, 628 Plymouth Bldg., in charge of Paul Barnard; New York City, 207 West Seventy-sixth Street, in charge of J. H. Cooper; San Francisco, 339 Phelan Bldg., in charge of Ralph Longstaff.

The latest office to be opened is in Kansas City, 230 Rialto Bldg.

CLEAN CUT PROFITS

JUSTRITE PLOW BLADE SHARPENER

Its scoop is broad and it handles plow blades, road scrapers, drag teeth, drill shoes, cultivator shovels, corn-knives—in fact, anything needing to be drawn down to a fine, clean edge—without battering irregularities or nicks.

It is not a large, bulky machine, yet it is very masterful—having the strength, power and speed of a "lightning giant." 2 H.P. only is all that is required to operate it.

JUSTRITE is the only up-to-the-minute sharpener on the market that can turn out from 75 to 100 pieces a day and done in such an excellent manner that your customers will stick to you. That's worth more than the price of the machine! Is it not?



Don't waste time working with old slipshod methods—write us today for full information.

Strite Governor Pulley Co.

307-309 So. 3rd St. Minneapolis, Minn.

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

will be inserted under this head at 3 cents a word, including the address, for each insertion, payable in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York
PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT

Patents

PATENTS FOR INVENTIONS.
H. W. T. JENNER, patent attorney and mechanical expert, 622 F Street, Washington, D. C. Established 1883. I make a free examination and report if a patent can be had and the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trademarks registered.

For Sale

FOR SALE—AUTO SUPPLIES
K. W. Coil Points, doz., $2.40; 100 lots, $15.00
Magneto Files, 12c; doz.....$1.20
Speedometer Gears, 15c.; doz.....$1.50
Brake Lining (Durabestos), per foot.

1½x3/16	1¼x3/16	2x3/16	2¼x3/16
35c	40c	45c	50c

Radiator Hose, 3-ft. lengths, per foot:

1"	1¼"	1½"	1¾"	2"	2¼"	2½"
21c	26c	30c	33c	38c	42c	45c

Other sizes in proportion
Ford Hose Connections, doz., 90c.; 100.....$6.00
Ford Felt Packing, per set..... 50c
These prices for dealers only
BICKNELL MFG. & SUPPLY CO., Janesville, Wis.

FOR SALE
1 No. 408 Champion steel horseshoer's forge, $25; 1 heavy floor emery stand, $10; 1 No. 1 Eureka, new style tire bender, $10; 1 iron split pulley, 28 in. diameter, 5 in. face, for 1 11/16 shafting, $5; 1 new steel shafting, 1 11/16 x 12 ft. long, $5; 1 steel shafting, 1 7/16 x 16 ft. long, $4; 9 adjustable 12 in. iron drop hangers for 1 7/16 in. shafting, $2 each; 1 "one cow" Viking cream separator, good as new, $20. Address Andrew Bjerk, Box 105, Colgate, N. D.

FOR SALE
One 16 in. lathe with 8 ft. bed, with all equipments and chuck, price $200. One 18 in. lathe, 10 ft. bed, with all equipments. Price $225. Both lathes in good shape and suitable for auto shops or small machine shops. Cullander Machinery Co., Belzoni, Miss.

FOR SALE CHEAP
Blacksmith shop. Stock and tools, machinery including gas engine, band and rip saws, planer, drill, emery stand, Shaler's vulcanizing machine, plumber's taps and dies, and blow torch. No other shop near. Plenty work for 2 or 3 men. Good place for a garage. Address Box 198, Brewster, N. Y.

FOR SALE
Well equipped blacksmith shop doing fine business in good Iowa county seat, town of 4,000. Rent building or will sell equipment and stock at a sacrifice account of health. Fine opportunity for business, or equipment for shop elsewhere. Write J. H. Hammerand, Harlan, Iowa.

FOR SALE
Well equipped blacksmith shop, good location, doing good business; two-story shop, three thousand feet floor space, also residence property close to business. This is a splendid opportunity. Mack Thomas, Curtisville, Tipton County, Indiana.

FOR SALE
If you can't get the nuts off from old bolts that turn when taking machinery apart, try one of our Nut Splitters. Splits all nuts three-quarter inch and smaller. Get circulars. Whisler Mfg. Co., Gibson, Iowa.

FOR SALE
Ideal lawn mower. Grinder almost like new. Only successful grinder. Can make a dollar in five minutes with it. Runs by hand or power. Apply Mrs. M. A. Tuttle, Lake Charles, La.

FOR SALE
One shop, tools and stock doing $5,000 business; also 1 house and lot. E. J. Bee, Auburn, W. Va.

FOR SALE, GOVERNORS FOR AUTO ENGINES
We make governors for Auto and Cycle engines when used as stationary. Write today for circular. C. L. H., Box 774, Dept. C, Taft, California.

FOR SALE
One Hawkeye power hammer No. 2, $50; one 20 inch Silver's band saw, $20; one Greenriver shoeing vice, $8; one No. 400 Champion blower, $10; one 3 inch tire bender, $5; one Reynolds tire bolter, $3. Want to buy a good lever punch 6 inch throat or more to punch 5/16 inch iron or less; also one shear for cutting sheet iron. Stenberg-Tweet Incubator Co., Radcliffe, Ia.

FOR SALE
Blacksmith shop and garage combined, building 30 x 80 feet; galvanized iron, equipped throughout with modern machinery; only shop in town. Big trade already established. Will take half price of new stuff, and it is all as good as new. L. L. Warren, Pendleton, Texas.

Miscellaneous

PRINTING FOR BLACKSMITHS
Increase your business by handing out our printed business cards with "The Blacksmith's Ten Commandments" printed on back; 50 for $1.00. NEWS PRINTING CO., Stockton, Ill.

Wanted

WANTED
Good all around blacksmith at once. Young married man preferred. M. W. ABTS, Morrill, Nebr.

WANTED
First-class Active Working Foreman Blacksmith with experience in oil and gas well drilling equipment preferred, but main consideration in selecting a man for this place will be thorough knowledge of his business ability to handle men and a record for rapid and accurate production. In making application give age, experience in detail, wages wanted, and references. This is a permanent position with lots of work and good living and working conditions. Apply Box 183, Parkersburg, W. V.

Tires

TIRES

GUARANTEED 4000 MILES

Buy *New Firsts* and save 40 to 50% on the *New Prices*

"Tires that repay in satisfaction"

	Plain	Non-Skid	Tubes		Plain	Non-Skid	Tubes
30x3	10.00	10.75	1.50	34x4	21.00	22.50	2.75
30x3½	12.50	13.50	1.75	34x4½	28.00	29.50	3.50
32x3½	14.00	15.00	2.00	35x4½	29.00	31.50	3.50
31x4	19.00	20.00	2.25	36x4½	30.00	32.50	3.50
32x4	19.75	21.00	2.50	35x5	33.50	36.00	4.00
33x4	20.50	22.00	2.50	37x5	35.50	38.00	4.00

DOUBLE TREAD TIRES

	Plain	Non-Skid		Plain	Non-Skid
28x3	4.50	5.00	34x4	9.00	10.00
30x3	5.50	6.00	36x4	9.00	10.00
30x3½	6.60	7.35	34x4½	10.00	11.00
32x3½	7.00	7.70	35x4½	10.00	11.00
31x4	7.70	8.25	36x4½	10.00	11.00
32x4	7.70	8.25	35x5	11.00	12.00
33x4	9.00	10.00	37x5	11.00	12.00

TERMS: I will send tires C. O. D. privilege of examination. 2% cash discount when remittance in full accompanies order.

NOTE: Special proposition to dealers.

I have built a reputation for service and dependability for over 10 years. In selling you, it is my desire to maintain and uphold this reputation.

I. JAFFESS

1319 B Fifth Avenue Cor. 111th Street
241 B West 54th Street Near Broadway
NEW YORK CITY

Tire Dealers Attention!

REDUCED PRICES ON DOUBLE TREAD TIRES

30 x 3 Plain - $5.00
30 x 3½ NonSkid $6.75

All other sizes on request. 20% deposit on C.O.D. orders required. Write for list to

M. LIBEN & CO.
793k 7th AVE. NEW YORK CITY

PRICE WRECKERS

Double Tread Tires with Double Lock Stitch

30x3	N. S.	$5.50	34x4½	N. S.	$11.00
30x3½	"	6.50	35x4	"	10.00
32x3½	"	7.25	36x4	"	10.25
31x4	"	7.50	36x4½	"	11.00
32x4	"	8.00	36x5	"	12.00
33x4	"	9.50	37x4½	"	12.25
34x4	"	10.00	37x5	"	13.00

We carry a full line of Firsts and Factory Blemished Tires and Tubes at moderate prices.

ROYAL TIRE EXCHANGE
282 Halsey St. Newark, N. J.

DOUBLE TREAD TIRES
We carry a full line of new and used tires and tubes. H. GINSBERG & SONS, 236 W. 48th Street, New York City.

Telephone Circle 2460

B. LIBEN & CO.

DEALERS AND JOBBERS

in all Makes of Auto Tires and Tubes

261 WEST 54th STREET, NEW YORK

Biggest Drop in History in

Double Tread Tires

Greatest selection in factory seconds and blemished tires.

Write for information.

I AM THE FOUNTAIN HEAD OF THE ABUNDANCE OF THINGS

I KEEP the populace awake when otherwise they would slumber—I am the active agent stirring up work for millions of men and women—I keep doors from rusting on their hinges—I make folks think—I compel them to open their purses and buy anything—Everything that is good—

I am Advertising.



Quality and Service

in *design*, *wear*, *fit*, *finish* and all-around efficiency have been, are and always will be, the first consideration in the manufacture of

DIAMOND
CALKS and SHOES

We aim to make our product of such superior excellence in everything that makes for satisfied dealers and satisfied users that they will not only ask for, but insist on the DIAMOND line because they cannot buy a better one.

Your good will and your customers' good will are what we want above all else.

Diamond Calk Horseshoe Co.
Duluth, Minn.



Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

YOU CAN WELD STEEL AS EASILY AS IRON

CLIMAX WELDING COMPOUND TRADE MARK REGISTERED AUG. 22 1905.

Especially adapted for welding tires, axles, springs and all lap welding.

Either of these compounds will weld steel at the lowest possible heat that steel can be welded. Also protects steel at high heat.

Owing to our improved process of manufacturing, these compounds do not boil off and waste in the fire but adhere to the metal when applied.

FOR SALE BY ALL LEADING DEALERS IN BLACKSMITH SUPPLIES IN UNITED STATES AND CANADA

Large Free Samples Sent upon Request

CORTLAND WELDING COMPOUND CO.
CORTLAND, N. Y.

BORAX-ETTE FOR STEEL TRADE MARK REGISTERED AUG. 22 1905 A PERFECT WELDING FLUX

PREPARED ESPECIALLY FOR WELDING FAR SUPERIOR TO COMMON BORAX

A flux which causes the steel to weld like iron. Not necessary to apply between the lap, but may be applied to the outer surface of the work, the same as borax. Has no equal for plow work. Just the thing for welding toe-calks so they can't knock off.

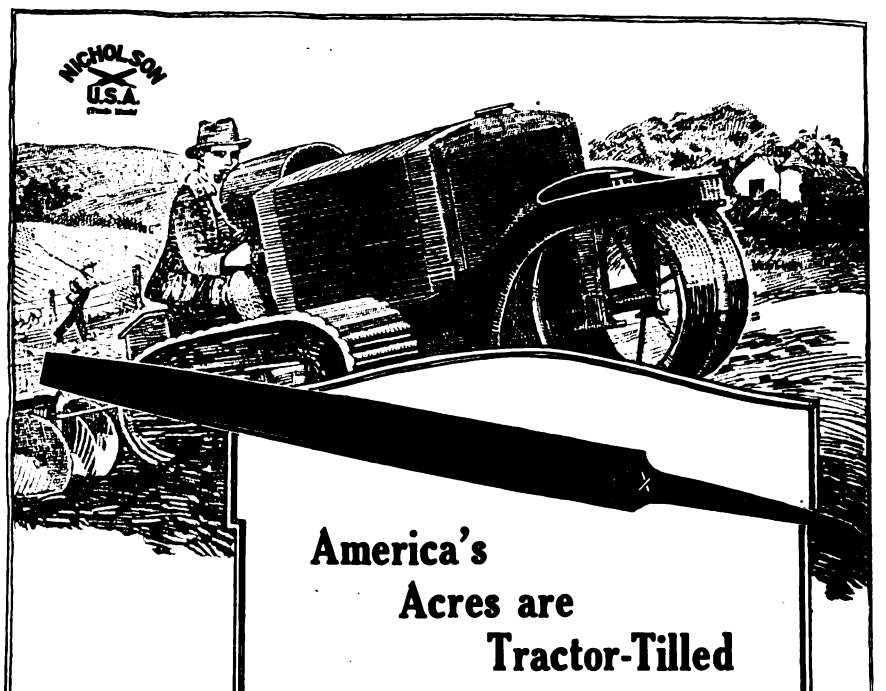
STERLING
PADS and PROTECTORS

Sterling pads are one solid, inseparable piece. The tough, pliable, waterproof back, made of our patented rubber and fibre compound, is vulcanized (not cemented or stitched) to the resilient rubber heel. They will never pull apart. STERLING Pads and Protectors are waterproof—do not swell, shrink or get soggy in stable moisture.

They are best for the horse's hoofs, and best for the shoer's business.

We sell exclusively through the regular jobbing trade. Please ask us for samples.

STERLING TIRE CORPORATION
RUTHERFORD, N. J.



America's Acres are Tractor-Tilled

The wheat and corn acreage of America saved the world from starvation, and the American tractor made that acreage possible. Yet tractor tillage is in but its infancy. Tractors adapted to all tillage conditions are already developed or in the making, and

Nicholson Files

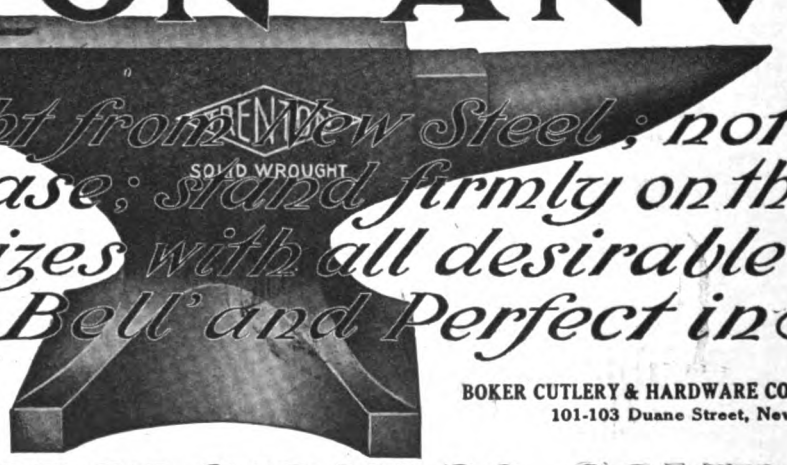
are playing a worthy part in this significant development—smoothing and shaping the parts of these power units of Agriculture. In the tool box of the working tractor, too, is found most frequently the File that Cuts FASTEST and SMOOTHEST.



Write for our Catalog and for File Filosophy—a most instructive booklet about files and their use.

Nicholson File Co.
Providence, R. I., U. S. A.

TRENTON ANVILS



Solid Wrought from New Steel; not cast.
Recessed Base; stand firmly on the block
Made in all sizes with all desirable Clips.
'Ring like a Bell' and Perfect in Shape.

BOKER CUTLERY & HARDWARE CO., Inc., Sole Sales Agents,
101-103 Duane Street, New York City

THE COLUMBUS FORGE & IRON CO. COLUMBUS, O.

Digitized by Google

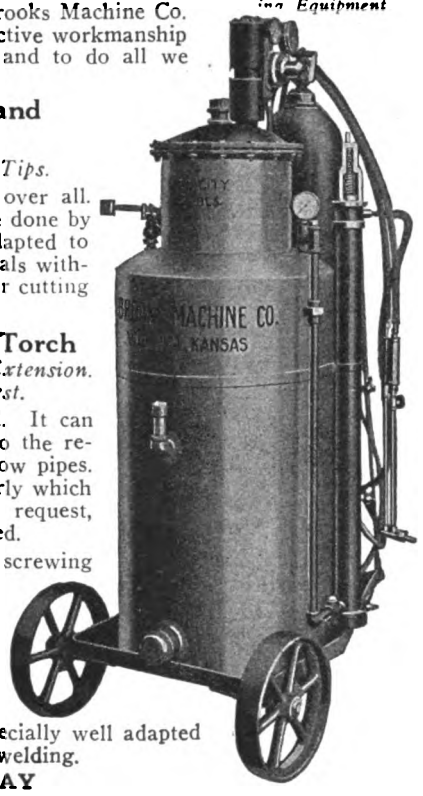
BROOKS WELDING AND CUTTING APPARATUS

The Most Important Part of the Tool Equipment in All Metal Working Shops for Both Repairing and Manufacturing

The Brooks flash-back safety valve eliminates all chances of bursting the dry pipe. This is the greatest safety device ever put on an Acetylene Generator. It opens and releases the force the same as the exhaust valve on a gas engine.

The Brooks Machine Co. manufactures welding and cutting torches, automatic acetylene pressure generators, both portable and stationary. Complete equipment to take care of all kinds of welding and cutting. Tell us the nature and quality of your work, we will advise you fully as to the size and kind of equipment to meet your requirements best.

Brooks Portable Automatic Acetylene Generators
25 and 50 lb. Carbide Capacity, with Welding Equipment



All products manufactured by the Brooks Machine Co. are guaranteed for one year against defective workmanship and to be made of first-class material and to do all we claim for them.

Brooks Universal Welding and Cutting Torch

Ten Welding and Three Cutting Tips.

Torch made in lengths of 20 inches over all. With it, either welding or cutting can be done by simply changing tips. This Torch is adapted to all classes of welding and cutting of metals within range of the Oxy-Acetylene welding or cutting process.

Brooks Commercial Welding Torch

Eight Welding Tips and One Extra Extension. Larger Tips Furnished on Request.

Torch made up to 21 inches over all. It can be lengthened or shortened, according to the requirements of the work, by changing blow pipes. One extra blow pipe is furnished regularly which makes the torch 28 inches long. On request, pipes of any length may be furnished.

By taking off the tip elbow head and screwing the welding tip on direct to the short extension, it can be converted into a straight torch, which is often convenient.

The Brooks Commercial Torch will handle all welding work within the limit of the process. This Torch is especially well adapted for pipe line, boiler and machine shop welding.

WRITE TO US TODAY

THE BROOKS MACHINE CO., 219-229 W. Lewis St., Wichita, Kansas



Free 448 PAGES OF BARGAINS POST PAID

WE WANT TO SEND YOU THIS 448 PAGE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

Tells how you can work up a profitable auto supply and repair business.

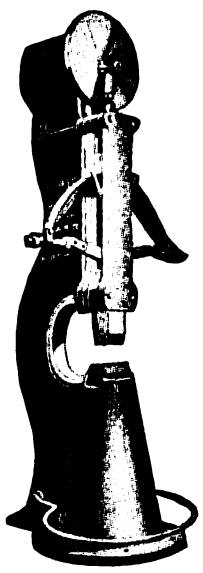
Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories
1117 W. 11th Street, Cleveland, Ohio, U. S. A.

The Perfect Power Hammer



Note the difference in construction over other makes:

Extra Long Guides, insuring a direct movement of the ram without any side motion, which causes guides and springs to break on other Hammers.

The only Hammer made with a disk attachment with special anvil for sharpening harrow and plow disks.

A recently invented **Friction Clutch** fitted with **Ball Bearings,** absolutely controls the operation of the Hammer by foot pressure from the lightest tap to the heaviest blow. This ease of operation makes the Hammer particularly well adapted for plow work, as you can get as light a stroke as you desire.

Will ship to any responsible party on approval. If not as represented, no sale.

Made in two sizes:
3-inch square, 40-lb. ram; shipping weight, 1,150 lbs.
4-inch square, 80-lb. ram; shipping weight, 1,800 lbs.

Write any jobber for prices, or

Macgowan & Finigan Cordage Co.,
204 North Third St., ST. LOUIS, MO.

Edwards Shears

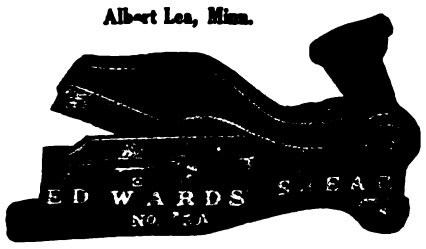
For twenty-four years the **Two Leading Low Priced Shears** in the U. S., representing the **Greatest Value for the Least Money.**

No. 5, weighs 200 lbs., cuts 4x½ inch soft steel.
No. 10, weighs 430 lbs., cuts 4x¾ inch soft steel.

At their price you should have had one long ago. **Order one from the first iron man that calls on you. They All Sell Them.**

Write for descriptive circular and prices.

C. D. EDWARDS MFG. CO.
Albert Lea, Minn.



Leading Blacksmiths use STAR STEEL SHAPES

Solid Cast, Crucible, Soft Center Steels

Write your Jobber to-day

Made by

STAR MFG. CO. Carpentersville, Ill.



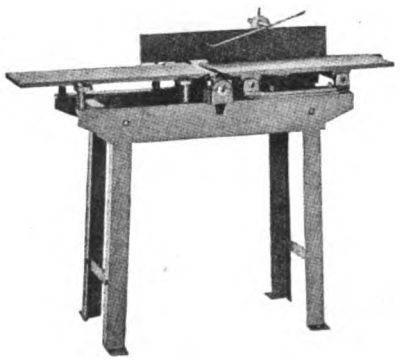
SELDOM SEE

a big knee like this, but your horse may have a bunch or bruise on his ankle, hock, stifle, knee or throat.

ABSORBINE
TRADE MARK REG. U.S. PAT. OFF.

will clean it off without laying up the horse. **No blister, no hair gone.** Concentrated—only a few drops required at an application. $2.50 per bottle delivered. Describe your case for special instructions, and Book 8 R free. ABSORBINE, JR., the antiseptic liniment for mankind, reduces Painful Swellings, Enlarged Glands, Wens, Bruises, Varicose Veins; allays Pain and Inflammation. Price $1.25 a bottle at druggists or delivered. Liberal trial bottle postpaid for 10c.

W. F. YOUNG, Inc., 55 Temple St., Springfield, Mass.



THE CLIPPER

9 in. Jointer
— or —
Hand Planer

Price only $40.00

Can you afford to do without this planer at the above price?

Cast iron and steel construction.

Catalogue No. 15 for the asking gives full line.

W. L. SHERWOOD
KIRKSVILLE, MO.

Would You Sell Your Life For $65?

You wouldn't part with even an arm or a leg for that figure, would you?

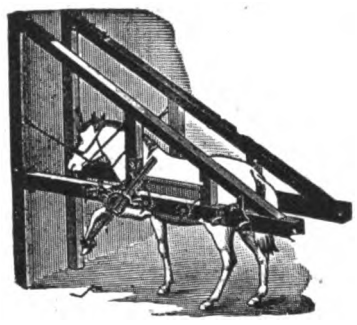
Yet every vicious horse you shoe is likely to do more damage in the twinkling of an eye than can be repaired at several times the cost of **Barcus Stocks.**

When you place a horse in a Barcus Stock, he is harmless—he cannot hurt either you or himself. Costing only $65 it is cheap insurance, indeed.

BARCUS STOCKS not only furnish the logical way to observe "Safety First," but they are also a positive aid to good shoeing. The BARCUS is a modern Stock—automatic working parts instead of the bothersome ropes, straps and blocks that made the old style stock almost more of a nuisance than a help.

If you don't know about **Barcus Stocks** you owe it to yourself and your family to write **at once** for the complete details.

The Barcus Mfg. Co.,
Wabash, Ind.

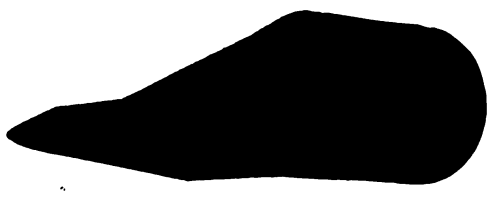


Please send me full particulars regarding your Horse Stocks without any obligation on my part.

Name.....

Town.....*State*.....

Digitized by Google



Good Work May Be Done with Good Tools

but—work that gives lasting satisfaction is done with Giant Grip Shoes, Calks and Tools.

Giant Grip Shoes, Calks and Tools are made for work and wear—the choice of master workmen who know their trade.

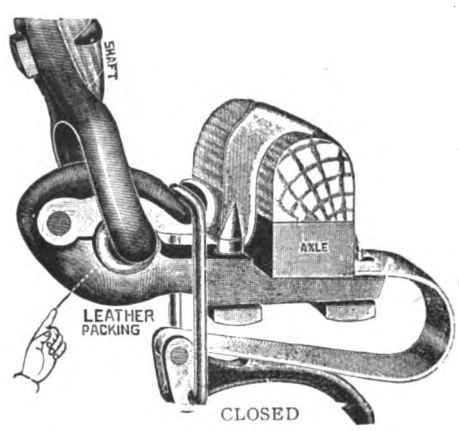
To shoe with Giant Grip marks you as the man who works with better tools—and profits by such service.

Ask us for details.

GIANT GRIP HORSESHOE COMPANY
Established 1863
OSHKOSH - WISCONSIN

Also makers of Giant Grip Traction Equipment for Motor Trucks

BRADLEY
Carriage Couplers



Bradley Ball Bearing Coupler

PERFECTLY SAFE

ALL STEEL

A Positive Anti-Rattler and Rapid Shifter

Write for Free Booklet

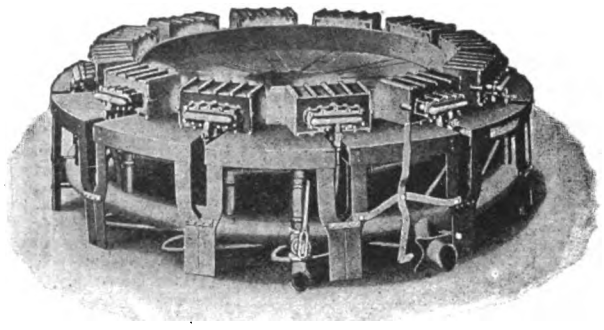


Bradley Holdfast Coupler

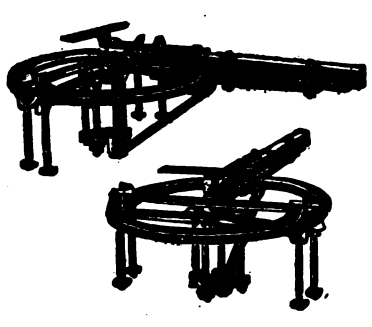
Used on a majority of the better known vehicles

Let Us Quote You on Your Requirements

C. C. BRADLEY & SON, Inc.
SYRACUSE, N. Y.



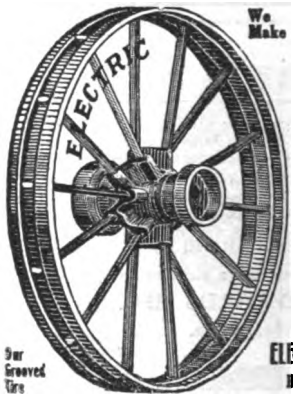




TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas, Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.
OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.

Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE COCEL MFG. CO., TOLEDO, OHIO.



We Make **STEEL WHEELS**
To Fit Any Axle
Plain or Grooved Tire
Steel or Hickory Axles
Any Size
A Full Line of Wood and Steel **Farm Trucks**
With Steel or Wood Wheels
Write for Large Catalog and Prices
ELECTRIC WHEEL CO
Box N, Quincy, Ill.

Our Grooved Tire

WELDING PLANTS, $25.00 to $300.00

Designed for all purposes. Small cash payment; balance, three to six months.
Every mechanic and shop should have one.

BERTSCHY-BERMO CO. OMAHA, U. S. A.

Campbell Iron Company

WHOLESALE SUPPLIES

Still carry a stock of Wagon, Blacksmith Materials, Farrier Supplies, as well as Tools, Hardware Specialties and Duplicate Parts for Fords.
Write for General Catalogue.

817 Cass Avenue St. Louis, Mo.



OTTAWA KEROSENE ENGINES

Start Easy in any weather. Pull steady. Carry big overload. All sizes and styles. 1½ H-P. to 22 H-P. **90 Days' Trial. Money Back Guarantee.** Prompt shipment.
Low Prices Write for present money saving prices and **Free Book**, telling all you want to know about engines. Write today.
OTTAWA MFG. CO. 1783 King Street, OTTAWA, KANS.

940 Pages instead of 824 — **NINTH EDITION** — 3362 Illustrations instead of 2000

$4.46 prepaid DYKE'S AUTO ENCYCLOPEDIA $4.46 prepaid

Entirely re-written, hundreds of illustrations and many new subjects added. Practically a new book. A non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 50 Instructions—Simplified and Practical.

3362 Illustrations—the kind you understand at a glance.

2 Supplements, part printed in two colors, treating on the construction, operation, repairing and adjusting of the FORD and PACKARD—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.

778 illustrations and 279 pages on Electric Ignition, Electric Starters and Generators, etc.

51 pages and 79 illustrations on the Delco system alone.

60 pages and 254 illustrations on Adjustments, Tests, etc., of leading Electric Systems.

154 pages and 1189 illustrations on Repairing.

Oxy-Acetylene welding. Axle, Differential and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.

27 pages and 180 illustrations on Tires and Tire Repairing.

44 pages and 119 illustrations on Carburetion.

89 pages and 291 illustrations on Engines and Parts.

16 pages on Digest of Troubles.

6000 lines to the Index. This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. Index begins on colored paper, easy to refer to.

Dictionary is also included, which gives the meaning of motoring terms.

Inserts: There are five—printed in colors. New features you never before saw or heard of in one of the inserts.

Additions to the Ninth Edition:
TRUCKS, TRACTORS, MOTORCYCLES, AIRPLANES and LIBERTY ENGINE

HOW TO BECOME AN EXPERT AUTOMOBILE MECHANICIAN

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion subject so thoroughly, you can adjust any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

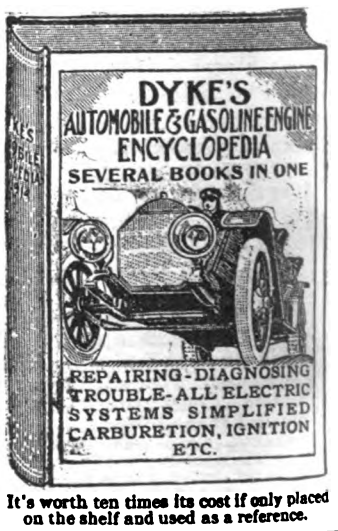
You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical Automobile book in America. Price $4.46, prepaid.

Address all orders to

THE BLACKSMITH & WHEELWRIGHT
73 MURRAY STREET NEW YORK

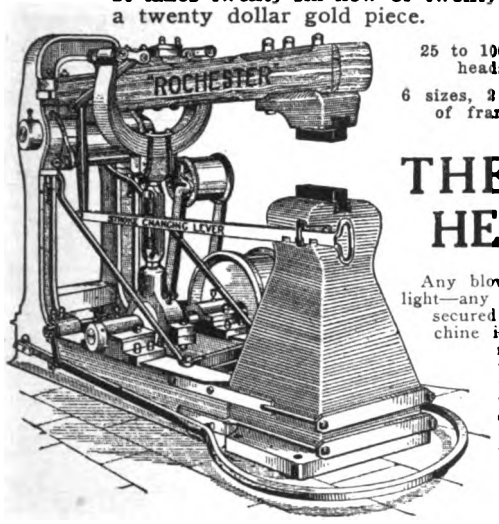


It's worth ten times its cost if only placed on the shelf and used as a reference.

Digitized by Google

THIS IS SOME NEWS!

It takes twenty-six new or twenty-five old and used bills to balance a twenty dollar gold piece.



25 to 100 lb. heads

6 sizes, 2 styles of frames

NOW, that we have your attention let's think a little about

THE ROCHESTER HELVE HAMMER

Any blow, long or short, fast or slow, heavy or light—any length, weight and force of blow instantly secured on the Rochester "Helve" while the machine is running. This feature alone saves so much time where there is a variety of small work to be forged, swaged or welded, that it recommends the tool without reference to its other distinctive features. Made in 6 sizes, 2 styles of frames; 25-lb. to 100-lb. heads. For Welding and General Forging the "Rochester" is peerless in efficiency. Full description in catalog.

GET OUR HELVE HAMMER BOOK

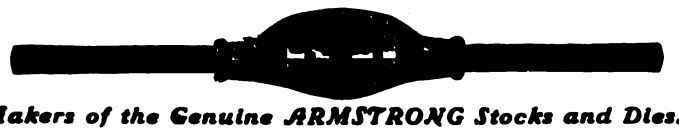
THE WEST TIRE SETTER CO. :: :: Rochester, N. Y.

THE ARMSTRONG MFG. COMPANY

BRIDGEPORT CONN., U.S.A.

NEW YORK OFFICE 248 CANAL STREET

like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



"Makers of the Genuine ARMSTRONG Stocks and Dies."

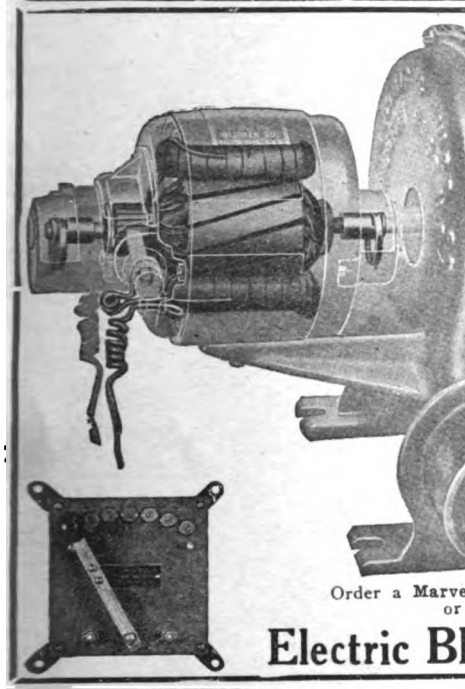
ROBERGE'S GREAT BOOK

"THE FOOT OF THE HORSE"

By DAVID ROBERGE

The author of this book for many years enjoyed the entire confidence of Robert Bonner, who, in his day, owned many of the fastest trotters the world has ever seen. Bonner and Roberge worked together in shoeing the former's horses. Many believe that David Roberge was the ablest horseshoer this country has ever seen. His book is filled with plates and illustrations showing proper methods of shoeing horses for every kind of lameness. We have sold large numbers of these books and they have always given entire satisfaction. The work represents the life experience of its author. Sent to any address, postage prepaid, on receipt of price, **$5.00.** Address

M. T. RICHARDSON CO., Publishers, 71-73 Murray Street, New York.



"ONE FIRE" MARVEL

A. C. or D. C.
or
UNIVERSAL MOTORS

Extra Large Ring Oil Bearings

Case Hardened Armature Shaft

$38.00 Net

Order a **Marvel** on 30 days' trial through your Dealer, or your Electric Light Company

Electric Blower Co., 352 Atlantic Avenue BOSTON, MASS.



PARKS WAGON SHOP SPECIAL

You may think you don't need this practical woodworker in your shop. Take advantage of our trial offer, and be convinced how much it will save you. **Machines sent on trial anywhere in United States and Canada.**

Machine is a combination of Circular, Rip and Cross Cut Saws,
22" Band Saw,
12" Jointer,
Rim Rounder,
Felloe Borer,
Spoke Tenoner,

All ready for instant use. No Changing.

Light size takes 2 to 3 H. P., heavy size 3 to 4 H. P.

Write for catalog and full information about how a woodworker should be arranged to be convenient to operate.

Parks Ball Bearing Machine Co.
North Side Station
Cincinnati, O.

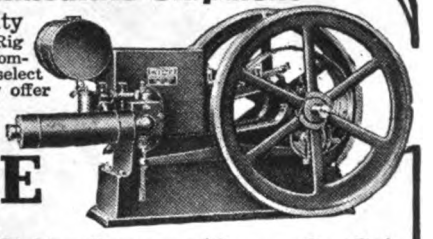


DIRECT TO YOU *from* WITTE

ENGINE PRICES NOW REDUCED

All Sizes—Immediate Shipment

Don't miss this opportunity to get a WITTE Engine, Saw-Rig or Portable at a Direct-From-Factory price. Before you select **any** engine, get this new offer and new book showing how I can save you **$15 to $200** on engines 2 to 30 H-P.



Buy on Your Own Terms ALL CASH or PART CASH As You Wish

WITTE KEROSENE ENGINES

Use Kerosene (Common Coal Oil) Operate At Half the Cost

Lifetime guarantee protects you against **defect** of material or workmanship—the **quantity** of fuel required and the **horse-power** of your engine. 33 years of success building engines **exclusively** is **best proof** that you should own a WITTE. I cannot **begin** to tell you everything in this ad, but **I can tell you why** the WITTE is **better** than other engines if you will send me your name and address. **Do this today.**



Write For My New FREE Book

"HOW TO JUDGE ENGINES"—The greatest of all engine books—the **best** illustrated and printed—the most **widely** read, most **talked** about, and most extensively **copied.** Be sure to read this original, instructive, valuable and **true engine factory book.** It will open your eyes and **save you money.** Send postal card or coupon.—ED. H. WITTE, Pres.

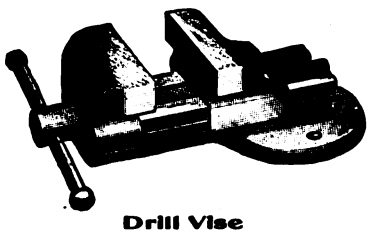
WITTE ENGINE WORKS,
2442 Oakland Ave., Kansas City, Mo.
2442 Empire Bldg., Pittsburgh, Pa.

Just Send Name and Address
Before you decide on any make of engine be sure to get my latest and best factory book mailed FREE.

Name.....
Town.....
State.....
R.F.D.....
2442

BICKNELL'S DRILL PRESS VISE

Holds Rounds, Squares and Flats



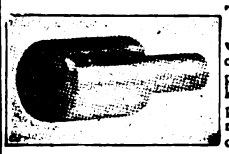
Drill Vise

Saves its cost every year in drills alone.
Base, bed and jaws fully machined.
Swivels to any position on Drill Table, or can be used as a Bench Vise.

For sale by the jobbing trade.

Write for circular.

BICKNELL MFG. & SUPPLY CO., JANESVILLE, WIS.



THE only successful Chuck to hold square taper shank wood bits and drills so you can use them in your drill press. See the spring. It keeps the drills from dropping out of the chuck. Made right Priced right. If your dealers won't supply you we can.

WHISLER MFG. CO., Gibson, Iowa

Get This Car



And The AGENCY For Your Territory

Drive a new 1919 Model Birch Motor Car. Pay for it out of your commissions and make big money on sales. Special offer now. Write quick for Big Free Book and full information. Address Ralph Birchard, Pres.

BIRCH MOTOR CARS, Dept. 745 81 E. Madison St., Chicago

Carriage Tire

Our VICTOR BRAND 37c. lb. In Full Reel Lots

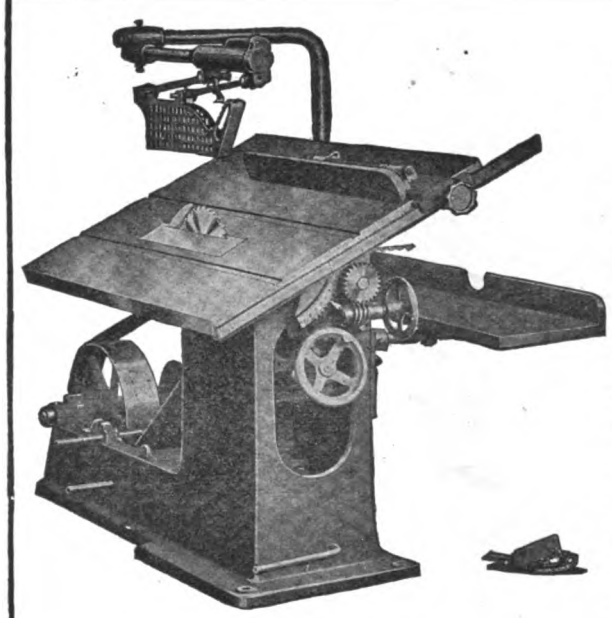


Less than Reel Lots 40c. lb.

Get our prices on wheels, rims, spokes, tires, shafts, bolts, etc.

ASK FOR CATALOG No. 61

WHEEL TOP & HARDWARE CO. Department W2 CINCINNATI, O.



CRESCENT Wood Working Machines

will always satisfy those particular users who want the highest quality at reasonable price.

Send today for catalog of band saws, saw tables, shapers, jointers, variety wood workers, planers, planers and matchers, swing saws, cut off table, disk grinder, borers, hollow chisel mortiser, Universal wood workers.

THE CRESCENT MACHINE CO.
203 Main Street
LEETONIA, OHIO, U.S.A.

Digitized by Google

Firestone
Carriage Tire

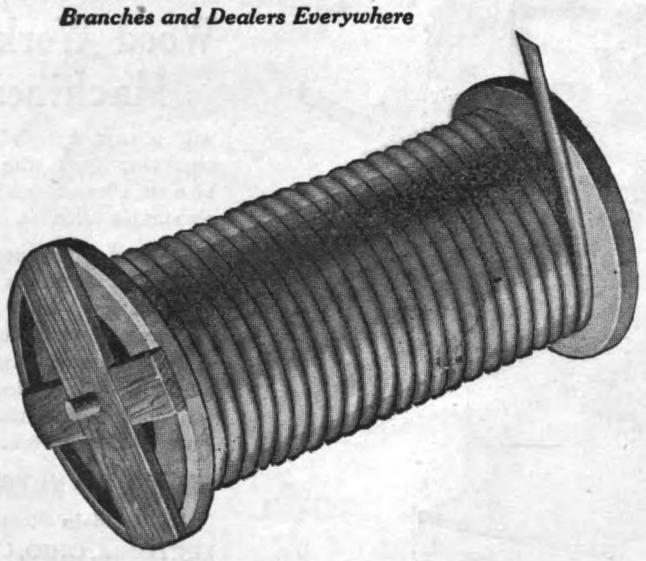
TRANSPORTATION is the need of the hour and every vehicle takes on a new importance today. Now, more than ever, the owners of vehicles of every description appreciate the dealer who gives them Firestone comfort and vehicle-protection with long, uniform wear.

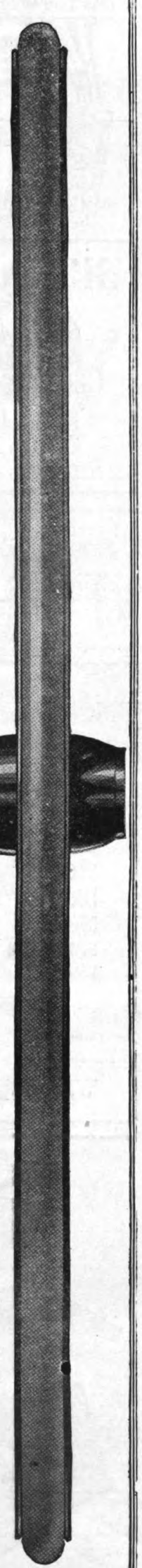
Firestone rubber is light enough to give your customer the satisfaction of massive size without extra weight, and this lightness means extra profit for you per reel.

Get further details about this equipment. It will uphold your own standard and reputation with the Firestone quality which insures

Most Miles per Dollar

Firestone Tire & Rubber Co.
Firestone Park Akron, Ohio
Branches and Dealers Everywhere






MOTOR DRIVEN

Little Giant Power Hammers

25, 50, 100, 250 and 500 lb. Models.

BELT OR MOTOR DRIVEN.

The Boys in Khaki and Sailor Blue Will Be the Farmers of the Future.

Their war equipment has been the most modern, and when they return home the old out-of-date methods will no longer satisfy them.

They will insist on their farm equipment being kept in first class repair and they will take their work to the blacksmith who has up-to-date shop equipment.

No blacksmith shop is modern unless it has a Little Giant Power Hammer. Either of our models will pay for itself in a few months on our easy payment terms, and continue to repay for itself for many years after.


BELT DRIVEN

The first Little Giant Power Hammer made 26 years ago and every one since sold,—some 8,000 in all,—are still in use. There is no wear-out to them.

Average annual repair sales on all Little Giant Power Hammers in use, large and small, from oldest to latest, is 48¢ each or less than 2/5 of 1% of original cost to user.

Any Belt Driven Little Giant Power Hammer can be quickly changed to a Motor Driven Outfit. Ask your power plant superintendent for current, voltage, phase and cycles of motor required. Send this information to us and we will quote prices.

Little Giant Power Hammers are guaranteed FOREVER against defective material and workmanship, and are shipped on 30 days' trial.

Write Your Jobber, or Direct To Us

Little Giant Company, **103 Rock Street,**
Established 1876. **MANKATO, MINN., U. S. A.**

PLYMOUTH COMBINED HAND POWER PUNCH AND SHEAR

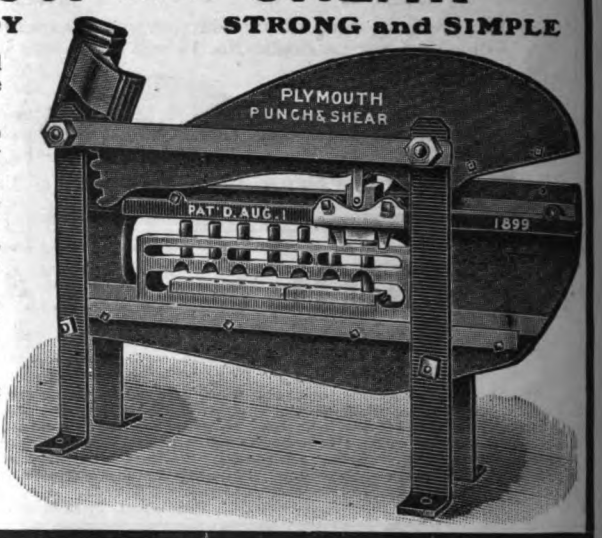
ALWAYS READY **STRONG and SIMPLE**

No lost or misplaced Punches — always in the machine.

Punch Rack shifted to position for use of any punch in a moment without the need of a wrench or any other tool.

Seven different size punches with every machine, ¼, 5/16, ⅜, ½, ⅝, ¾, and ⅞.

Will punch ½ in. hole in ½ in. iron or its equivalent. Shears 4x½ or 3x⅝ or 1 in. Round Iron



Manufactured By
PLYMOUTH FOUNDRY & MACHINE CO.
PLYMOUTH, WISCONSIN

For sale by all Heavy Hardware Jobbers and Blacksmiths' Supply Houses.



For a Clean Cut

Any average-good nipper will cut clean when it's new. But it takes a tool like Pexto No. 132 to stay sharp, and stand up generally throughout a long period of hard usage.

Pexto Blacksmiths' and Farriers' Tools are all conspicuous for their strength, superior workmanship and finish. There's a large line to choose from —pincers, nippers, parers, butterises, farriers' hammers, etc. *Ask your dealer.*

THE PECK, STOW & WILCOX COMPANY
Southington, Conn. **Cleveland, Ohio**

Address Correspondence to 209 West Center Street, Southington, Conn.

100% *American for* 100 *Years* (*Founded* 1819)

PEXTO
BLACKSMITHS' TOOLS

Digitized by Google

ESTABLISHED 1880

The Pioneer Journal of its Class

THE BLACKSMITH & WHEELWRIGHT

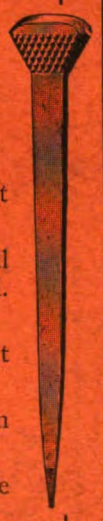
Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U. S. Patent Office.

Entered as Second-class Matter March 4, 1880, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Published Monthly.

Vol. LXXX. No. 2 NEW YORK, AUGUST, 1919 TERMS: One Dollar a Year. Foreign, $1.50. (6s. 3d.)

Use "Capewell" Nails



Some Reasons Why:

1 The Capewell Horse Nail is easiest to drive and the most economical. Holds both the shoe and the customer.

2 No waste material to pay for when you buy Capewell Nails. Quality always the best. Inspection most rigid. Every nail serviceable.

3 No loose shoes to tighten for nothing when they are put on with Capewell Nails.

4 Safety for the horse, confidence for the owner, and an easier day's work for the shoer.

5 Horseshoers, horse owners and horses all share in the benefits which follow the use of Capewell Nails.

Not the cheapest nail regardless of quality, but the world's best at a fair price.

Look for the Trade Mark on each nail head—a pattern formed by lines crossing each other diagonally.

The Capewell Horse Nail Co.

Hartford, Conn., U. S. A.

New York, Buffalo, Philadelphia, Baltimore, New Orleans, Cincinnati St. Louis, Chicago, Detroit, Denver, Portland, San Francisco, Toronto

Largest Manufacturers of Horse Nails in the World



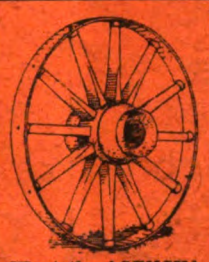
L. C. CHASE & CO., BOSTON, NEW YORK, DETROIT, CHICAGO, SAN FRANCISCO



SUREGRIP CALKS

American Calk Co.

DETROIT, - - - MICH.



WONDERFUL INVENTION

Makes the repaired WOOD Wheel better than new. Guarantee every wagon against loose tires or dished wheels.

PLEASE EVERY CUSTOMER

Saves Time, Costs Less, A Business Builder, A Money Maker.

Want the AGENCY? Then WRITE TODAY.

ADJUSTABLE WAGON TIRE MFG. CO.

Shipping Point Near You. OKLAHOMA CITY, OKLA.

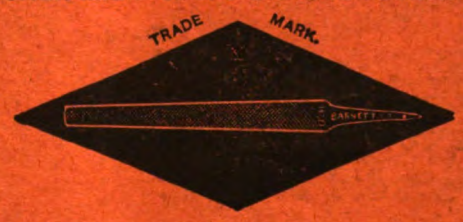
THE TEETH IN

BLACK DIAMOND RASPS

ARE MINGLED

So as to Cut Clean and Free and Leave no Furrows in the Work

Twelve Medals of Award by Jurors



At International Expositions

C. & H. BARNETT COMPANY

Black Diamond File Works, PHILADELPHIA, PA.

Owned and Operated by NICHOLSON FILE CO.

Copy of Catalog sent Free to any interested file users upon application.

SEND US YOUR NAME

and Address and you'll get information worth while regarding this splendid Shear and Punch.



THE MARVEL

A Double Lever Machine.

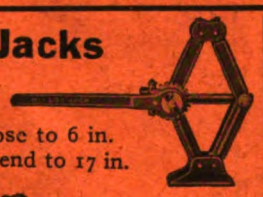
One man does all the machine is capable of and he faces his work all the time.

ARMSTRONG-BLUM MFG. CO.

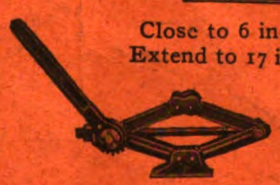
340 N. Francisco Ave., Chicago, Ill.

Hi-Lo-Jacks

Six Sizes



Close to 6 in.
Extend to 17 in.



Capacities ½ to 12 tons

Made by

The RoweCalk & Chain Co.

Plantsville, Conn.

AETNA STEEL TOE CALKS

Made by THE AETNA NUT CO., Southington, Conn.

BLACK HORSE BRAND

BEST SHAPE
BEST SPUR
TO DRIVE
BEST STEEL



TOE AND HEEL CALKS

SOLD BY ALL DEALERS

Stokes Bros.' Improved Horse Rasps

Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A.

Campbell Iron Company

WHOLESALE SUPPLIES

Still carry a stock of Wagon, Blacksmith Materials, Farrier Supplies, as well as Tools, Hardware Specialties and Duplicate Parts for Fords.

Write for General Catalogue.

817 Cass Avenue St. Louis, Mo.

STEEL STAMPS

BURNING BRANDS
RUBBER STAMPS
STENCILS

GEO. M. NESS, JR.
61 FULTON ST. NEW YORK

Send for price list.

Digitized by Google

STERLING

PADS and PROTECTORS

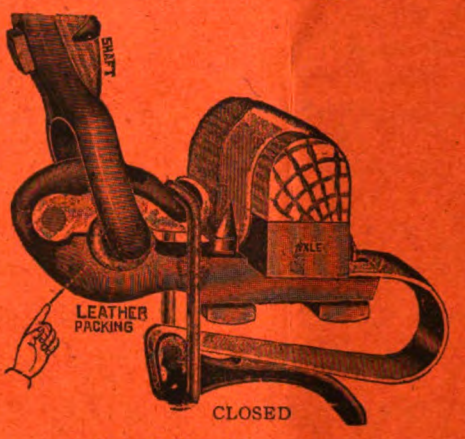
Sterling pads are one solid, inseparable piece. The tough, pliable, waterproof back, made of our patented rubber and fibre compound, is vulcanized (not cemented or stitched) to the resilient rubber heel. They will never pull apart. STERLING Pads and Protectors are waterproof—do not swell, shrink or get soggy in stable moisture.

They are best for the horse's hoofs, and best for the shoer's business.

We sell exclusively through the regular jobbing trade. Please ask us for samples.

STERLING TIRE CORPORATION
RUTHERFORD, N. J.

BRADLEY
Carriage Couplers



Bradley Ball Bearing Coupler

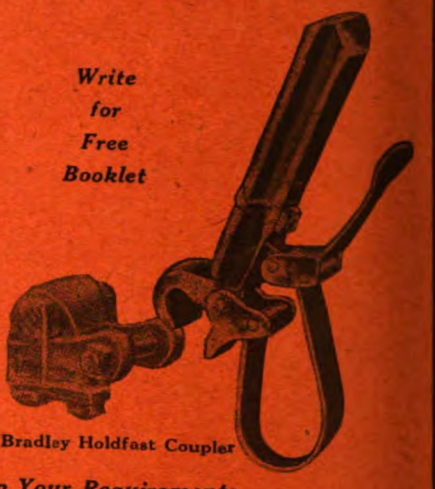
PERFECTLY SAFE

ALL STEEL

A Positive Anti-Rattler and Rapid Shifter

Used on a majority of the better known vehicles

Write for Free Booklet



Bradley Holdfast Coupler

Let Us Quote You on Your Requirements

C. C. BRADLEY & SON, Inc.
SYRACUSE, N. Y.



Valued Most Where Most is Demanded of them.

Where production costs are carefully checked and counterchecked, where file expense and filing output are keenly watched—that's where you'll find the NICHOLSON FILES most highly appreciated.

NICHOLSON U.S.A.

The "NICHOLSON" trade mark on the Tang

means most to the machinist who files most, whose reputation as a workman depends upon fast and accurate filing. Executives and workmen alike find a guarantee of filing satisfaction in that name on the tang of a NICHOLSON FILE.

Write for our Catalog and for File Filosophy—a most instructive booklet about files and their use.

NICHOLSON FILE CO.
Providence, R. I.



Good Work May Be Done with Good Tools

but—work that gives lasting satisfaction is done with Giant Grip Shoes, Calks and Tools.

Giant Grip Shoes, Calks and Tools are made for work and wear—the choice of master workmen who know their trade.

To shoe with Giant Grip marks you as the man who works with better tools—and profits by such service.

Ask us for details.

GIANT GRIP HORSESHOE COMPANY
Established 1863
OSHKOSH - WISCONSIN

Also makers of Giant Grip Traction Equipment for Motor Trucks

Digitized by Google

"F-S" PAINTS



"F-S" Products Stand the Most Rigid Inspection.

Your good work will stand even higher at inspection when you use "F-S" Superfine Coach Colors on your carriage, coach and automobile bodies. The best of material is used as in all "F-S" products—ground in gold-size Japan.

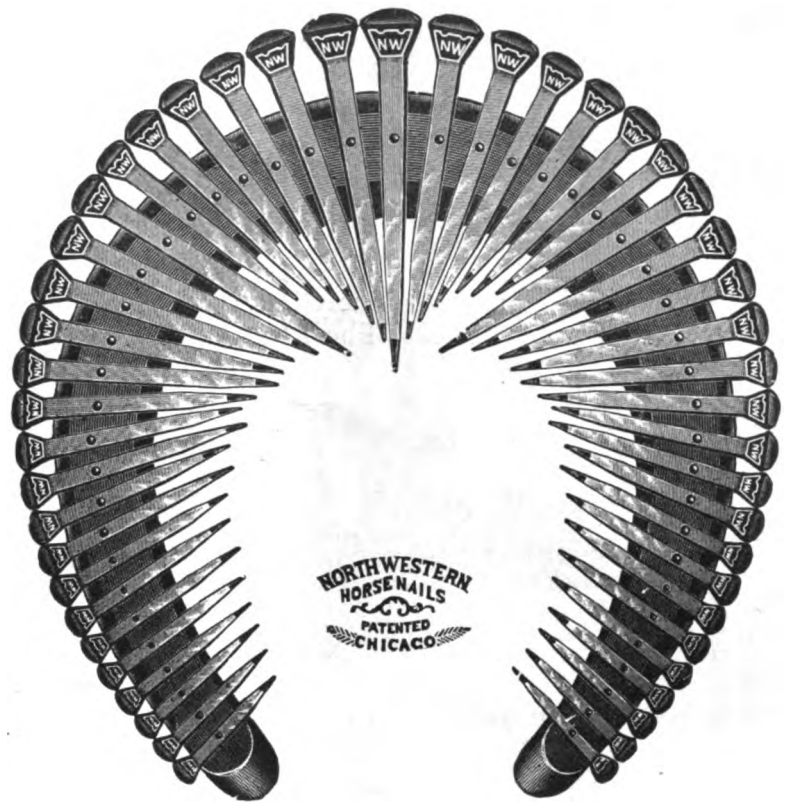
FELTON, SIBLEY & CO., Inc.

Manufacturers of Colors, Paints, Varnishes since 1863

136-140 North Fourth Street, Philadelphia

(147)

NORTHWESTERN HORSE NAILS



MADE OF THE BEST QUALITY MATERIAL

The most perfect in form and finish and will hold a shoe longer than any other nail made.

THE RE-INFORCED POINT makes it the easiest to drive and the safest to use.

UNION HORSE NAIL COMPANY

Manufacturers

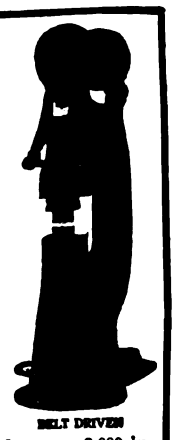
CHICAGO ILLS.

Little Giant Power Hammers

25, 50, 100, 250 and 500 lb. Models.

BELT OR MOTOR DRIVEN.


MOTOR DRIVEN


BELT DRIVEN

The Boys in Khaki and Sailor Blue Will Be the Farmers of the Future.

Their war equipment has been the most modern, and when they return home the old out-of-date methods will no longer satisfy them.

They will insist on their farm equipment being kept in first class repair and they will take their work to the blacksmith who has up-to-date shop equipment.

No blacksmith shop is modern unless it has a Little Giant Power Hammer. Either of our models will pay for itself in a few months on our easy payment terms, and continue to repay for itself for many years after.

The first Little Giant Power Hammer made 26 years ago and every one since sold,—some 8,000 in all,—are still in use. There is no wear-out to them.

Average annual repair sales on all Little Giant Power Hammers in use, large and small, from oldest to latest, is 48¢ each or less than 2/5 of 1% of original cost to user.

Any Belt Driven Little Giant Power Hammer can be quickly changed to a Motor Driven Outfit. Ask your power plant superintendent for current, voltage, phase and cycles of motor required. Send this information to us and we will quote prices.

Little Giant Power Hammers are guaranteed FOREVER against defective material and workmanship, and are shipped on 30 days' trial.

Write Your Jobber, or Direct To Us

Little Giant Company, **103 Rock Street,**

Established 1876. **MANKATO, MINN., U. S. A.**

For more than 200 years Wrought Iron, because of its fibrous nature, which enables it to stand the hard usage given an anvil without material damage, has been recognized as superior to all other material for anvil purposes.

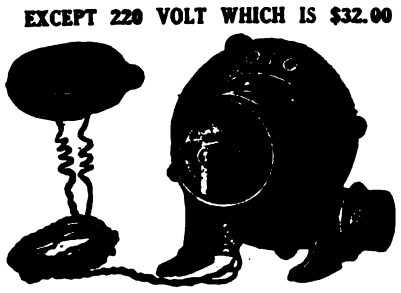
Arm and Hammer Brand Anvils are made from Wrought Iron.

THE COLUMBUS ANVIL & FORGING CO.

COLUMBUS, OHIO, U.S.A.

The ROTO ELECTRIC BLOWER ONLY $30.00

EXCEPT 220 VOLT WHICH IS $32.00



Write for information about our special cash price of Twenty-Nine Dollars

SAVE TIME! SAVE MONEY!

Are you still blowing your forge by hand? Do you know this time is WASTED? Install a ROTO Electric Blower and SAVE this time. It is the greatest *time and labor saver* you can put in your shop. It will let you do *twice* the work, do it *better—quicker—cheaper.* You will then say, like hundreds of our customers,

I wouldn't sell my ROTO for $100.00 if I couldn't get another.

Buy direct and *save the middleman's profits* of $10 to $20. The ROTO is used in several departments of the U. S. Government. You can rely on it. Write for more information or, better yet, mail the coupon today and try this blower in your own shop. If not satisfied, send it back at our expense. That's fair isn't it?

Send the Coupon—Do it Now

THE ROSEWATER ELECTRIC CO.

5516 KINSMAN ROAD, CLEVELAND, OHIO

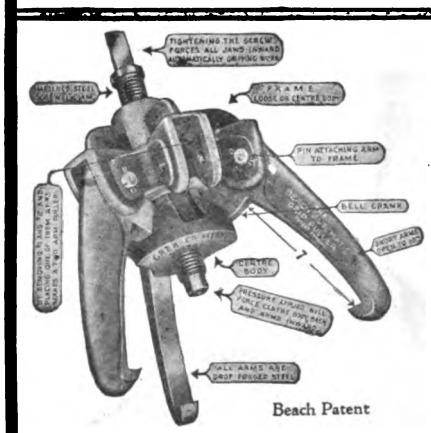
Send me by.....An AIR COOLED ROTO BLOWER with one year's guarantee, complete with cord, plug and Speed Regulator. I will return it to you at the end of 30 days, if it does not give me entire satisfaction, and if I keep it, I will pay you $30.00 for the 110 Volt, or $32.00 for the 220 Volt Blower at the end of 30 days.

Name..... Address.....

Current..... Voltage..... Cycles.....

Your Electric Light or Power Company Will Give You This Information.

GREB AUTOMATIC GRIP PULLER



Make Your Gear and Wheel Pulling Show a Profit.

A Powerful automatic one-man Puller, which adjusts to work instantly. Combination of two or three arms. Two complete sets of three arms.

Senior Size for heavy work, Capacity 1 to 18 in.
Junior Size for small work, Capacity 1 to 7 in.

Ten Days' Trial

If your jobber does not have them, we will send you one. Try it ten days. If not satisfactory, return it to us and we will refund your money.

We also make the Greb Rim Tool and Grebford Extension.

10 DAYS TRIAL

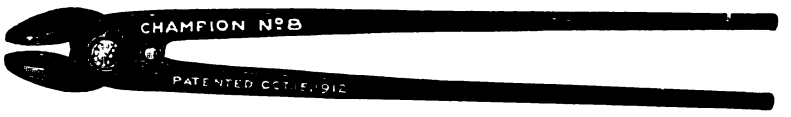
THE GREB COMPANY, 219 State St., Boston, Mass.

Digitized by Google

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge

Nothing to get out of order.



Will hold securely any size of shoe.

No. 8 16 Inches Long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

Weights, 1¾ to 3 lbs.

This Hammer is the most popular Sharpening Hammer on the market.

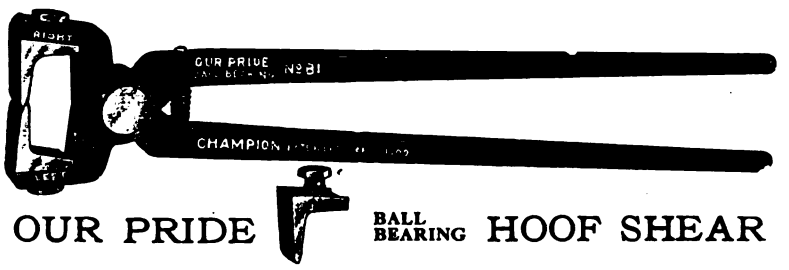


Corrugated Pein.

IT GIVES RESULTS

No. 12 ELECTRIC SHARPENING HAMMER

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.



Blades easily replaced when worn out.

All parts interchangeable.

OUR PRIDE BALL BEARING HOOF SHEAR

Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY - Meadville, Pa., U. S. A.

THE LIVINGSTON CO., 131 E. 23d Street, NEW YORK, Eastern Representatives

PHOENIX HORSE SHOES

Constant Demand is the Best Proof of Their Superiority.

Practical to the Highest Degree. **Made of Unexcelled Material.**

BULL DOG CALKS

Hold Firmly to the Shoe. **Never Jump Out When Set.** **Easy to Drive in Shoe.**

Perfect in Every Detail.

FOR SALE BY ALL DEALERS. **WRITE FOR SAMPLES.**

WE ARE THE LARGEST HORSE SHOE MANUFACTURERS IN THE WORLD.





PHOENIX
Horse Shoe Company

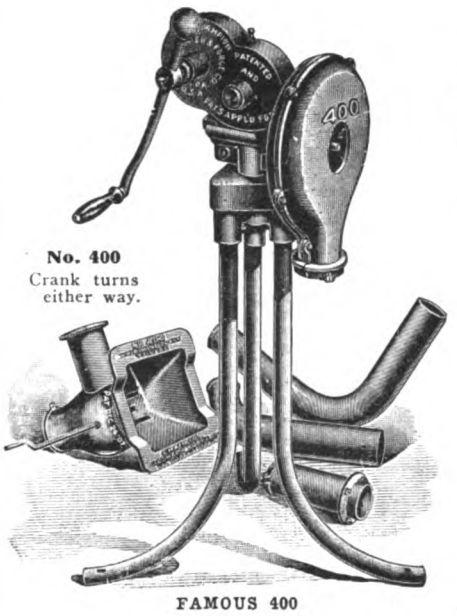
CHICAGO, ILLINOIS

ROLLING MILLS and FACTORIES { **JOLIET, ILLINOIS** / **POUGHKEEPSIE, N. Y.**

Digitized by Google

WORK WITH THE FAMOUS CHAMPION BLACKSMITH TOOLS



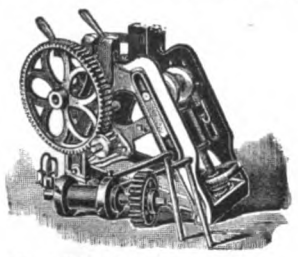


No. 400
Crank turns either way.

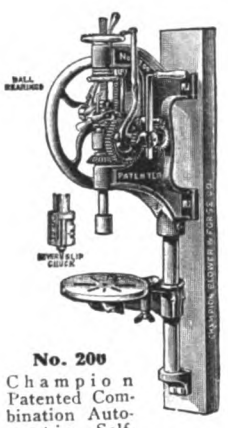
FAMOUS 400

Don't Fail to Get Our 1918 Catalog

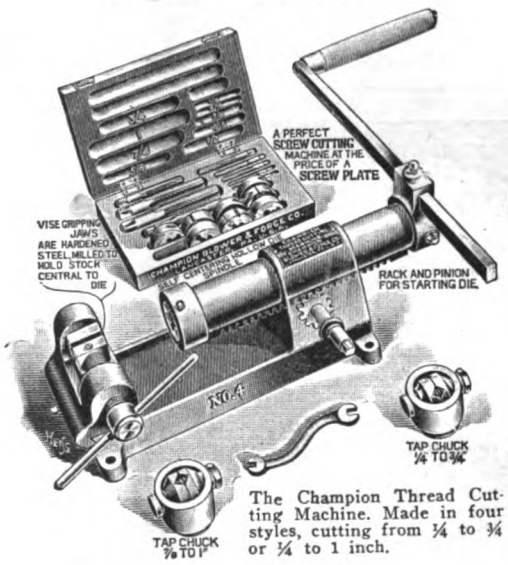
Before purchasing a Hand Blower Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



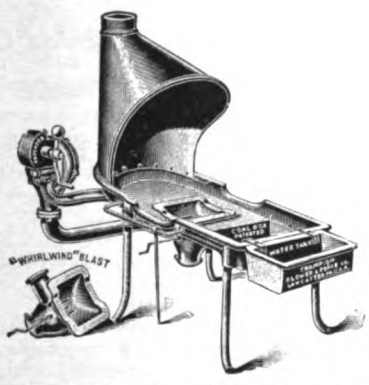
The Champion "Columbian" Tire Bender. Made in 3 sizes.



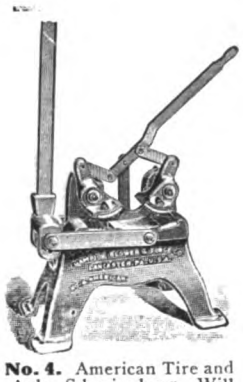
No. 200
Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



The Champion Thread Cutting Machine. Made in four styles, cutting from ¼ to ¾ or ¼ to 1 inch.



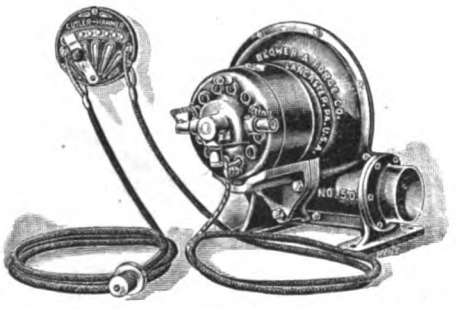
No. 433. Cast Iron Blacksmith's Forge.



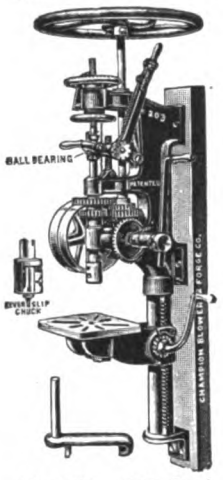
No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



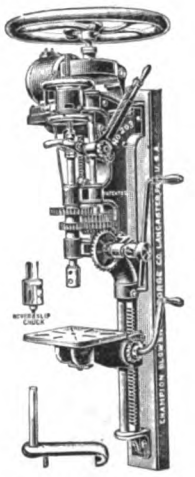
No. 408. Steel Blacksmith's Forge.



No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower.



No. 203. Self-Feed and Double Compound Lever Feed Drill.



No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.



Hercules Patented Power Hammer. Weight of ram, 65 pounds.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

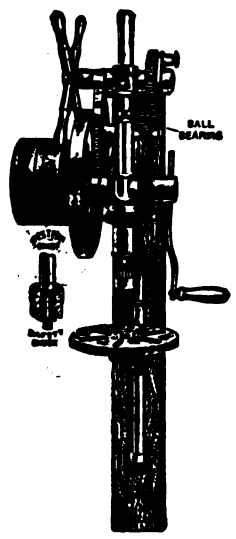
Digitized by Google

The Better Your Equipment The Bigger Your Profits

Buy CANEDY-OTTO

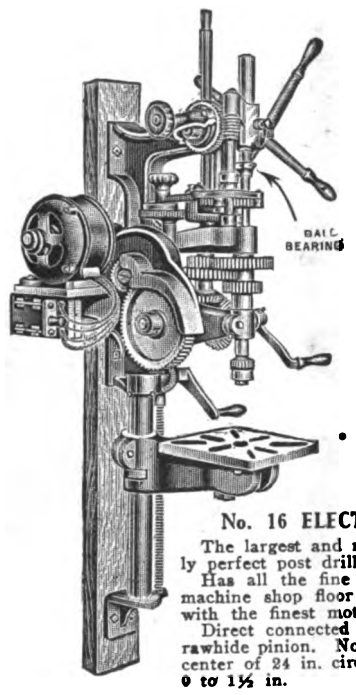
AND INCREASE YOUR INCOME

Once Tried, Always Used : There's a Reason—Quality



No. 19 DRILL

A low-priced combined hand and power self-feed drill.
Drills to center of 10¼ in. circle.

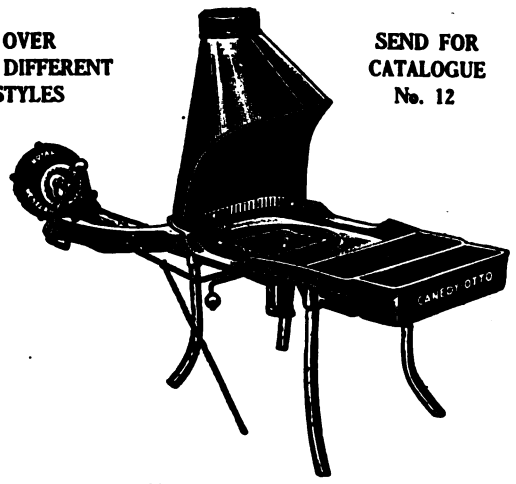


No. 16 ELECTRIC DRILL

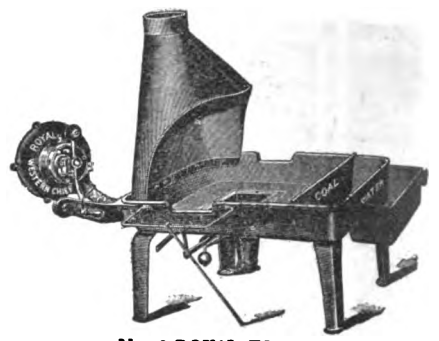
The largest and most mechanically perfect post drill manufactured. Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable. Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1½ in.

OVER 200 DIFFERENT STYLES

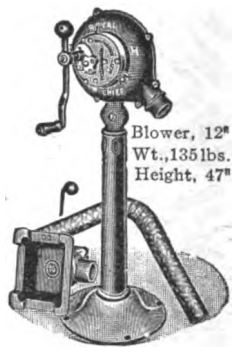
SEND FOR CATALOGUE No. 12



No. 100 ROYAL FORGE
The most popular forge ever made.
Fan, 12 in. Hearth, 31½x45½ in.



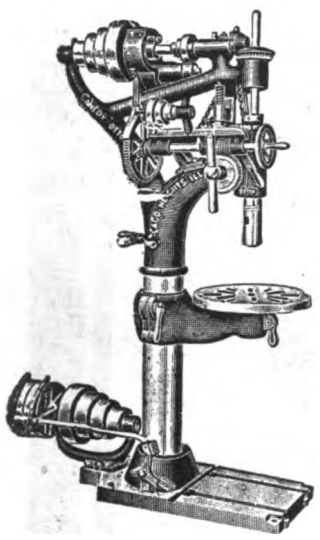
No. 9 ROYAL FORGE
Capacity for the heaviest work. Hearth, 38x50 in. Blower, 12 in.



Blower, 12"
Wt.,135lbs.
Height, 47"

ROYAL BLOWER
(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.
Fire pot is 8x9 in. inside.

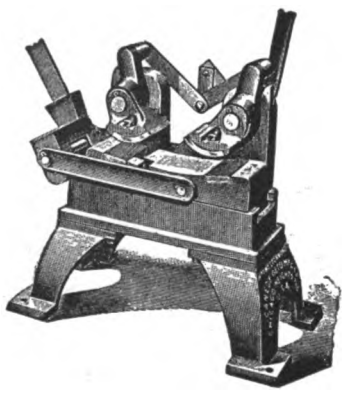


No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.
All machines are tested before leaving the factory, and guaranteed in every respect.
Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.

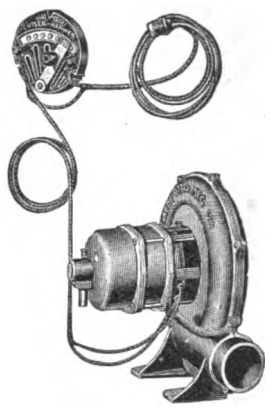
CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"
Forges, Blowers, Drills, Punches, Shears, Shrinkers
CHICAGO HEIGHTS, ILLINOIS



No. 1½ SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



No. 8 ELECTRIC BLOWER

The best outfit money can buy.



E-Z and Crescent Welding Compounds

It Pays to Use Only the Best

For welding axles, tires, springs and lap welding of all kinds, no other compounds give you such uniformly perfect results at low heats as "E-Z" and Crescent Compounds. In all around blacksmith work they have no equals.

"E-Z" works equally well on all kinds of steel. Welds at lower heat. Sticks to the metal. Does not boil away and waste. Leaves no scale.

Crescent is especially good for plow work. Makes perfect welds on toe-calks. Insures smooth finish on split welds, finishing heats, welding under dies, etc.

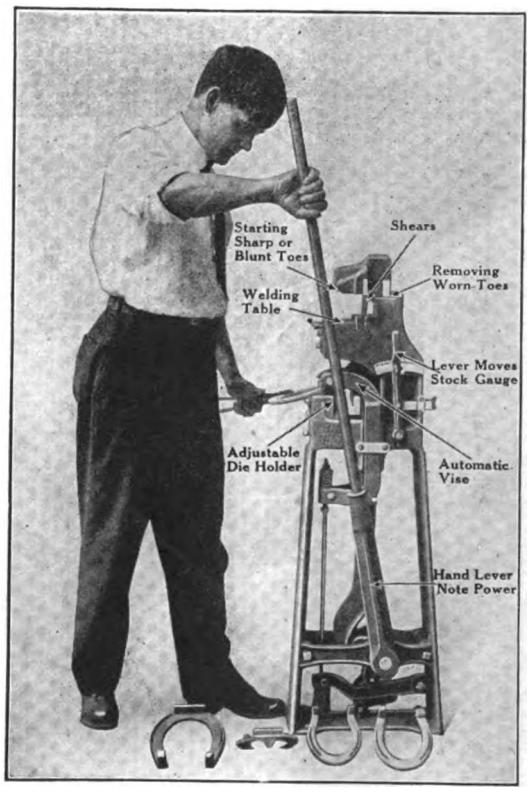
Carried in stock by leading jobbers and dealers in United States and Canada. Your money back if not satisfied.

Write for large free sample.

Anti-Borax Compound Company
FT. WAYNE, INDIANA

1919 MODEL
THE L. S. P. CALKING MACHINE

The Greatest Time and Labor Saving Machine On Earth



1919 MODEL—Fully covered with Patents

OUR 1919 Model is the same as our 1918. We agree with the users and so would you, that it cannot be improved.

Do not mistake this for a machine which makes toe calks or a foot vise. This machine is for turning heel calks, both Blunt and Sharp, sticking and welding toe calks, clipping and trimming ends of shoes. IT CALKS SHOES, doing the work just the same as you do by hand with the hammer, only it is done much better and easier, and in a fraction of the time.

In turning heels, you can turn up just as much stock as you wish, upset or stoveup to make as heavy as you like and square up the calks without use of hammer. There is no losing of toes when you weld on the L. S. P.

It is a strong, handsome, well made machine and will last, as you might say, a life time, fully warranted for one year. It is in use in the best shops in the United States, users claiming more for it than we do.

Write at once for full information and prices.

L. S. P. CALKING MACHINE CO.
P. O. Box 225 WYALUSING, PA., U. S. A.
NATIONAL MACHINE CO., Brighton, Ontario, Canada

Digitized by Google

IF YOU SEE THE (A) THE SHOE'S O. K.



WE BACK UP THAT SHOE

We have steadfastly refused to permit inferiority — or even its suspicion — to influence us in the materials that we use in manufacturing

American Horse and Mule Shoes

We have never permitted inadequate machinery — or cheaper methods — or lower-priced workmen to put a question mark in the records that we make.

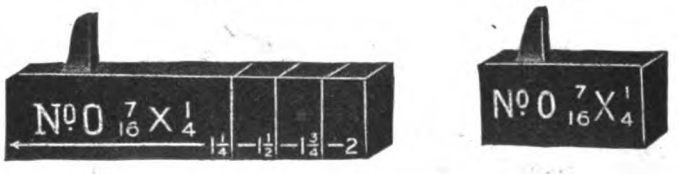
A first-class product always creates a bond of good-fellowship between you and your customers, Mr. Blacksmith, to say nothing of what the horse thinks. It is an endless source of satisfaction all round, and conserves your good name in the bargain.

It is always best to be just a trifle overstocked than understocked. The Heavy Hardware dealer who finds his stock of American Horse Shoes clear down to the marrow is in a bad fix — get your order in today.

Even if you did have two catalogs and misplaced them — you are entirely welcome to the third. Send for it.

American Toe and Heel Calks will stand the keenest competition and reveal the fact that they are MORE than "Just a little better."

BLUNT BLUNT



American Horse Shoe Company

Rolling Mills, Works and Offices

Phillipsburgh - - - New Jersey

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

UNIFORMITY

SHELDON

AXLES AND SPRINGS

HAVE LONG BEEN

INTERNATIONALLY FAMOUS

For Their Superiority In

DESIGN, MATERIALS and WORKMANSHIP.

REASON:

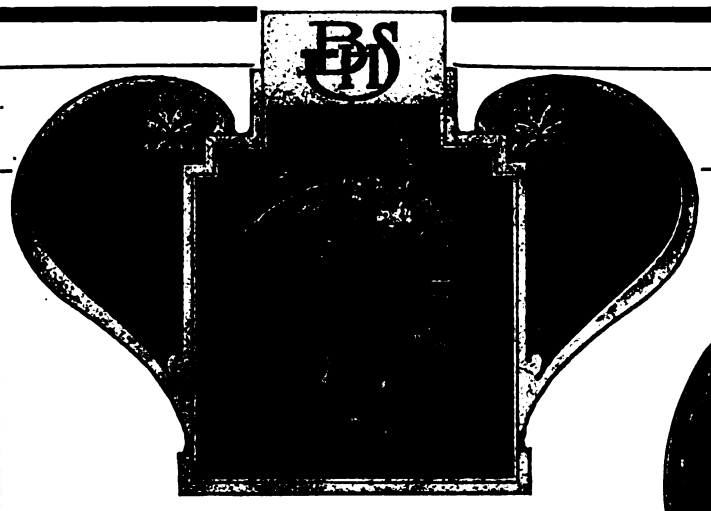
Sheldon Took Guesswork Out of Axle and Spring Manufacturing

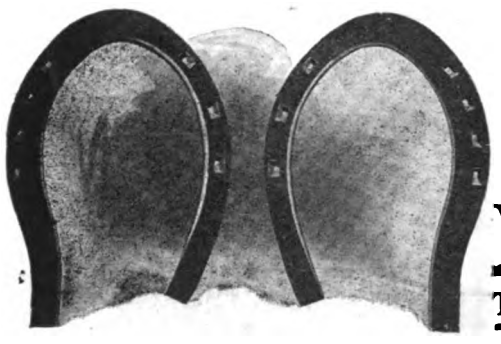
which means

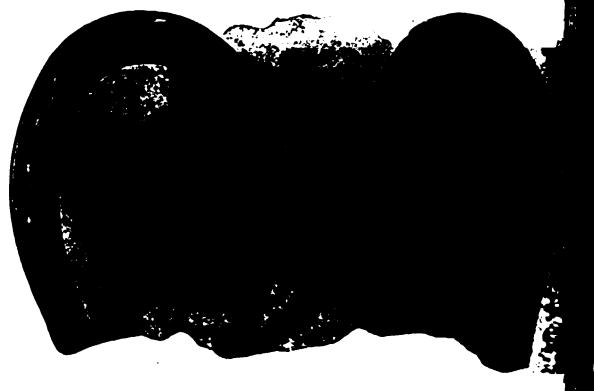
UNIFORMITY OF PRODUCT

Sheldon Axle & Spring Co., Wilkes-Barre, Pa.

THE ART OF HORSESHOE MAKING







WE MAKE SHOES

TO MEET EVERY REQUIREMENT

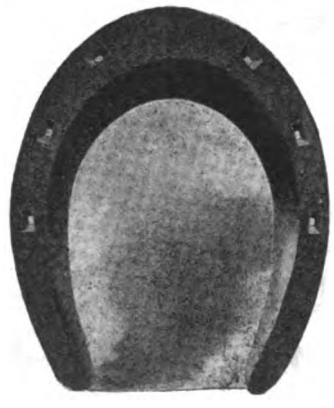
Here Are a Few of Our Specialties

Sideweights—Bryden "C" Horse and Mule
Ideal Calked—Toeweight—Clipped Goodenough

Send for Descriptive Catalog which Shows Our Full Line with Weights, Etc., Etc., Etc.

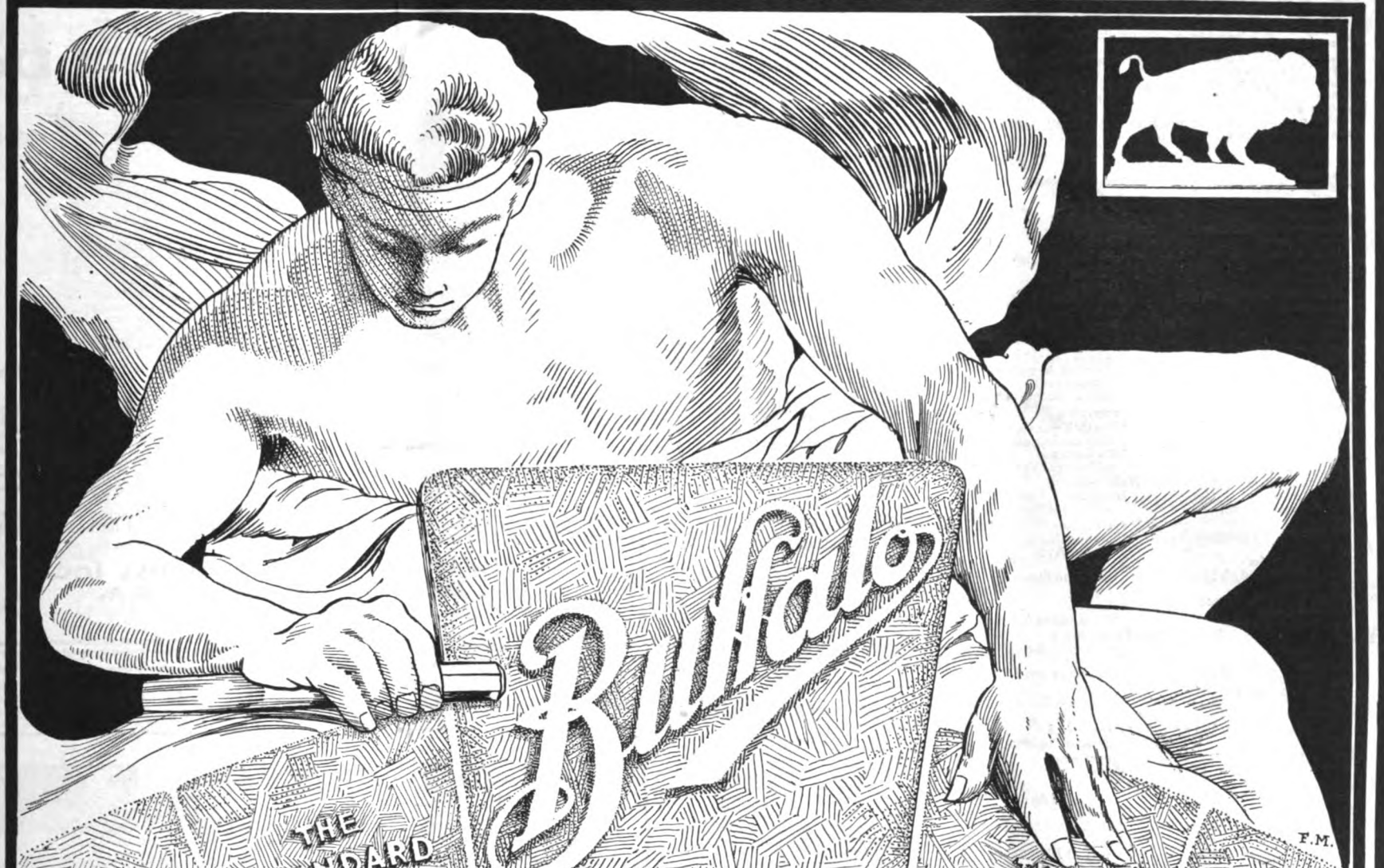
BRYDEN HORSE SHOE WORKS CATASAUQUA, PENNSYLVANIA

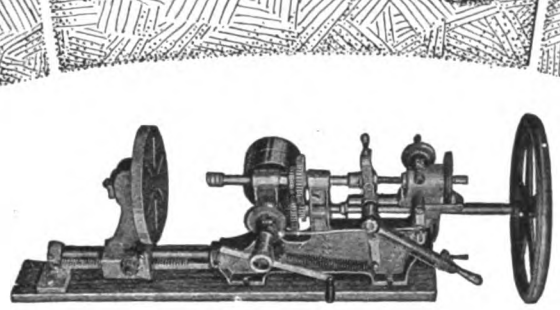


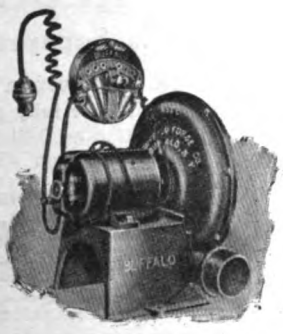


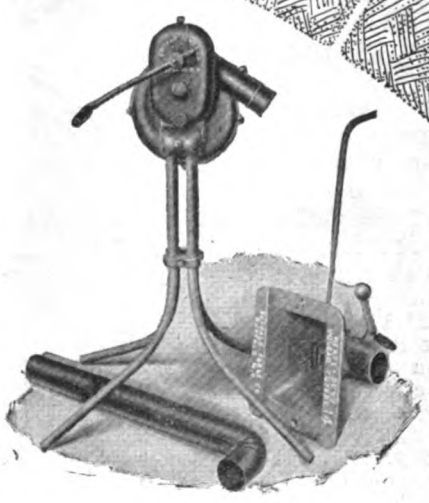


Digitized by Google

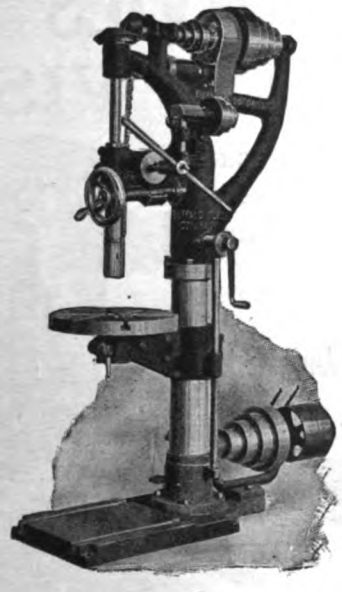








MODERN SHOP EFFICIENCY



BLACKSMITHS AND GARAGEMEN are determined to have the best that may be had in Blacksmith Shop Equipment.

The work of the modern shop demands modern efficient tools—tools that will stand up under severe service.

Forges; electric blowers; drills—floor and post type; shears—for cutting angles, bars and sheets—and of every size from the little bench type hand power shear to the heaviest power shear made—these are the tools you should know about.



Buffalo Forge Company, Buffalo, N. Y.

WRITE DEPT. 6 FOR CATALOG

Digitized by Google

LINDE OXYGEN

From Coast to Coast 65 Producing Plants and Distributing Stations provide an unlimited supply of Linde Oxygen for users everywhere.

LINDE SERVICE means no investment except for oxygen actually received—no expensive overhead or upkeep charges.

Linde Oxygen may be obtained from any of the following Linde Plants and Distributing Stations where a large suppply of charged 100 to 200 cu. ft. cylinders is kept on hand constantly to insure immediate shipments.

Mail or telephone your order to THE LINDE AIR PRODUCTS CO., at the nearest point. **Shipments will be made on day order is received.**

PRODUCING PLANTS AND WAREHOUSES

Alabama
*Birmingham
10th Ave. & 28th St.
California
*Emeryville, Oakland
*Los Angeles
1405 Mission Road
Colorado
*Denver
S. B'way & Exposition Ave.
Connecticut
Hartford
1095 Main Street
District of Columbia
Washington
9th & Maryland Ave., S. W.
Georgia
*Alanta
Plyant St. & Southern R. R.
Savannah
OgeecheeCanal,So.of BaySt.
Illinois
*Chicago
3633 Wall Street
East St. Louis
6th & Walnut Ave.
Peoria
721-731 So. Washington St.
Indiana
*East Chicago
S.E.Cor. Kennedy& 145th St.
Fort Wayne
414 E. Columbia Street
*Indianapolis
2819 Roosevelt Ave.
Iowa
Davenport
118 Harrison Street
Des Moines
117 W. 5th Street
Kansas
Wichita
Rock Island Ave. & 2nd St.
Kentucky
Louisville
128 East Main St.
Louisiana
New Orleans
861 Fulton Street
Maryland
*Baltimore
25th & Montebello Ave.
Massachusetts
Cambridge
26 Waverly Street
Springfield
Napier Street
*Worcester
961 Southbridge St.
Michigan
*Detroit
St. Aubin Ave. & Newton St.
Grand Rapids
Pearl Street by the Bridge
Minnesota
Duluth
Seventh Ave., West
*Minneapolis
1809 Hennepin Ave.
Missouri
*North Kansas City
14th & Charlotte St.
*St. Louis
4218 Forest Park Blvd.
Nebraska
Omaha
1007 Jones Street
New Jersey
*Elizabeth
Linden Ave.
Newark
354 Plane Street
New York
Albany
Montgomery & Colonie Sts.
*Brooklyn
475 Driggs Ave.
*Buffalo
Broadway and Ideal Sts.
*Utica
Walnut & Schuyler Sts.
Ohio
*Cleveland
602 East 72nd Street
*Cincinnati
Stanton & Mellish Aves.
Columbus
310 Dublin Ave.
Dayton
521 E. First Street
Lima
338 East High Street
Ohio
Toledo
441 South Erie Street
*Youngstown
601-621 Jones Street
Oklahoma
Oklahoma City
27 E. Grand Ave.
Tulsa
1 North Boulder St
Oregon
Portland
15th & Hoyt Streets
Pennsylvania
Allentown
211 Gordon Street
Erie
1502 Sassafras Street
*Norristown
*No. Philadelphia
18th & Cambria Streets
Pittsburgh
16th & Pike Streets
*Trafford
Tennessee
Chattanooga
212-238 King Street
Memphis
203 Washington St.
Texas
*Dallas
Harwood and Coombs St.
Houston
Cedar and Baker Sts.
San Antonio
512 Dolorosa St.
Utah
Salt Lake City
112 West Second St., South
Virginia
*Norfolk
82nd St. and Colonial Ave.
Richmond
1709 E. Carey Street
Washington
*Seattle
Henrietta St. & 8th Ave., So.
Spokane
121-123 S. Madison St.
Wisconsin
Manitowoc
810 Quay Street
*Milwaukee
36th St. & National Ave.

(Star) * Designates Plants.

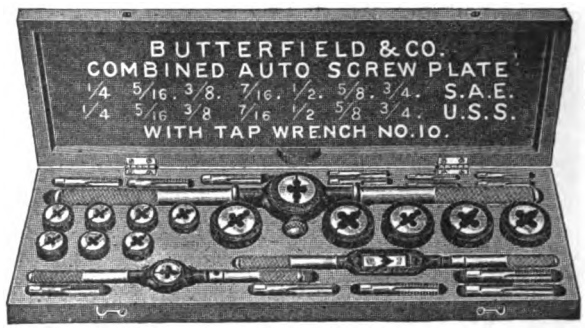
Other Plants and Distributing Stations are planned for other industrial centers throughout the country and will be established as fast as and wherever the local demand for oxygen warrants.

THE LINDE AIR PRODUCTS COMPANY

Largest Producers of Pure Oxygen in America

Forty-Second St. Building **NEW YORK**

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.

New York Store: 126 Chambers Street

THE HORSE RASP OF QUALITY



Ask Your Dealer for the *Improved*

HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, "Slim," "Light," "Slim Light" and "Fine Cut." Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial.

New catalogue mailed free on application.

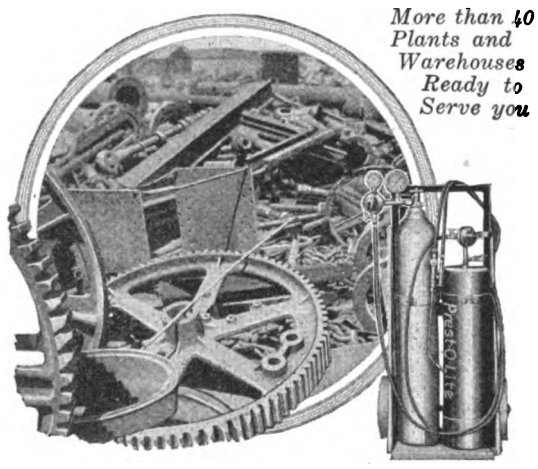
HELLER BROTHERS CO., *Established in 1836,* **Newark, N. J.**

Prest-O-Lite Service Never Depreciates

PREST-O-LITE Service never wears out or grows obsolete and you never can outgrow it.

Of what other manufacturing facility is this true?

Once you subscribe to PREST-O-LITE Service it is yours *for life*—a definite, permanent, transferable right which fits the varying requirements of your business perfectly—as flexible as a sectional bookcase.



Prest-O-Lite

DISSOLVED ACETYLENE

The Universal Gas with the Universal Service

Physically, a self-contained all-purpose unit of ideal form—portable, sturdy, accessible anywhere.

Technically, the one component gas which satisfactorily, simply, and economically performs all heating operations, from the heaviest welding and cutting to the lightest soldering and brazing.

Legally, a clean-cut, life-long obligation which the Company is bound to fulfill. Your rights are transferable any time, to anyone, without notice to us.

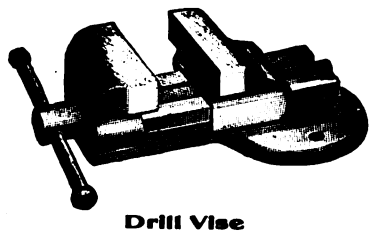
Thanks to PREST-O-LITE's part in the war, our subscribers may draw upon a plant and cylinder equipment not equalled for size and quality anywhere in the world.

Better write us about it—there are ample facilities right near you.

THE PREST-O-LITE CO., Inc., General Offices, 30 E. 42nd St., New York
Kohl Building, San Francisco

126

BICKNELL'S DRILL PRESS VISE



Drill Vise

Holds Rounds, Squares and Flats

Saves its cost every year in drills alone.
Base, bed and jaws fully machined.
Swivels to any position on Drill Table, or can be used as a Bench Vise.

For sale by the jobbing trade.

Write for circular.

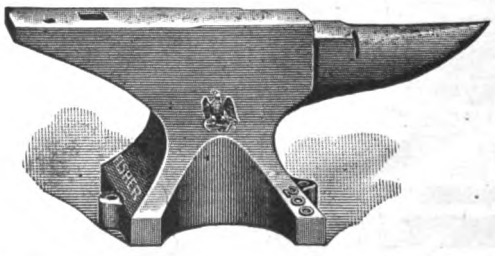
BICKNELL MFG. & SUPPLY CO., JANESVILLE, WIS.

1843 EAGLE ANVILS 1919
AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

THE

BLACKSMITH AND WHEELWRIGHT

Vol. ~~LXXIX. No. 8~~ 80 NEW YORK, AUGUST, 1919 TERMS ONE DOLLAR A YEAR

A Cure for a Suffering World

Help the Movement for the Prevention of Accidents and the Cure of Disease

BY H. C. RIDGELY

THROUGHOUT the world, men and women are beginning to realize that the amount of suffering could be reduced if everyone would join in a movement for the purpose. It is necessary to enter upon such a movement with heart and soul, brain and muscle. It is necessary to teach our children the value of such a movement and have them take part in it.

With complete co-operation of this kind, the amount of good that can be accomplished is incalculable. The millions of accidents which take place daily in every country on the globe could be reduced very materially. There can be doubt about it. Man has always been his own worst enemy. He calls himself his own best friend, but he is not. He is careless of himself and of others. Being careless is not being friendly—just the opposite.

Watch Your Eye

More than two hundred thousand eye accidents occur each year in the United States alone. That figure could be reduced if everyone would take part in the great safety movement which has been inaugurated for the coming year. There is no reason why there should not be a better showing, and there is every reason why the improvement should begin at once.

One means for reducing the number of such accidents consists in the wearing of goggles in hazardous occupations where the eye is likely to be hurt. Why there should be any objection to the use of goggles under such circumstances is difficult to say, and yet many men hesitate to put them on. It seems to be a well established fact that the majority of eye accidents happen to men who actually have goggles but do not wear them when they should.

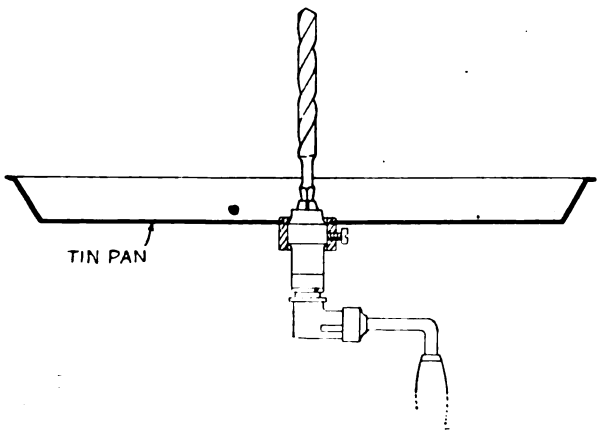


Fig. 1. A Tin Pan Keeps Chips from the Eyes.

One explanation of the widespread objection just noted is that the goggles do not fit or are in some other way unsuited to the individual. If glasses or goggles are uncomfortable, there is always the temptation to lay them aside, and this temptation is yielded to very often just at the wrong moment.

The solution of this problem would seem to be to provide goggles that yield the proper degree of comfort. Then there will be pleasure in wearing them, and the temptation to discard them will vanish. Purchases of goggles should be made from a reliable dealer. Surely the protection of the eye is worth this much consideration.

The work of the blacksmith and wheelwright, although not regarded as extremely hazardous, is one in which care must be taken to protect the eyes. Such protection is advisable even in the simple operations of welding and riveting. Grinding operations also call for similar care. Other instances

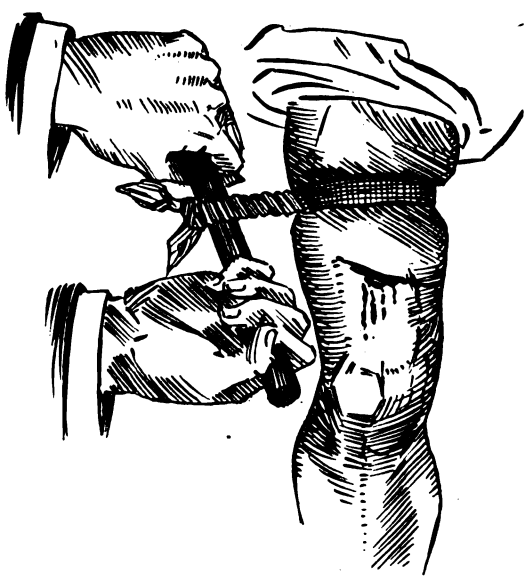


Fig. 2. How a Tourniquet Binds up an Artery.

where caution is expedient are in chipping work, babbitting, the handling of acids, structural iron work of various kinds, and any particular job which common sense points to as more or less hazardous.

Goggle Features

In the selection of goggles there is room for the exercise of discretion. That goes without saying, of course, but we do say it for the sake of emphasis. One feature to which some makers are calling particular attention is the advisability of selecting glass that won't break. That might seem impossible, and no doubt is in extreme cases, but still the impossible can be approached, even if it can never be reached, and there is some consolation in that.

Glass that splinters readily should never be used in the construction of goggles for flying splinters are more dangerous than the flying particles that cause the fracture. Some glass is highly annealed and tough, and will stand pretty severe tests. A fairly hard blow from a hammer has been tried on some of the best specimens without causing fracture.

Valuable tests have been made by the U. S. Bureau of Standards to determine the most desirable qualities of goggles for use by aviators. The conclusions apply also to glasses worn by men in industrial plants. There should be no distortion of view and the percentage of light transmission should be high. One can readily appreciate the importance of clear vision in aviation work, and there are many instances that readily come to mind where various forms of machinery could not be operated with safety if the operator's eyesight is impaired.

When Drilling Overhead Holes

When drilling overhead holes, the device shown in Fig. 1 is found to be an excellent safeguard against falling chips which might get in the eye. The device is in reality an ordinary pie plate attached to the brace in such a way as to catch the falling particles.

The construction is a very simple matter. First, a bushing is made that will fit over the bit chuck, and is provided with an 8/32 inch set screw to hold it in place. This bushing is sweated to the pan at the center, where a hole is made. The pan may be about eight inches in diameter or any suitable size desired.

Such an arrangement is useful when drilling for overhead shafting bearings or for any overhead work of that nature. Where there is a large amount of such work being done, the construction of a chip catcher is a paying investment, as it can be made in spare moments and actually requires very little time or effort to complete.

The Severed Artery

First aid is important when an injured person is bleeding profusely, particularly when a large artery is severed. In that case, the blood is a bright red color and sometimes issues in spurts. Pressure should be applied immediately by means of the fingers and if that is not effective a tourniquet of some kind should be rigged up. A simple form is quickly made from a bandage or handkerchief into

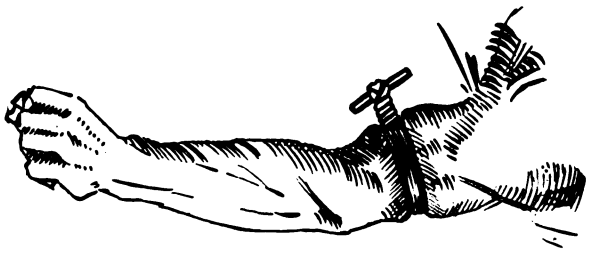


Fig. 3. A Handkerchief Twisted Around a Cut Arm.

which a small stick or metal bar is twisted.

What is known as the femoral artery is an important one in the thigh and calls for immediate treatment when severed. It extends in a graceful curve down along the inner side of the thigh, and is really an extension of the iliac artery of the abdominal cavity. The tourniquet should be applied at once if the patient is bleeding badly, and a physician should be called in as speedily as possible.

In Fig. 2 is shown a tourniquet applied to the thigh in a manner to stop the bleeding of the femoral artery. Any other artery or large veins in the upper part of the leg would be treated in a similar manner. The method of applying the tourniquet to the arm is well illustrated in Fig. 3.



Fig. 4. Ambrine Candle for Cut or Burn.

Digitized by Google

In the case of a deep cut, after first aid has been applied to stop the bleeding, home remedies should cease and the patient turned over to a physician. Applying hydrogen peroxide and similar disinfectants is not always a good thing. Frequently, the physician decides to allow the wound to heal from the bottom; otherwise, the surface may close with very bad conditions inside. The deep wound or cut is plainly a case for the physician.

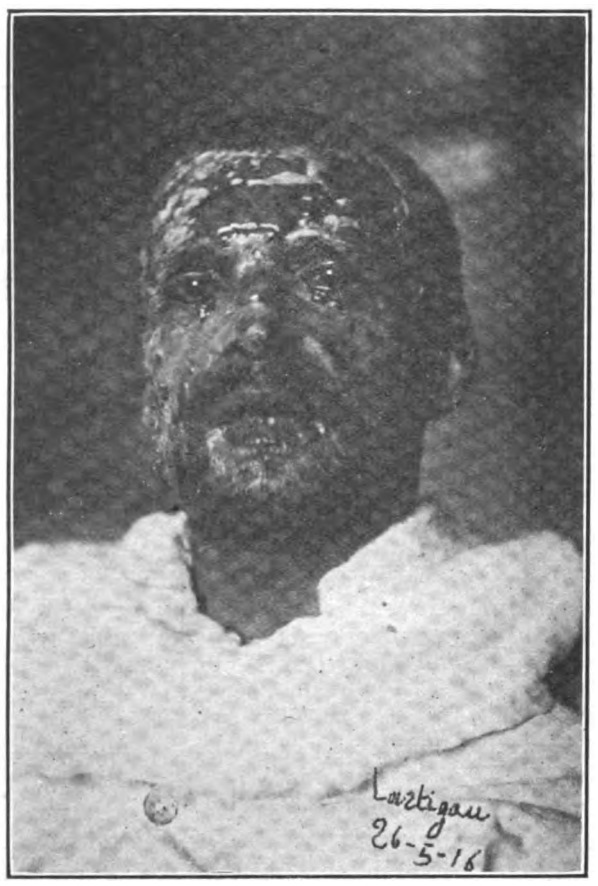


Fig. 5. Severe Burns Treated with Ambrine from Atomizer.

Now and then we hear some wise or unwise man telling how to treat a cut by taking a handful of sawdust from the floor and applying it to the wound. Such a course is absolutely wrong and may cause serious in-



Fig. 6. How the Patient Looked in a Month.

fection. The idea of cleanliness should be kept constantly in mind in all such cases, and no treatment should be resorted to which violates the law of cleanliness.

Gettting low grades of cutting-oil in a wound is a thing to be guarded against if possible. The man who uses wheel grease for a salve or ointment is taking risks. He fails to consider the fact that the grease may have been manufactured from a dead horse and that the horse may have died from the effects of some serious disease. Cutting-oil from machinery sometimes gets in a slight wound and causes soreness. If it does so, the wound should be treated with some disinfectant before serious trouble results. Hydrogen peroxide may be used to advantage if the wound is not deep.

Treatment of Burns

For the treatment of burns, stock solutions of linseed oil and lime water are always kept on hand at the drug stores. It is often referred to as Carron oil, and is a mixture of equal parts of the two ingredients. Vaseline, olive oil, or sweet oil are also used, and give very good results.

Baking powder in solution is often applied by drenching a cloth with it and wrapping the burnt part. Over this, soft linen gauze or an antiseptic compress may be placed, and the whole bandaged.

Burns are divided into three classes, according to their severity. The first class includes cases where the flesh is reddened but not blistered to any extent. The second class includes cases sufficiently severe for the formation of well defined blisters. In the third class or degree, there is more or less charring of the flesh, both the outer skin and the underlying tissue.

The form of treatment will vary somewhat in the three classes. Burns of the first and second degrees, unless they cover considerable surface, are not apt to be of a serious nature. If a third or half of the entire body is affected, the case is serious and may even result in death.

Burns of the third degree are usually the most dangerous, but depend largely upon the size and position. There is usually quite a shock accompanying such burns and death may result in from twenty-four to forty-eight hours. The healing of third degree burns is by the process known as granulation. Considerable deformity of the part may be caused by the contraction of the tissue.

The severe pain which usually accompanies burns is due to the exposure to the air of the very fine nerve ends which terminate in the skin. Exclusion of the air is one of the main objects sought in the various forms of treatment.

In burns of the second degree, where large blisters are formed, it is considered best to puncture the skin and let out the fluid. A clean needle should be used, after first sterilizing it by passing it through the flame of an alcohol lamp.

A New Dressing for Burns

Rather a unique dressing for burns and various kinds of wounds is a form of wax that is melted and allowed to harden on the flesh. It is known as ambrine and was used extensively in the treatment of burns caused by liquid fire, explosions, and accidents in the war zone.

In its simplest form, ambrine is made up into a candle, which is lighted and held over the burn or cut. As the melted wax runs down on the flesh, the end of the candle may be used to spread the dressing out into a thin sheet. The candle form is intended for emergencies and is most readily applied to slight burns or wounds.

In Fig. 4 is shown the ambrine candle, from which the wax is dropping down onto the hand. This does not burn the flesh, for the reason that the wax melts at a low temperature, which is about 120 degrees Fahrenheit.

Another method of applying the dressing is to melt the substance in a small container held over a flame. The temperature in that case is raised to about 150 degrees, which is not sufficiently hot to burn. A brush may be used to spread the melted wax into a thin sheet.

Still another method of application is by the use of an atomizer. The melted ambrine is spread in this way to the proper depth, which is merely a thin laver, and then may be covered with medicated absorbent cotton. A second layer of the melted or atomized ambrine may then be applied, and the whole allowed to harden into a substantial dressing.

Fig. 5 shows a patient who was badly burned about the face and hands and who had his burns covered with the ambrine dressing. The ambrine was applied in patches by means of the atomizer, and before each patch had time to dry it was covered with a thin layer of absorbent cotton and again sprayed.

Fig. 6 is from a photograph of the same patient a month later. The flesh had healed except at a few points where the burns had been deepest. Comparatively little pain was experienced, as the air was excluded entirely, sight is impaired.
and it is exposure to the air which causes much of the pain from burns.

Fig. 7 shows the same patient practically well, just ten weeks after his first admission to the hospital. The face appears normal and is free from scars. The hands have not quite recovered, due largely to the fact that the patient could not be induced to keep his fingers still.

Absence of Scars

The dressing showed no tendency to stick to the newly formed flesh, and this in itself is a good recommendation for the method of treatment. With many forms of dressing, the flesh is torn at each treatment, and this fact alone is responsible for many of the scars that accompany severe burns.

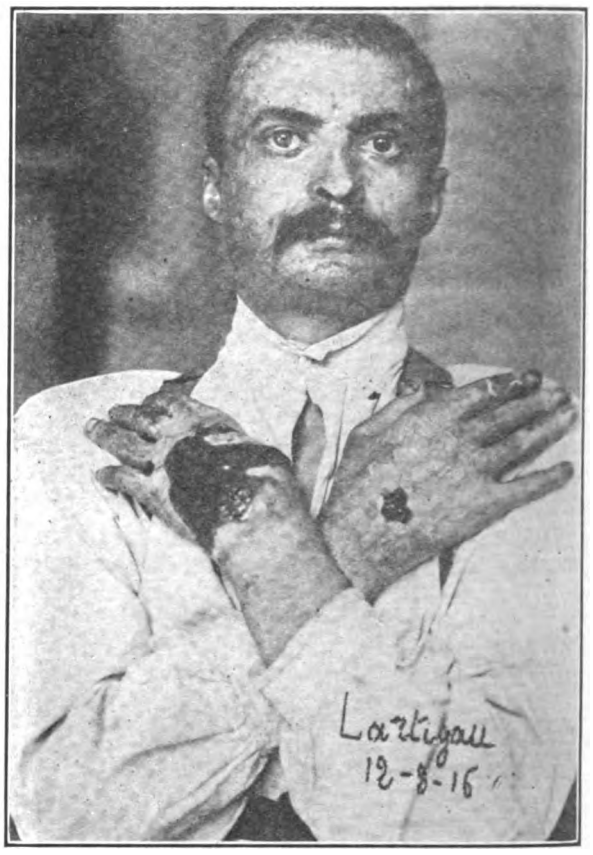


Fig. 7. Practically Well Ten Weeks After Accident.

Dr. Barthe de Sandfort, of France, is the originator of the new method, which has been tried in thousands of severe cases, not only of burns, but cuts, lacerations, amputations, frostbites, bruises, sprains, boils, and many forms of skin affections.

A dozen years of experimenting with paraffin and other forms of wax preceded the final adoption of the compound that has received the name of ambrine. Success was at last attained, and when the war broke out, Dr. de Sandfort saw the opportunity to apply in practice the theories which had been developed with so much patience.

He took charge of a hospital at Issy-les-Moulineaux, and from the very start the results obtained were most gratifying. Comfort was given to patients who had been suffering the most terrible agony. Many are the soldiers who can thank Dr. de Sandfort that they are not scarred for life and that their sufferings were reduced to a minimum.

The hospital soon became renowned throughout the world, and physicians journeyed there from long distances to study the new methods and witness the wonderful cures that were wrought. In this way ambrine became known in the chief countries on every continent. It is now manufactured and be-

Digitized by Google

ing put on the market in large quantities in the United States.

The Splinter Beneath the Nail

One of the most painful and annoying things is to have a splinter under the finger nail. Sometimes pus gathers in the wound and may lead to blood poisoning if all particles of the splinter are not carefully removed. It is not always an easy matter to get at a particle of foreign matter that has penetrated far beneath the nail. A convenient method sometimes used is to scrape the nail thin and then cut out a V-shaped piece, close up to the flesh. This can be done readily by working the flesh loose from the nail by means of a knife or sharp pointed instrument of any kind.

When this has been done, the splinter can be reached for more readily than if the nail had not been cut in the manner described. In removing the splinter, an ordinary penknife is often the most convenient means at hand. A needle or a pair of fine pincers are also convenient implements to have on hand for such purposes.

Counteracting a Poison

What to do in the case of poisoning is important to think about before the occasion arrives. Of course, it is not always possible to determine beforehand just what the circumstances will be, so that all that can be done is to form general plans which may be modified for particular cases.

In the case of carbolic poisoning, the most effective cure is alcohol, administered as whisky or in some other form. Care must be exercised not to give wood alcohol by mistake, as that would be simply adding one poison to another. Now that there is a ban on whisky, it is hard to say just what difficulties will be placed in the way of this form of treatment. Why so many persons who attempt suicide should select carbolic acid is a mystery, for it is one of the most painful deaths imaginable.

When a case of poisoning has been discovered, send for a physician immediately, and if possible have the messenger tell the physician the nature of the poison taken. Then apply the first aid relief. Usually it is desirable to produce vomiting as quickly as possible. Luke-warm mustard water or warm salt water are good emetics. These should be given in large quantities. Dish water and any kind of soapy water are also good. It is well to tickle the patient's throat inside, by means of a feather or similar object. The vomiting should take place several times, but must be stopped before the patient is exhausted.

This may be followed by a soothing liquid, such as a little milk or raw eggs, preferably beaten. If an acid poison was taken, a tablespoonful of hartshorn in two cups of water makes a good antidote. Other antidotes are soda, chalk, plaster, whiting, lime, magnesia, or even a mild solution of wood ashes.

Treatment for Electric Shock

If the person shocked is still in contact with the wires, the first thing to do is to disengage him, and this calls for skill. If possible, the current should be turned off at once. If it is not possible to break the circuit, then the rescuing party must work carefully and stand on dry boards or other suitable insulation. A dry cloth or rope may be used to pull the patient away from the wires, or with the proper care his clothing may be taken hold of, but in no case should his hands be grasped, nor should his face or any other portion of his bare flesh be touched.

When the patient is free from the wires, artificial respiration should be resorted to. If a pulmotor is at hand, it can be used to advantage, but if not the arms may be worked slowly back and forth above the head and down again to the sides. Striking the soles of the patient's feet has been found to be an excellent method to pursue when restoring him to consciousness. Hot water bottles may be used to keep the patient warm or blankets may be wrapped about him.

Practical Horse Shoeing

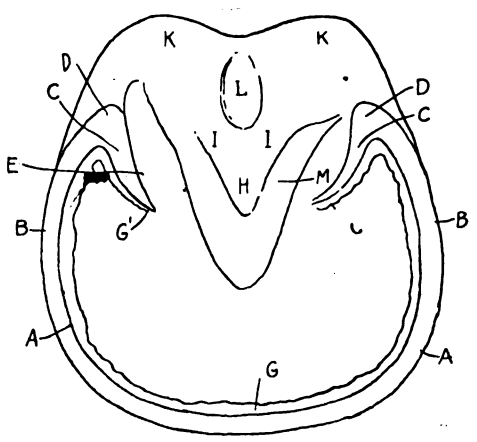
A Careful Study of the Horse's Foot Can Be Made After Removing the Horny Capsule

General Review

BEFORE going on, it will be well to pass in review some of the more salient points which have been under consideration. The bones of the foot may be reckoned as seven in number. Starting from the upper part, they are: (1) the lower end of the cannon bone, (2) the upper pastern bone, (3) and (4) the two sesamoid bones, (5) the coronary bone, (6) the coffin bone, and (7) the navicular bone.

There are three articulations: (1) the fetlock joint, involving the cannon, the upper pastern and the two sesamoid bones—four in all; (2) the coronary joint, involving the upper pastern and the coronary bones; and (3) the coffin joint, involving the coronary, the coffin and the navicular bones. All three joints are more or less hinge-like, the fetlock joint being especially so, and consist of one or more convex surfaces above, working in concaves below.

There are many ligaments whose duty it is to hold the various bones in place, while nevertheless permitting them to make their proper hinge-like movements. Three are capsular ligaments which envelop the several joints more or less after the manner of a sheath. There is also a special ligament which binds the two sesamoid bones together. Then there are side, or lateral, ligaments at all the joints, one on the left side of the foot Ultimately, this impure blood goes to the lungs where it is purified by the action of the air that is breathed by the horse. Life itself depends upon the continuous, uninterrupted action of the pump, which is the heart; of the lungs, which are the purifying apparatus; and of the piping, which consists of veins and arteries.



Under Surface of Right Fore-Foot. Bearing Surface of Toe is from A to A; Bearing Surfaces of Quarters Extend from A to B, on Each Side; Heels, from B to C. D Shows Commencement of Bars; E, Lateral Aspect of Bars; G, White Line, Extending to Bars at G'; H, Horny Frog; I, Bulb or Glome of Frog; K, Bulb of Heel; L, Median Lacuna of Cleft of Frog; M, Lateral Lacunae of Frog.

The blood must circulate and keep on circulating. Otherwise, the horse dies. However, a rupture or other injury to a tube carrying blood *to* the heart, generally termed a *vein*, is apt to be much less serious than a similar injury to a tube carrying blood *from* the heart, this tube being usually termed an *artery*. In general, the arteries are smaller in diameter, have thicker walls and are less numerous than the veins. Usually, they are more deeply set in the body. Unlike the veins, they have no valves.

The smaller bore, thicker wall and deep position are Nature's provisions against rupture from the strong current flowing from the heart and against accidents from the outside world. If the finger (not the thumb, however) is lightly pressed on a blood vessel, there may be noticed a slight throb repeated regularly. If so, then this blood vessel is an artery. If an accident has occurred and blood is flowing from a ruptured tube, the last is an artery if the blood flows in jerks and is also a bright red.

The flow from a severed vein will be steady and the blood will be a darker shade. In the case of a dead horse, the veins will generally contain blood while the arteries are empty. They were thought to be tubes carrying air, prior to the time of Harvey who discovered the circulation of the blood about three centuries ago.

In addition to the veins and arteries there are fine, hair-like tubes which occur at the outer ends of arteries. The blood is urged along by the heart's action, the fluid portions escape to some extent through the thin walls of these little tubes and supply to the tissues material necessary to them.

The horse's foot is well supplied with blood vessels. The only parts of the foot not so supplied are those made up of horny tissues. But the parts which produce these horny tissues are more than ordinarily well supplied with blood. The arteries are largest at and near the heart. As they continue their course away from the heart, they divide and branch and grow smaller and smaller. Similarly, the arterial walls are thickest near the heart and thin as they become more and more distant. Naturally, then, one will expect the arteries in the foot to have declined in bore and thickness of wall because of the distance from the heart.

The movements of the horse's foot are brought about by contractions of muscles. All of these muscles are distant, being located above the knee or the hock. They transmit their pulls by means of tendons. The tendons which operate to extend bones —that is, to make them reach forward—are located principally on the anterior, or front, faces of the bones and are called extensor tendons. Those which operate to bend bones backward are arranged to the rear and are termed flexor tendons. The foot has three principal tendons, one extensor and two flexors. The anterior extensor tendon runs down the front faces of the cannon, the upper pastern and the coronary bones and secures final attachment to the coffin bone. It covers all the joints. Two lateral tendons coming down from above join it, on the right and left sides of the leg between the fetlock and coronary joints.

Counting all three as the anterior extensor tendon, one may say that this tendon is attached to five of the seven bones involved in the foot. That is, it is attached to both sesamoid, to the upper pastern, the coronary and the coffin bones, but not to the navicular bone.

The fore-foot has a special anterior extensor tendon which is attached to the upper pastern bone. On the right fore-foot, it lies to the right of the main anterior extensor tendon; and on the left fore-foot, to the left of it.

The flexor tendons are two in number—the superficial flexor tendon and the deep flexor tendon. The superficial tendon has a short section just back of the fetlock joint where it is tubular, and the deep tendon passes through this tube. The superficial flexor tendon is attached to and flexes the upper pastern. The deep flexor tendon is attached to and draws backward the coffin bone.

Finally, there are several ligaments, which hold tendons in place. Thus, the superficial flexor tendon is held, back of the fetlock joint and a little lower down, by ligaments which envelop it; while the deep flexor tendon has a ligament covering its lower extremity.

Special Tissues in the Foot

We come now to some important tissues in the foot of the horse. I mention first the two lateral, or side, cartilages and the frog. "These are peculiar to the horse, and do not occur in the same form in the foot of any other animal. They, therefore, make the horse's foot different from all others."

Cartilage is a rather firm, white tissue of close grain. It is quite tough. It contains no nerves or nervous tissue, and is, accordingly, insensible to stresses and blows, and

Digitized by Google

is consequently free from all pain. Cartilage is flexible and elastic. By "flexible" reference is made to the capability to bend easily; and by "elastic," to the capability to regain its normal form and size when released from pushes and pulls. The long external ear of the horse and mule consists of cartilage. The surfaces of the foot joints, particularly, the portions which come into contact with other surfaces, are covered with cartilage.

Elastic tissue when seen under the microscope, is disclosed as consisting of fine fibre which are conjoined in a kind of network. Sometimes, elastic tissue will occur in an animal in the form of a bundle, and sometimes in the form of a cord or band. Sometimes, it will form the whole tissue. If one of the fine fibres is broken, it curls up. A larger fibre if pulled will, when released, fly back to its normal position, bending this much like a strip of rubber. Elastic tissue itself contains no nerves or nervous tissue, although it may be more or less closely associated with such sensitive material.

There are two lateral cartilages to the coffin bone, one on the right and the other on the left. They thus appear as if they were prolongations of that bone in the upward and backward directions. They rise to a level above the center of the coronary bone. Each is, in front, attached to the anterior extensor tendon, and also to the coffin bone. The cartilages are likewise attached to the frog. At the rear, the cartilages reach beyond the coffin bone and bend somewhat towards each other.

The Frog

The *frog* is a cushion. Indeed, it is very properly called the "plantar cushion" by some. It covers, underneath, the central portion of the rear two-thirds of the sensitive "sole" of the foot. It consists principally of yellow elastic fibre and white fibre. Associated with these fibres are fatty cells scattered throughout the general mass. It lies next to the horny frog which is exposed to examination of anyone desiring to observe it.

Next to the frog, on the inside, is the deep flexor tendon. However, the frog has a certain extent of attachment to the coffin bone. It is a heart-shaped affair, one end being quite large and the other tapering to a point. The thick end is set to the rear. The right and left halves of the rear part consist of bulb-like forms. They are very soft, and provide cushions to the bulbs of the foot. Each bulb of the frog is connected by a strong elastic cord with the lower end of the upper pastern bone. These cords have been called the suspensory ligaments of the bulbs. The frog is held in place largely through its attachment to the coffin bone, but also, in part, by means of the elastic cords mentioned and other tissues.

Blood Vessels of the Foot

The horse, as well as animals in general, resembles man, in that it is provided with a system of tubes connecting with the heart. These tubes extend all over the body from the head to the feet. The heart is a pump which compels the blood to flow to the outlying parts of the body and to return. Further, the pump causes blood to flow to and return from the lungs. The blood flowing from the heart to outlying parts of the body is pure and possesses a bright red color. The blood returning is distinctly inferior in color. It is in fact carrying waste materials.

The Skin

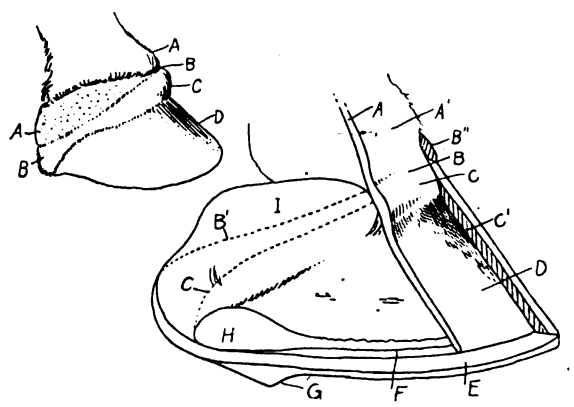
Just as with other animals, the horse has a skin over pretty much the whole of his body. This extends down fore and hind legs, covering the bones, ligaments and tendons of the foot. In fact, it covers even the coffin bone, although it is in this region invisible, being itself covered by the horny-hoof.

The visible skin is ordinarily covered with hair. It consists of three layers: (1) the epidermis, (2) the leather-skin (the dermis), and (3) the sub-cutaneous tissue. We shall not tarry long with these. The epidermis is so called because it lies *upon* the dermis, the Greek word *epi* meaning upon. • There are in the epidermis no blood vessels nor nerves. It consists of horn-like cells or scales which lie side by side and form a thin, uninterrupted layer. It is a protective sheath for the horse's body. Abrasions and the like which do not quite pierce through it are usually unimportant. No nerve or blood vessel is thereby ruptured. However, it is possible through pressures or flat blows to injure underlying parts without breaking open the epidermis. But, if blood appears, one may know that the epidermis has been pierced all the way through. If nerves are exposed, one reaches the same conclusion that the epidermis has been torn through. However, it may not always be so easy to determine whether nerves are actually exposed. Just a tenderness would hardly be sufficient, as that might be caused by a broad, flat blow which did not open up the epidermis.

Actual piercing of the epidermis is not to be disregarded, even though the opening may be a small one. Big or little, it is an avenue through which all kinds of trouble may enter from the outside world.

The dermis, or leather-skin, is made up of solid, fibrous and elastic tissues. There are in the dermis many blood vessels, nerves, sweat glands, oil glands, and hair follicles. This layer may be converted into leather when given the proper treatment—hence one of its names. To the rear of the fetlock joint is a horny spur surrounded by a tuft of long, coarse hair known as the footlock. In the case of high-bred horses, this tuft will often, or generally, be smaller and of finer hair.

The epidermis is produced by the underlying dermis. The outer flakes of the epidermis are constantly becoming loose and are dropped or carried off. New cells or scales



The Small Figure Shows a Foot with the Horny Capsule Removed. A is the Corium, on which are Hairs. B is the Perioplic Ring; C, Coronary Band; D, Sensitive Wall. The Large Figure Shows Foot from which Parts of Horn Wall and Sensitive Structure Have Been Removed. A' is the Hairless Part of Corium; B Indicates the Perioplic Ring, and B' the Upper Border of Same; B", Section of Perioplic Horn; C', Section of Wall at Toe; C, Upper Border of Coronary Band; D, Sensitive Wall; E, Horny Sole; F, White Line; G, Horny Frog; H, Planter Cushion; I, Lateral Cartilage.

are just as constantly being formed on the upper surface of the dermis and relinquished to the under surface of the epidermis. That is to say, the epidermis is continually losing material from its outer surface and just as continually gaining material at its under surface. The epidermis has no "feeling" of its own, because when the dermis gives up cells to it, it does not follow them up with extensions of nerves.

The third layer of the skin, the sub-cutaneous tissue, consists of a loose, fibrous material connecting the under surface of the dermis with the tendons, ligaments and bones. In parts of the body where there are muscular layers—as in the leg above the knee or hock—it also connects the muscular tissue with the dermis. In the foot, however, where there is no muscular tissue, it is only the tendons, ligaments and bones, and the like, which are connected to the dermis in this manner. The sub-cutaneous tissue is that loose fibrous mesh or network which is cut through in removing the hide from the carcass.

The Hoof-Skin

So much for the skin in general. Where it disappears from sight and envelops the coffin bone beneath the horny covering called the hoof, the skin is termed the *hoof-skin.* This hoof-skin calls for the horseshoer's very particular attention, because of its close relation to his work. It is an extension of the dermis. The horny layer of the hoof corresponds to the epidermis. Otherwise, there is no epidermis. The sub-cutaneous tissue is wanting everywhere in the bottom of the foot where the hoof-skin covers the coffin bone. Further, the hoof-skin has no hairs, nor oil glands, nor sweat glands. Instead of hairs, there are small projections resembling threads. These are called *villi.* On the outer surface of the hoof-skin are thin, fleshy layers which are of a sensitive nature. When a horseshoe nail goes astray and passes all the way through to the under surface of the horny hoof, it causes pain by coming into contact with these sensitive layers. These layers constitute what is sometimes called the "quick." Just as the epidermis is a surface production of the dermis, so is the horny hoof a production of the underlying hoof-skin.

The horseshoer may want to study the hoof-skin by means of an actual example. If so, let him secure a horse's foot or the lower part and then remove the horny layer constituting the hoof. This is accomplished by permitting the whole to decompose, in part. This will occur in about a week, if the foot is left in a place where the temperature will remain about that of an ordinary room. The hoof may then be taken off without injury to the underlying hoof-skin. The hoof-skin itself consists of several parts, five in all.

(1) There is the *perioplic band.* This is a narrow ridge of material only about 1/5 or ¼-inch in width. It forms the upper edge of the hoof-skin. The ordinary skin, covered with hair, extends down to the perioplic band. Then comes this perioplic band, and then the coronary furrow. This is a depression or groove. The perioplic band has its highest part on the front. Here it is also a little wider than at average points. Further, it is distinctly wider at the point which may be called the heels. It is to be understood that the narrow perioplic band is not everywhere at the same level. In fact, it runs on both sides backward and downward from the high point in front to the bottom of the rear of the foot, where it passes over the bulbs of the heels and ends in the velvety tissue of the fleshy frog. It has a slightly glistening appearance. The thread-like projections already mentioned—the villi—are everywhere to be seen on its surface. These are short, like the hairs on a man's face some hours after a shave. They may be as long as 1/12-inch, and they may be only half that length.

Attention has already been called to the fact that the horny hoof is an outgrowth of the hoof-skin. Naturally, the various sections of the hoof-skin severally produce corresponding parts of the hoof. The reader will, accordingly, be prepared to understand that the perioplic band produces the soft horn of that part of the hoof which overlies it. This part of the hoof is called the perioplic ring. The two parts are not to be confused. The ring is horn. The band is a part of the hoof-skin. Further, the outside layer of the hoof is due to the perioplic band, although it extends over the whole horny wall. How it is able to do this will be explained later on.

(2) The *coronary band* is another narrow strip. It extends along with the perioplic band. In front, at least, the position of the coronary band is that of a front wall while the position of the perioplic band is that of a roof. The coronary band is not a perfectly plain band, but is somewhat rounded or convexed, especially in front. As it runs backward and downward, under the perioplic band, it flattens. It is thick with villi, which are longer here than on the perioplic band. The coronary band or cushion is, for a part of its length, about 4/5-inch wide; but, at the bulbs of the heels, where it extends forward and inward to near the top of the fleshy frog, the coronary band narrows to 1/3 or ½-inch. This narrowed part is termed the *bar portion of the coronary band.*

The coronary band produces the larger part of the horny wall of the hoof, but not the perioplic ring. The middle layer of the hoof is the part which comes from the coronary band.

(3) The *fleshy wall* is all that part of the hoof-skin which is overlaid with fleshy leaves. These fleshy leaves lie close together and form parallel rows. They extend in straight lines down from the coronary band to the bottom edge of the coffin bone. The general surface is not smooth.

Digitized by Google

General Utility Body

Easily Made in the Shop



EVEN the blacksmith who is not regularly engaged in the construction of new wagons has an opportunity now and then to make to order a body of special design. Therefore, it is well to keep abreast of the times and to absorb all the ideas upon the subject that it is possible to secure. You may not wish to construct the new body precisely in accordance with the design which you have seen, for your customer may wish a combination of features not often ordered.

Some blacksmiths keep a scrap-book in which they paste drawings and descriptions of wagons. A prospective customer can inspect such a record and talk more intelligently about his plans than if they were carried entirely in his head. It is not always an easy matter to make a clear statement about construction work. The customer may think that his descriptions are understood, and the listener may think that he understands them, and yet when work actually begins the two men may discover that they are as far apart in their ideas as the North Pole is from the South.

Possibly you will consider the wagon body illustrated below worthy of a place in your scrap-book, or if you do not keep such a book perhaps you will wish to keep a file of back numbers of BLACKSMITH AND WHEELWRIGHT and will place this number in your file. The body shown is of the general utility type; that is to say, it can be used for various purposes, according to the requirements of the purchaser. It is of the tilting type, as you will note, and it is well balanced, in order to make the dumping operation an easy one.

At *A*, of the figure, is shown a side view, the dotted lines indicating the position assumed when the body is tilted. The truck framing is made to limit the slant. The dimensions are chosen to suit the requirements and can be adapted to any style of truck.

B is a sectional view on line *F* in *A*, looking in the direction of the arrow. *G* is a plate bolted to the body and has projecting pins on which the body rests. A front view of *G* can be seen to better advantage in part *A* of the drawing.

C is a sectional view on line *E* of the side view *A*, the body being shown in the normal position. The channel irons of the truck are indicated in cross section, and are seen to support a casting, *J*, on which the forward end of the body rests when horizontal. This casting is indicated also at *J* of Fig. *A*.

D is the plan view of the body, and shows the lugs *G*, or plate with the projecting pins. To save space in the illustration, a part of the body is shown cut away in this view.

The bearing plate *H* is bolted securely to the chassis frame and consists of heavy casting extending the width of the body, as shown in Fig. *B*. An end view of the bearing casting may be seen at *H* in Fig. *A*. The strengthening ribs make the bearing additionally stout and secure.

At *K* is shown a pin for locking the body securely when horizontal. This pin passes through a plate attached to the body and penetrates the casting *J*, or a lug that is cast on it for the purpose. The position of *K* may be seen from the two views *A* and *C*.

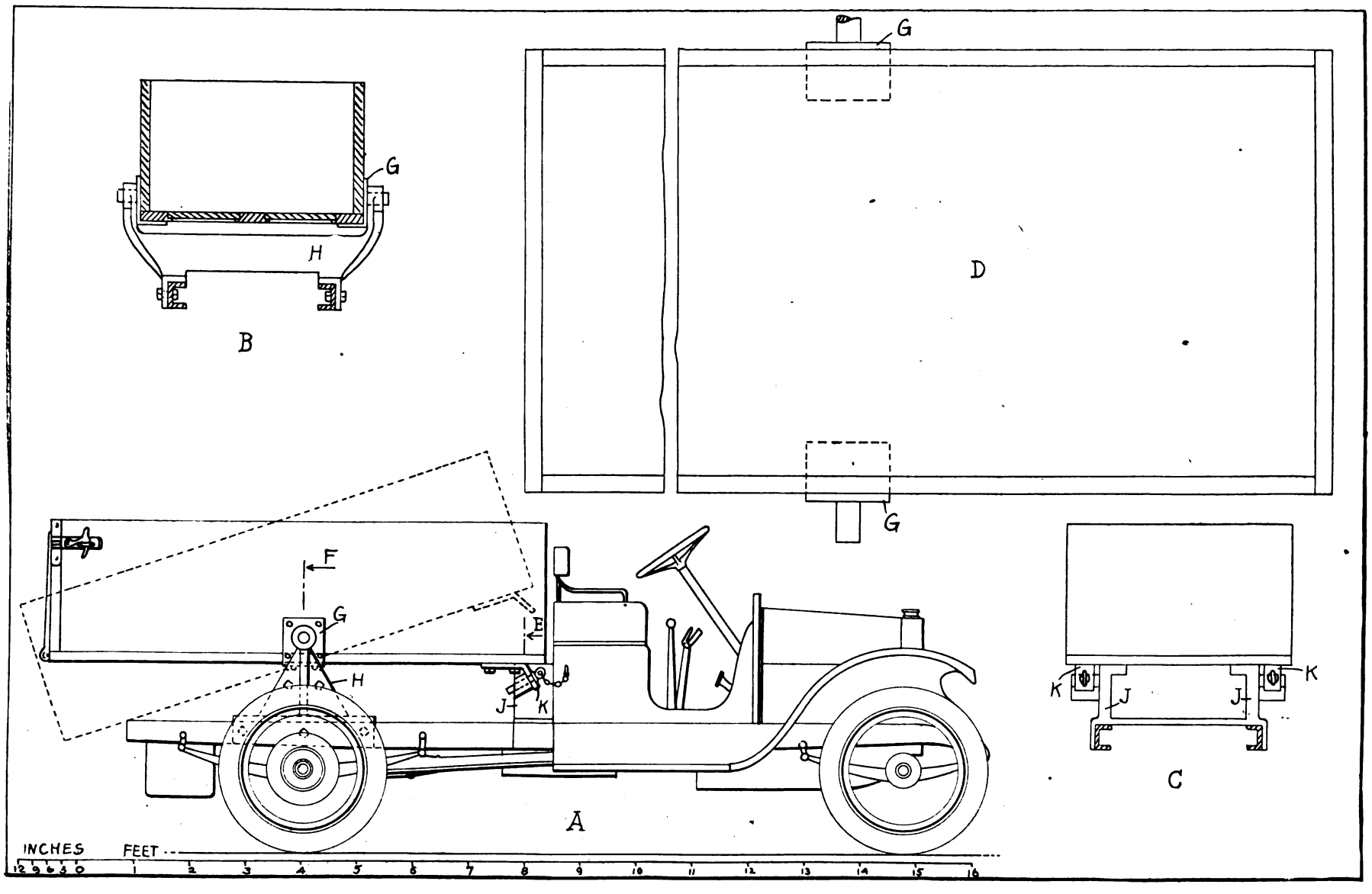
A body of this type is useful for a variety of purposes, as previously stated. It would be useful on a farm or for the work of a city contractor. It would be well suited to a general haulage business.

The haulage business is forging ahead with such leaps and bounds that the extra body business should take on new life in the near future. The blacksmith and wheelwright who can turn out bodies of a good quality will be in demand. Some one has to make the bodies, and the big wagon makers are not able to fill all their orders. The one-man business has a good chance if the one man is also good. That is the test of the case, of course. It takes a good man to make a good wagon body.

HORSE SENSE

The following suggestions for the care of horses in hot weather are offered by the Freight Transportation Department of the Packard Motor Car Company:

1. Load lightly and drive slowly.
2. Stop in the shade if possible.
3. Water your horse as often as possible. So long as a horse is working, water in small quantities will not hurt him. But let him drink only a few swallows if he is going to stand still. Do not fail to water him at night after he has eaten his hay.
4. When he comes in after work, sponge off the harness marks and sweat, his eyes, his nose and mouth and the dock. Wash his feet but not his legs.
5. If the thermometer is 75 degrees or higher, wipe him all over with a damp sponge. Use vinegar water if possible. Do not turn the hose on him.
6. Saturday night give a bran mash, lukewarm, and add a tablespoon of saltpetre.
7. Do not use a horse-hat unless it is a canopy-top hat. The ordinary bell-shaped hat does more harm than good.
8. A sponge on top of the head, or even a cloth is good if kept wet. If dry it is worse than nothing.
9. If the horse is overcome by heat, get him into the shade, remove all harness and bridle, wash out his mouth, sponge him all over, shower his legs, and give him two ounces of aromatic spirits of ammonia, or two ounces of sweet spirits of nitre in a pint of water; or give him a pint of coffee, warm. Cool his head at once, using cold water, or if necessary, chopped ice, wrapped in a cloth.
10. If the horse is off his feed try him with two quarts of oats mixed with bran and a little water and add a little salt or sugar. Or give him oatmeal gruel or barley water to drink.
11. Watch your horse. If he stops sweating suddenly or if he breathes short and quick, or if his ears droop, or if he stands with his legs braced sidewise, he is in danger of a heat or sun stroke and needs attention at once.
12. If it is so hot that the horse sweats in the stable at night, tie him outside with bedding under him. Unless he cools off at night he cannot well stand the next day's heat.



Digitized by Google

A Look Around the Shops

A Friendly Visit to Your Neighbor's Place of Business Will Often Result in New Ideas

BY JAMES F. HOBART



SEEMS to the writer that he can never put his head inside of a blacksmith shop without seeing something interesting. There must be a whole lot of interesting things scattered around the world or else "ye scribe" may not be able to find more of them bye and bye! The above thought has often come up. Nevertheless, there's no use worrying about there being no more new things to find and write about. A blacksmith always has something novel.

One smith of my acquaintance is surely going to get a Christmas present from the writer. It will be a big box of pills or some stronger medicine, if it can be found—for the fellow "put one over" in good shape the other day. This smith well knows the writer's fondness for new and interesting things, and this shop has yielded many of them. But just a few days ago, as the writer was passing, the smith set up a hail: "Oh, Hobart! Come in here and I will show you something which no man ever saw before!"

The writer 'bit," and swallowed the bait, hook and line. Later, he wished he had swallowed the smith, too, for that worthy got out his pocket knife, cut open an apple and said: "There! No man ever saw those seeds before!" But usually the writer gets ahead of the smiths, and sees the interesting things in their shops before the smiths have decided whether the "old codger" is a hobo, a book agent or a delegate from the "bughouse"!

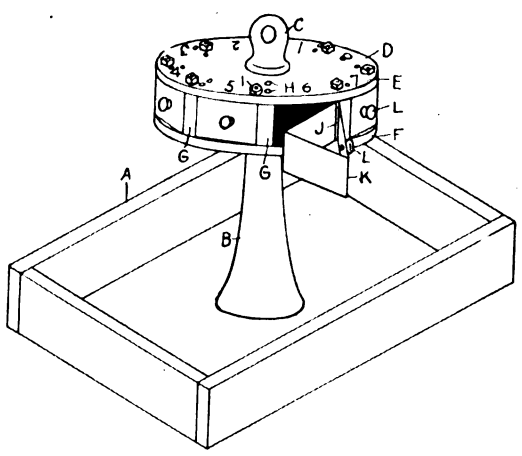


Fig. 1. Convenient Style of Tool Box.

One day last May, during a visit to the shop of Mr. Thomas Carter, on 1118 Beecher street, near Shelby in Indianapolis a shoeing box was seen like that in Fig. 1. The box, and others like it in this shop, were made by the proprietor, who is a colored blacksmith—and a good one, too. There are two fires in this shop, which originally was the barn belonging to a sizeable farm.

Power in the shape of an electric motor has been put into the shop and grinding wheel, drill press, band saw and buzz planer are in evidence. The power drill stands right between the two fires, very handy to both the smiths, and convenient to the woodworking department of the shop which is located directly opposite the forges. These woodworking machines are in one end of the barn, all by themselves and partitioned off from the rest of the shop.

Hoosier Shoeing Box

Two points of excellence stand out above the others in the shoeing box, shown in Fig. 1. The box is open, all the way around, and tools may be thrown into it from any or all sides. The smith never stopped to lay down a tool. He just gave it a toss, and into the box it went, striking against the central post *B*, which acted as a soft buffer for tools. The box or tray, *A*, was of ordinary size and shape.

The eye *C*, serves as a handle for lifting and carrying the box, or for hanging it up out of the way when not in use. I really saw one box hanging up, while in this shop. Eye *C* is hollow and tapped to act as a nut for a bolt through *B*, holding that member to box *A*. The nail-box *D* turns on a short bit of pipe through which the bolt passes. A washer is placed between the bit of pipe and post *B*, then eye *C* is screwed down hard against the pipe and nail box *D* is free to turn around the pipe, upon the washer, and underneath eye *C*.

The nail "turn-head" can thus revolve freely while post *B* is held securely to the box or tray *A*. The head consists of the two wooden discs *E* and *F*, separated by eight pieces of wood *GG*. Screws through these pieces hold heads *E* and *F* securely together. Bolts *I* and *J* also help make the nail turn-head solid. There are eight swing drawers for nails and these are marked consecutively 1 to 8, on the top of disc *E*.

The little three-cornered nail drawers are made of galvanized sheet steel. The proprietor says, "When I get rich I will make some of brass!"

The manner of hanging the eight little drawers is simplicity itself. The ¼-inch bolt *J* passes through a hole drilled or punched for it in the very tip end of the drawer. The upper part of the drawer bears against the bolt, and that is all there is to it. Simplicity so simple that it makes one ache! A knob *L* is lifted to each drawer, in the middle of the front thereof, by means of which the drawer may be pulled open. The nails in this shoeing box are always clean. There are no hoof-chips in them, and they are always at hand, as the turn-head is easily spun around until the required size of nail is opposite the workman.

Trouble jumps into many smith shops because the owner, the driver of a horse and the smith fail to come to a full understanding when work is ordered. Sometimes the driver will order repairs which, although necessary, are not brought to the owner's attention. In some cases the driver may order work not necessary, and, failing to tell the owner, more friction arises between the owner and the smith when settling-up time comes.

Keeping Tabs for the Owner

M. BEGLEY
2722 North 11th St.
BELL, TYLER 1920
KINLOCH, CENTRAL 4894

St. Louis,.....191..
Please Shoe.....
Horses .....
New Shoes.....
Reset .....
.....
.....
And charge same to....
.....
Driver .....

Fig. 2. A Good Job Slip.

To overcome this trouble, which often caused him much unpleasantness, a St. Louis blacksmith got up a lot of slips, as shown in Fig. 2, and used two of them, with carbon paper between, for each and every job of shoeing which came into his shop.

The smith did not trouble himself whether the owner had ordered the work or not, but let the owner settle that with the driver. The smith got a signature on his Job Slip, under the order for work, together with the owner's name, and that slip, thus signed, constituted all the "original entry" required by law, to back up the claim of the smith.

This simple expedient worked so well and was so very simple—only two slips with a bit of carbon paper between them—that many other smiths could use the method to advantage. And it is possible to simplify the above method of two slips and carbon, by one-half. Just have the slips bound at one end in a stub book and have the slips in pairs, the first of each pair printed on paper with a carbon-coated back. Then, the loose carbon may be dispensed with.

To use the "duplex" stub book, open the cover, which is simply the folded-over end of the cover at the end opposite the stub binding. Raise a pair of the slips, fold the top cover under them, using that leaf of the cover to write upon, thus preventing the pencil from marking through any of the carbon sheets save the top one. When the work is charged into the smith's loose leaf ledger, the remaining slips are torn from the stub book and filed away as the original entries. The pencil slip, of course, being given to the driver for the owner.

Try this scheme, brother smiths. It's a good one and may be extended readily to fit any business, by the addition of other blanks and lines for the various kinds of work handled by the particular shop which is to use the system.

Dead Ones Barred

Mrs. Youngbride (at the grocer's): "I'll take a few of those beets if they are live ones."

Clerk: "Live ones, ma'am?"

Mrs. Youngbride: "Yes. I must have live ones. I heard my husband say he has no use for dead beets."—*Boston Transcript.*

Can't Be Done

"A man betrays hisse'f by braggin'," said Uncle Eben. "When I hears a man tell'm 'bout how easy he kin drive a mule, I knows right off he ain't no reg'lar mule driver."—*Washington Star.*

HE KNEW WHAT A FILE WOULD DO

A certain blacksmith, observes *Pearson's Weekly,* although an expert at his trade, was quite ignorant of surgical methods. When he sprained his wrist one afternoon he hurried to a doctor's office.

The doctor examined the wrist, and then took a small bottle from a shelf, but found it empty. "James," said he, turning to an assistant, "go upstairs and bring me down a couple of those phials."

"What's that?" exclaimed the patient, suddenly showing signs of emotion. "I merely asked my assistant to bring me down a couple of phials from upstairs," answered the doctor.

"Files!" cried the blacksmith. "No, you don't! If that hand has got to come off, use an axe or a saw!"

A Comment on Our Editorials

From B. W. Benson, Oklahoma.—I want you to know just how I appreciate the two editorials in the April BLACKSMITH AND WHEELWRIGHT, "Our Editor's Letter" and "The Most Popular Topic." I am an American bred and born in the United States and I love the name of our Country and what it stands for, therefore, I have no sympathy for Bolshevism.

The Bolshevists are a false and rotten set who raise a cry against a war of defense while planning to make war on the followers of all civil and moral laws.

A Bolshevist is against Capital and the Christian Religion. Without capital nothing could be done—you could not publish the BLACKSMITH AND WHEELWRIGHT—I could not run my little shop.

Who (but a Bolshevist) would want to live in a country in which there were no schools, no churches, no Sunday Schools? Yet the Bolshevist is against all of these institutions.

As for your second editorial, the League of Nations is an experiment to be tried—we hope that it is a step in the right direction. We hope that it will tend to eliminate future wars. Who among us want wars just for the glory and grandeur of the things? You do not! I do not! But at the same time all of us are willing to arm ourselves in the defense of our country and our homes.

(Editor's Note.—Mr. Benson's clear letter requires no comment; it is the truth and the point about capital is well made. Every reader of this magazine is a capitalist so long as he owns a pair of overalls or an Ingersoll watch.)

Digitized by Google

Prize Photograph Contest

Interesting Pictures Come to Us From Various Parts of the World

THIS month we are reproducing two more photographs for our prize contest. Any reader who owns a blacksmith shop is privileged to send in a photograph. If we can use it we shall be only too glad to do so. It costs nothing to enter the contest and anyone stands a good chance of winning a prize. If your photograph is used, the cut will be forwarded to you and may prove very useful in connection with your circulars and letterheads. We will also return your original photograph if desired. Even if you do not win a prize the cuts are valuable in themselves and are worth from two to ten dollars. You do not have to be a regular subscriber to enter the contest.

You should remember that the clearer the photograph, the better will be the reproduction. Practically any size picture can be used, from the smallest to the largest. We shall be glad to see a new supply of photographs coming in.

No doubt we shall have considerable difficulty in determining the prize. Many of the pictures are very good and it is hard to pick out the best. Perhaps we shall have to award more than the three prizes originally offered. Send in your photograph at once!

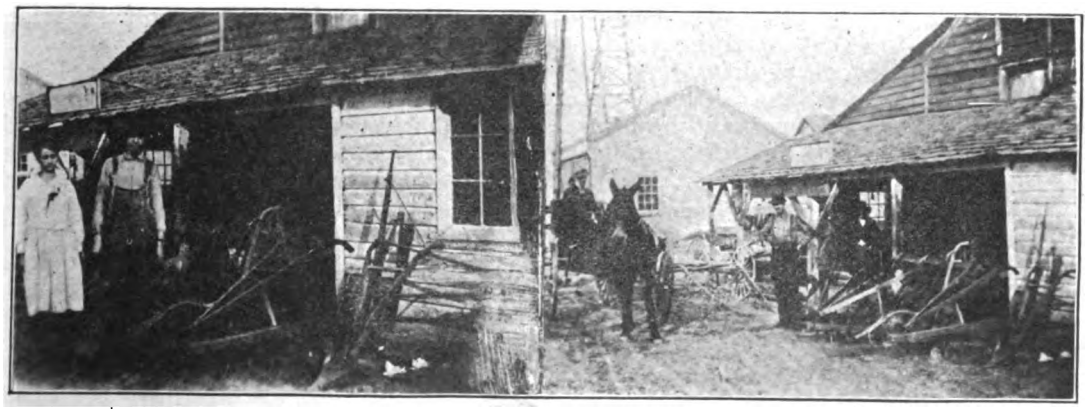
PRIZE PHOTO NO. 14.

From R. C. Hux, Mississippi.—I shall be glad to have the two pictures of our shop entered in the prize photo contest.

I want to tell you what I am trying to do. In the first place I am trying to make an honest living. I hammer iron and steel for a living and anyone who has ever tried it will know about what that means. I do horseshoeing and all kinds of plow work and make harrows, plow stocks and work on Fords. I have two sons who help me in the shop. One of them is a horseshoer and general blacksmith. The other works on cars and runs a grist mill. We grind corn every day and we work on anything from a coffee pot to a car. We have a good line of customers and do our best to keep them. We advertise in the home papers, and find it helpful.

We have been in our shop seven years and are improving daily. We have two forges, two anvils, two vises and three circular saws. We cut our own timber for plows and harrows. The sign that I put out at my grist mill may be worth publishing in your paper. It is rather unusual for a blacksmith to be a miller. The sign is as follows:

I am a miller
And have three sons
Will grind your corn
Whenever you come.



Where R. C. Hux Shoes Horses and Writes Poetry.

PRIZE PHOTO NO. 15.

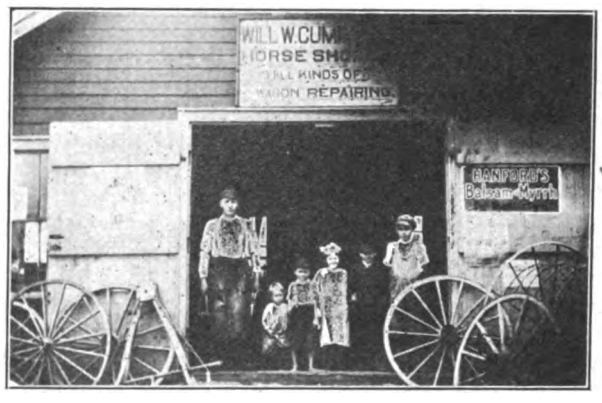
From Will Cummings, Pennsylvania.—I am sending you a photograph of my shop and family.

I do horseshoeing and all kinds of repairing, but this summer I have confined myself principally to the shoeing business. I have a shop equipped with a four H. P. Meco gasoline engine, an 18 inch rip saw, a 30 inch band saw, a 9 inch jointer, a 16 inch turning lathe, two emery wheels, a power drill and a wood-boring machine.

We get 60 and 70 cents for common shoes and 35 and 40 cents for re-setting shoes. All of us in this section belong to the local horseshoeing association, of which I am secretary. In my opinion, if there are any localities that are not organized, they should become so at once. It is the only way to run a horseshoeing business at the present time. We have ten members in our local association and meet once a month to have a good old chat. We are friendly, work harmoniously and do not "bite" one another in the back.

I am sorry to add that we lost one of our members recently, an old and much honored veteran in the business. At the time we were aided very much by the promptness with which the death benefit was paid by the Master Horseshoer's Association.

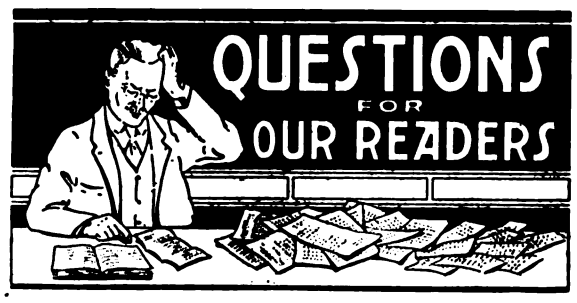
I want to say that I don't know of a trade that has a better outlook than horseshoeing and blacksmithing. The new men who are learning the business will certainly profit by our experience and will be greatly aided by our efforts in forming the Master Horseshoer's Association. A good horseshoer who starts in the business now or in the future will get any price he may ask for his work if well done. Among other things the new horseshoer should make a careful study of the anatomy of the horse's foot.



Will Cummings Says "Study the Hoof."

The man who is heart and soul in his work is not apt to get tired very soon.

Success in business is not found ready made, as is a hen's egg in a barnyard nest.



A Saw Table

From Charles Jenkins, Canada.—Will some brother be good enough to tell me through the columns of the BLACKSMITH AND WHEELWRIGHT how to build or make a small saw table or stand for a circular rip saw with tilting table and give full measurements, and also how fast the saw should run? How many r.p.m., say, on a ten or twelve-inch saw for use in a small country shop?

A Non-Slip Shoe

From John Johnson, Maryland.—Will some brother blacksmith give his opinion as to the best type of horseshoe to use on roads where there is an excess of tar? Some of these roads are very slippery, and a number of accidents have come to my attention of late.

In their enthusiasm in constructing roads suitable for the automobile, the road makers have overlooked the horse. Either the roads should be suited to both the horse and the machine, or else the horses will have to be shod differently.

I understand that in England a prize contest was held recently in an effort to produce a shoe which would be suited to the purpose, but that the result was far from satisfactory.

Second Hand Planer

From George MacDonald, Connecticut.—I am in need of a cabinet planer and would like to find a good second-hand, small one, cheap, for cash.

Power Hammer for Shop

From B. H. Brooks, Texas.—Will some brother tell me the best make of power hammer for a small shop? Also what is the best process for sharpening or rolling discs cold?

Infected Hoof

From Charles P. Jenkins, Canada.—I would like to know if anyone can tell me how to cure a hoof trouble which has existed about two years. About two years ago this horse picked up a two-inch nail which entered the hoof just under the frog on his front foot.

The resulting hole heals over at time, but soon breaks open again and pus forms. I have poulticed the foot for two months at a time and have poured all kinds of oils and liniments into the hole, but cannot heal it or dry it up.

I have never pared or dug out the hole to the bottom. I think that the nail must have entered a bone or some joint about half way between the point of the frog and the back.

Cylinder Oil Test.

From J. W. Johnson, North Carolina.—Will some brother give me a satisfactory fire test for automobile cylinder oil? This would be of great value to many of us who are doing automobile work in connection with blacksmithing. I always read with much interest the replies given by the various brethren in the blacksmithing business.

Others Have Noticed It

Uncle Ezra: "So ye just got back from New York! What's the difference between the city and the country?"

Uncle Eben: "Wal, in the country you go to bed feeling all in and get up feeling fine, and in the city you go to bed feeling fine and get up feeling all in."—*Life.*

Digitized by Google

BLACKSMITH & WHEELWRIGHT

The Pioneer Journal of Its Class in the World.

Member of the Audit Bureau of Circulations.

PUBLISHED MONTHLY BY

M. T. RICHARDSON COMPANY,

71-73 MURRAY STREET, NEW YORK.

POST OFFICE BOX, 654. TELEPHONE—7377-7378 Barclay.

CHICAGO OFFICE, Garland Building, 58 East Washington St.

Entered as second-class matter at the Post Office in New York City.

M. T. RICHARDSON, President and Treasurer
F. R. WHITTEN, Secretary
M. T. RICHARDSON, Editor
FRANK L. AVERY, Managing Editor

F. R. WHITTEN, Advertising Manager
H. F. LUDINGTON, Western Representative
GEO. A. SMITH, Eastern Representative
FRANKLIN MYERS, Art and Copy Dept.

FOREIGN AGENTS:

NEW ZEALAND
MR. R. HILL, Matlock House, Davenport, Auckland, New Zealand.

GREAT BRITAIN
ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance.....$1.00
One Copy, six months, in advance.....60 cents
Single Number.....10 cents
Canadian subscriptions.....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English Money.

Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

ADVERTISING RATES SUPPLIED ON APPLICATION.

SPECIAL NOTICE

Subscribers failing to receive their magazine regularly will favor us by giving us notification to that effect.

CHANGE OF ADDRESS

Subscribers who desire the address of their paper changed should send us the old as well as the new address.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

Our Editor's Letter

AS a matter of fact, the editor is on his vacation. We promised not to say anything about it, but to get out the magazine just as if he were present. A letter comes from him every day or so, telling about the pleasures of fishing, swimming, motor-boating, and the hundred other things in which the country fellow has the advantage over the city man.

After all, the idea of a vacation is to obtain a change of scene. It is like changing the acts of a play, and should bring about a corresponding variety of thought and action. It was "Bill Shakespeare" who said "Variety is the spice of life," and it must be confessed that William made quite a study of the subject. Probably no man ever lived who could speak intelligently about so many kinds of business as "The Bard of Avon." He would have made a good blacksmith if he had cared to put his time on that subject.

Blacksmithing has changed considerably since those days however. Like every other business, it is moving up to a higher plane. There was a time when the blacksmith had to know how to make a point for a spear or other weapon. If he knew that, he was a good blacksmith; if he did not know that, he was no blacksmith at all. Probably the modern smith would make rather a poor spear and a much poorer sword. The construction of those implements is fast becoming a lost art, and rightly so.

The sword is of no value even in warfare at the present day, even if some army officers do cling to it like grim death. The bow and arrow would be better, if we must have an ancient weapon. An American Indian could arm himself with a bow and arrow and whip the best swordsman on earth. A man with a pistol or small rifle can stop the attack of several swordsmen if he sees them in time.

Yes, blacksmithing has risen to a higher plane since the days when it was engaged largely with arrow tipping and spear point making. There are many things in the shop today that would mystify the old-fashioned knight of the anvil. If one of those old fellows could come to life and see a gasoline or an acetylene torch in the modern shop, he would look upon it as a brand plucked from the lower regions. He would view the machinery of the up-to-date shop as something handed down by the gods. If he saw a power forge, he would think that some one had stolen the "Hammer of Thor."



Your Business Educates You

YOUR shop should be your school. Education does not stop when one ceases to attend grammar school, high school or college. Education continues throughout life.

Every blow from a hammer must be guided and controlled by the brain to be effective, and hence every blow helps to train the brain. Hammering is mental exercise as well as physical. The brain cells develop with the muscle tissue. The force of the blow and the point struck, as well as the number of the blows, are all determined by that little pile of gray matter within the skull.

What is true of the hammer blow is true to even a greater extent of all the various operations required for completing a piece of work. Thought must precede action always. We may not be conscious of many things that we do, and yet there must be thought back of all action.

When we have learned to do a thing well, we do not have to think with so much effort. The child learning to walk has to think consciously of each step it takes. After a while, when walking has become automatic, we do not have to devote so much thought to the subject, and can use our brains for other work. That is true of the work in the shop also. The beginner has to work his brain pretty hard in striking a blow with a hammer. Notice how he screws his face up. He does not look handsome exactly, and he evidently feels the mental strain.

Yes, your business educates you. Life is a great school in which all may learn many and valuable lessons. We may learn them well or poorly, just as we did when we went to the old school house. You remember the excuses the students made. The lesson was torn out, or the student was sick and not able to study. He could not sleep all night, etc.

In the school of life, excuses do not count for much. You may say that you did not know that the iron was hot and that you ought not to be punished for putting your finger on it, but you will get burnt just the same. The discipline is stern in the practical school of experience. Nature is a rigid disciplinarian, and yet absolutely fair. There are certain rules that must be obeyed, and the scholars soon learn that they disobey those rules at their peril. If we did not get burnt when we touched the hot iron, the finger would be consumed. It is for our own good that we are burnt. Nature is just in enforcing the discipline.

Some try to "play hooky" in the school of life, just as they did in the graded school. They stay away from the shop and shirk their work. They become tramps and paupers. They go to the foot of the class in the great practical school of life, just as they did in their younger days. Then they start work again, many of them, and become good students once more in life's great school.

The education obtained in the shop is valuable. Those who try hard can get a great deal out of it. Every new idea of value is just so much added to your education. You may make use of those ideas some day. They may lead to some useful invention or to some important improvement in your shop. Therefore, get ideas wherever and whenever you can. Get them from your books, your magazines, and your shop. It does not take long to get ideas. Sometimes they come like flashes of lightning. Sometimes they seem to come from the sparks that fly from beneath your hammer, and are just as enlightening. Catch the ideas, keep them, make use of them.



Making Odd Things

WHY do not more of the blacksmiths make odd things during the spare moments, and incidentally make spare money? By odd things is meant many small but useful things outside the usual line of business. There are many possibilities of this nature, if the subject is given the necessary consideration.

As an example of the useful and odd things which could be made in a shop, we might mention household utensils. A good poker is readily constructed, and can be made superior to the ordinary commercial product, which is usually too short. A good long poker would be appreciated and could be disposed of at a private sale or through the medium of the village stores.

Such a poker can be constructed in a few minutes, from very inexpensive material. A rod of soft iron, three-eighths of an inch thick and four feet long, can be changed into quite a useful and artistic fire implement. A few inches of the rod are heated and bent over the horn of the anvil to make a suitable handle, which may be oval, circular, or any other shape desired. The opposite end of the poker is heated and bent at right angles, and then properly flattened and pointed. It is then complete.

With equal ease, it is possible to make an excellent fire shovel. The three sides of a piece of sheet metal are bent up and riveted or welded. A long handle is then welded on, the upper end being given any fancy shape desired. The upper end might be squared and twisted. It could then be brought around in a small circle and a few inches wrapped around the straight portion with pleasing effect.

A pair of fire tongs can be constructed in a simple manner by bending a long rod in the middle, making the half circle sufficiently large to provide the necessary spring. The ends of the rod are then shaped as in the ordinary tongs now sold.

Andirons or fire-dogs of a fancy pattern are easily forged by a first-class blacksmith. Such things ought to be popular, as the old-fashioned country fireplace is coming into vogue once more.

Another useful thing to make is the door scraper, for cleaning the mud from one's shoes before daring to walk on that nice new carpet. There are lots of things which the intelligent blacksmith can make as a side product, if he wishes to increase his income by utilizing his spare time.



Settlement of Strikes

ONE strike has followed another in such quick succession that it is difficult to keep track of them. Dock hands, river pilots, sky pilots, and various other classes, have been taking turns at this method of settling difficulties. Soon we shall have strikes among the parachute pilots and the pilots of the North Pole Limited.

What an immense waste of wages! There should be a cheaper way of reaching agreements. Agreements are always arrived at finally, and then both sides wonder why the same solution could not have been reached at a very much less cost. A thousand men on a strike for a month would mean a loss of at least a hundred thousand dollars. When we consider the hundreds of thousands of men who have been on strike throughout the world, the total loss is seen to run up into the millions.

Many millions of dollars have been lost in this way from the pockets of labor. There

Digitized by Google

can be no question about it. The manufacture or capitalists have lost as much as the laborers, or even more. Both sides have spent about a thousand times too much. That is poor business, most decidedly. If others attended to our business for us and lost all that money we would discharge them very quickly. We waste the same amount ourselves and say nothing about it. Will we ever learn wisdom?

It is too much to hope that man will become sensible all at once and stop this terrible waste of wages and property. The subject is one that is worth thinking over now and then, however, and that is why we editors speak of the matter. We wish you to think the matter over, not once but many times. Try to think of some way to spend money to better advantage than by throwing it away. Each one of you could think of a better method, we are sure.

The legal profession should be able to settle strikes. Setting difficult questions is part of their business. If a quarter of a million dollars had been turned over to the legal profession instead of being thrown away, many strikes might have been brought to a satisfactory termination. Many strikes might have been avoided entirely. That is worth thinking about.

The legal profession should go after that business. Suppose you blacksmiths were told that a quarter of a million of dollars is lying around loose, and that you could have it if you would reach out your hands and take it. Would you keep your hands in your pockets? You would not. You would go after the business, just as any other good business man would do.

If there are not enough judges and courts to handle the situation, then other judges could be appointed and other courts created.

The Rock Drill Blacksmith

How to Use the Swages and Gages in Forging the Drill Shanks

COPYRIGHTED: J. F. SPRINGER

THE previous article told of welding hollow steel by making a V-groove in one piece and a chisel edge on the other. Then the work is shifted to bring the joint into the fire where it is heated up again, this time to a forging heat. After shifting the joint back to the anvil, it is reduced under the hammer to the proper size.

It may be advantageous to make use of a long steel wire, of a diameter a trifle less than that of the hole in the stock, for the purpose of keeping the hole open in the region of the joint and of matching the one bore with the other. However, it is not considered necessary. If the wire is used, it is run in after the two lengths are made to stick together, being inserted from one end of the work.

Another Method of Welding Hollow Steel

The ends to be welded are each cut diagonally across to correspond the one with the other. Both ends are then upset, the hole being enlarged during the process. This enlargement of the hole is desired. The two ends are then heated to a welding heat, borax being meanwhile plentifully sprinkled on the diagonal surfaces. The work is then slid

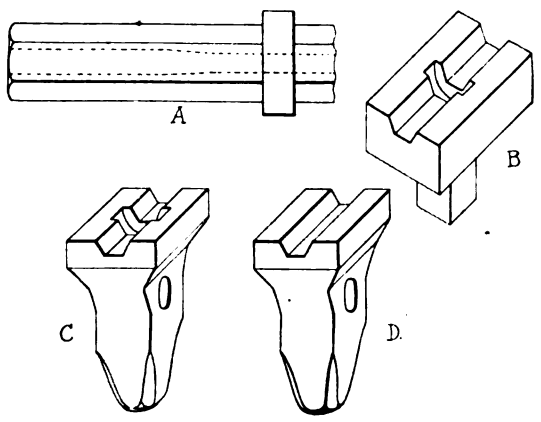


Fig. 1. At A is shown a Finished Shank End. The Upper Swages Are Those at C and D. The Lower Swage is B.

along to the anvil, if the arrangements described in the last issue are adopted; or, if not, the work is carried to the anvil in the usual way. The faces to be welded have previously, however, been hammered to produce rounded convex surfaces. The work is welded at the anvil under the blows of the smith's hammer. The smith strikes immediately above the point of actual contact, and then strikes points next to it, and follows these blows with others next to them, in this way working to close up the weld in such way as to force out all foreign material. It will probably be found at the close that the enlargement due to the upsetting will remain to some extent. It may be removed by chipping, or perhaps with the rasp.

Remarks and directions elsewhere given as to restoring steel that has been highly heated, naturally apply here. Any welding heat serves to overheat and damage the quality of steel. The hammering during welding tends to correct this, but it does not certainly reach all the points where damage has occurred. The steel should, accordingly, be reheated from below medium cherry red to the annealing point for rock drill steel—that is, to a point somewhat above the temperature at which the horseshoe magnet refuses to cling.

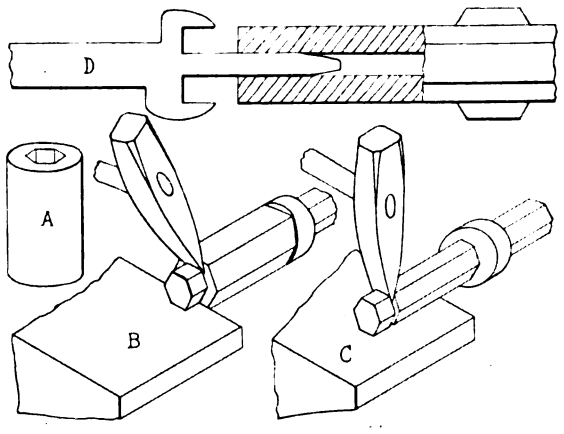


Fig. 2. The Hollow Gage A Fits Over the Shank, as Shown at B, to Verify Shape and Determine the Length to Cut, as at C.

The Shanking of Drill Steel

The forming of shanks on drill steel bars is of considerable importance, especially where hammer drills are employed. The shank may be a simple affair known as the *plain shank.* Naturally, it should be squared, shaped and finished and given the proper dimensions. The *collared shank* is a rib around the bar shaped to suit the machine with which it is to be used. See, for example, Fig. 1 at *A*. Then, there is the *shank with lugs,* which consists of several lugs projecting from the sides of the bar. Mr. C. C. Phelps has given some valuable information in this connection in *Engineering & Mining Journal.* This I follow in part.

The collar may be produced as follows: The end to be shanked is heated to a *full cherry red.* This will provide for two things: (1) It will render the steel susceptible to hardening; and (2) it will soften it. Both conditions are utilized. The end is heated to the specified heat for a distance of about 5 inches. The extreme end is then quenched in water or oil for a distance of 3 inches. This extreme end will accordingly be hard, and the 2 inches remaining will be soft. The bar is now jumped or bounced endwise on a metal slab and held vertically with the hardened end down. The result will be that the soft ring will be upset and a bulge will be formed all round the bar. Then this bulged place is heated in the forge to a full cherry red.

There is another method of upsetting the rib or collar which does not depend upon having a hardened end with a softened section above it. By this alternative method, the upsetting is done with the aid of special tubes. These are (1) the two halves of a split bolster, (2) the ring to surround the bolster halves, and (3) a hollow plunger. The split bolster is so formed that, when set up with the ring holding the halves together, the drill stock may be passed through it. At the end which is uppermost when in position, the bolster has a cylindrical depression of the proper size to receive the open end of the plunger. Further, connecting the small diameter hole through the bolster and this depression, the interior is so shaped as to permit a circular bulge to be formed when the shank end of the rod is passed through the bolster and the hollow plunger is driven down upon it. Naturally, the end of the rod is heated preparatory to this upsetting operation. See *A, B,* and *E,* Fig. 5.

This same upsetting operation may be carried out without the bolster, provided a quick-setting vise is used along with proper dies.

A punch is now used to open up the hole preparatory to the next operation, which is concerned with forging the rib to exact shape and size. Two swages or dollies are used for this work. See Fig. 1. The one is set up on the anvil, while the other is provided with a suitable handle. The work is properly held to position in the underswage on the anvil while the swage with a handle is held in proper position over the bar. The upper swage, shown at *B* and *C,* Fig. 1, is then struck repeatedly by a suitable hammer or sledge, while the bar is continually turned a little between blows. Unless conditions are rather favorable, a helper will probably be needed.

After the rib or collar has been rather exactly formed in this way, the work is again put into the forge and now heated to a full cherry red. The punch is again introduced into the hole. A second upper swage is next employed. This swage, shown at *D* in the same figure, has a simple groove corresponding to the form and dimensions of the main body of the shank. It is employed, in a manner similar to the other upper swage, to give exact form and size to the main shank between the collar and the near end of the bar.

Suitable gages enable the smith to determine when the proper forms and sizes of both collar and main shank are right. The gage, Fig. 2, *A,* for the end of the bar may be a short piece of steel with a hole through it of the size and form to fit over the bar when it is right in size and form. Likewise this gage may be given just the right length to serve as a guide in marking off the end of the bar to its proper length. The marking may be done with the cutting-off tool—say, a hot chisel fitted with a handle. After the marking has been done, the end is heated again and the cutting-off operation performed, as shown at *B* and *C,* Fig. 2. The end is to be squared off and, if necessary, filed or ground to exact smoothness when cold.

Certain shanks for some drills have to be fitted with two or more lugs all at the same distance from the end. As before, the steel is heated to a full cherry red for a distance of 5 inches and then quenched for a distance of 3 inches, leaving a heated ring 2 inches wide. Also, the bar is jumped up and down to upset the softened metal in this ring and make it bulge. A second heating to full cherry red is then given and the punch used to open up the hole.

While the metal is still hot, two swages are used to form one or two lugs. *A* and *B* in Fig. 3, show the lower and upper swages

Digitized by Google

for shaping a pair of lugs simultaneously. The work is heated again and a different upper swage—the lug-diameter-former, *C* in Fig. 3, is employed along with the same bottom swage as before. While the metal is hot, the other upper swage is also used. The center punch is employed during the foregoing operations to maintain the hole in the rod. The ends of the lugs are shaped with a third upper swage, *D*, Fig. 3, another heat being provided at the forge. The shank gage, shown at *A* in Fig. 4, is employed to guide this work. A special end-former is shown at *B* in the same figure. By its use, the end is properly rounded and the hole sized and made central.

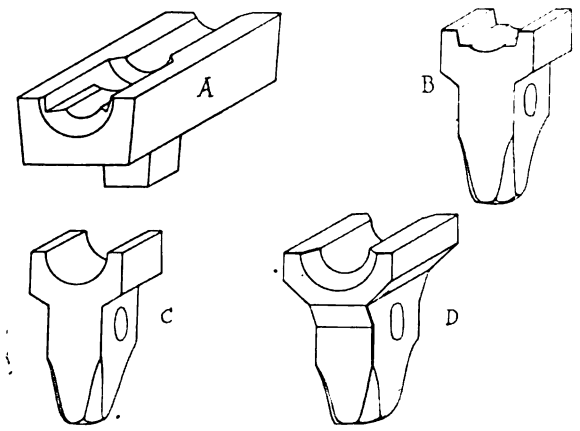


Fig. 3. Swages for Forming Lugs. Lower Swage A. Upper Swages B, C, and D.

Hardening

When the shank-forging and the cutting-off are done, the work is ready for hardening. This is a very necessary operation as it guards the forward parts from distortion through upsetting. The hardening is to be done on a rising heat—that is, the work is to be heated especially for the purpose and no advantage taken of any hot condition that may exist at the end of any final operation with swages or other forging tools. Further, when heating for hardening, the beginning should be made when the metal is comparatively cool, say at a black heat or at any cooler stage down to stone cold. The object in beginning the hardening heat from a low point is to get the advantage of the annealing effect obtained when one heats rock drill steel from below medium cherry red to a low point at which it will properly harden. This point may be determined, as elsewhere explained, by the use of a horseshoe magnet or otherwise.

The quenching is important, as with collars and lugs it is not desirable to have the highest degrees of hardness unrelieved by a tempering effect. On the other hand, in order not to complicate the blacksmith's duties, a special tempering operation will often, or generally, be undesirable. The thing to do when hardening, is not to quench in simple water, but to use oil or oil and water. The objection to water is based on the rapidity with which it does the cooling. Oil is slower. Fish oil is suitable or lard oil. By preparing the usual water bath for quenching and then adding a layer of oil, the sudden effect of plain water will be avoided. The oil, being lighter than the water and not mixing with it, will float in a layer on top. When quenching, the work being plunged vertically, the oil does the first cooling. The water comes into action only after the hot metal gets down the oil.

Sometimes the action of the quenching bath changes as it heats up from work being dipped into it. With plain water, this change becomes rather marked when the water is still considerably below the boiling point. With oil, there will generally be no especially marked change up to 200 or 220 degrees Fahrenheit—that is, up to the boiling point of water (not the boiling point of oil). If the amount of oil, relative to the quantity of work, is so small that it soon heats up to this point, then one may put the oil in a can and the can in a larger vessel containing enough water to make the water level as high as the oil level.

It may be necessary to use a cross piece to keep the can of oil from floating. It will be just as well not only to arrange matters with the cross piece in such way as to hold the can from rising, but also to provide a layer of water underneath the bottom of the can.

A shank end that is too hard tends to fracture the drill piston. One that is too soft will tend to cause trouble by an upsetting action of the metal, which may even result in cutting through the water tube.

A shank end with lugs may be dusted, before quenching, with powdered yellow prussiate of potash. This is put over the shank end as a whole, but especially around the lugs. The object is to increase the surface hardness.

The hardening of the shank end is to be extended from the very end to a point a couple of inches beyond the lugs or collar. This is to be borne in mind when heating preparatory to hardening.

Equipment and Tools

The rose bit with six cutting edges, especially when made from hollow steel stock, will represent perhaps the work which requires the most tools, in so far as ordinary practice with cutting bits goes. Shanking calls for special tools over and above the ones usually in a rock drill blacksmith shop.

For the six-edge rose bit, a dolly, quarter dolly, gouge, spreader and punch will be sufficient special tools. If hollow drill rod is to be shanked, special swages, gages, etc., will be needed. The precise tools will be indicated by the character of the drilling machine. While the resharpening and shanking operations are being performed, the drill rod will need support. A special, quick-acting vise will be very suitable for a good deal of the work, especially if special dies, shaped to fit the forms to be held, are provided.

Certain gages will be of service. The smith may use his ingenuity in providing himself with a gage for every measurement that needs to be frequently determined. For example, the bits for the various sections of a certain depth of hole will begin with a certain gage of bit and this will be followed by regularly decreasing sizes until the final size is reached. The rods will, perhaps, be of lengths corresponding to the various gage sizes. For a different job, the length corresponding to a given gage of bit may however differ. But there will probably be a good deal of uniformity of work, so that—for the standard work at least—a certain length will mean a certain gage size.

The smith will do well to have a single gage having the succession of bit sizes for

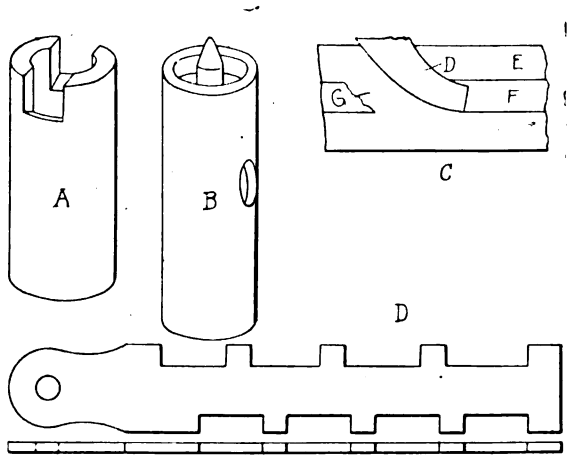


Fig. 4. A and D are Gages. B is an End Former. At C is Shown Method of Punching Side Outlet for Water.

a certain kind of job all arranged on it; and a separate gage for each and every job. In Fig. 4 at *D* is shown a suitable gage covering the requirements specified. Such a gage may be made from a piece of ¼-inch plate steel 3½ inches wide and about 15 inches long. A hole in the handle provides for hanging it on a nail. The gage intervals should be finished with a good deal of care.

An inside and outside diameter gage is shown at *D*, Fig. 2.

Side Hole for Hollow Steel Bits

Bits made from hollow steel sometimes give trouble, because the central hole in some rock tends to form a core which stops up the hole and prevents to a greater or less extent the passage of water through the bit to the face. A little thought will serve to make clear how this core forms. As there is complete absence of metal at the center of the face of the bit, no actual cutting is done at that point. If the rock at the center does not break up because of the cutting action of the rest of the face, then a pencil-like core will form. It projects up into the central hole of the bit. After awhile, it will break off, but it may still be in the hole. At any rate, such cores form and give trouble because they act as plugs.

A method has been devised which prevents the formation of such cores. A hole is punched in the side of the head of the

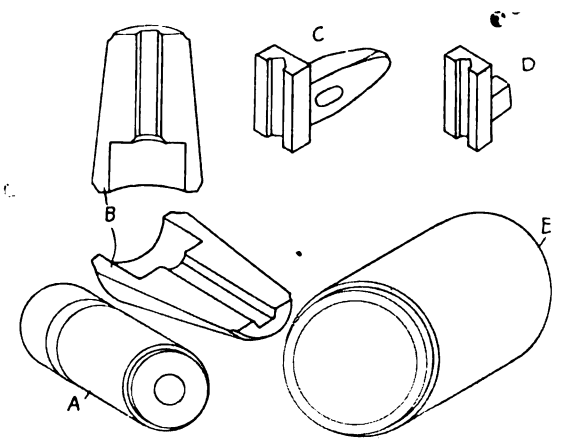


Fig. 5. The Sleeve E Holds the Split Bolster B Together. A is a Plunger. C and D are Shank Dollies.

bit until it connects with the central hole. Naturally, this side hole is located in a hollow or groove in the head. When this hole is punched, things are managed so that the short length of the central hole between the face of the bit and the new hole coming in from the side will be plugged up. The mode of accomplishing this is a very neat piece of blacksmithing.

A punch is made of a tapering form. The end will naturally be of the size of the central hole. But back of the end the punch is to be thickened by the taper. The drill bit, properly heated, is held sidewise on the anvil or other support and a hole started with the punch. The hole is slanted somewhat, as shown at *C*, Fig. 4, and not driven directly down towards the central hole. But the slant is only a small one.

The cold punch will naturally heat up from the hot metal of the bit. It is, accordingly, taken out and cooled in water. It is then put back and the whole driven in the full distance. However, if the smith manages everything right, the end of the punch will, at this juncture, heat up and soften and bend. All this is wanted. But it is wanted in such way as to produce a bent side hole which curves to meet the central hole.

Further, the bending punch, if the smith manages right, may be made to press metal under it and to plug up the central hole next the face. If the desired result is obtained, there will be provided a side exit for the water and metal will plug up the center at the face or just back of it. This latter result is desired, in order to prevent a new core from forming and interferring with the water.

He Didn't Like It

A nervous old beau entered a costumer's and said "I want a little help in the way of a suggestion. I am going to the French students' Christmas Eve masquerade tonight, and I want a distinctly original costume—something I can be quite sure no one else will wear. What can you suggest?"

The costumer looked him over attentively, bestowing special notice on his gleaming, bald and shining head.

"Well, I'll tell you," he said thoughtfully. "Why don't you sugar your head and go as a pill?"

What is right never dies, but what is wrong has a funeral every day.

Digitized by Google

The Ornamental Grille

How the Forgings and Sheet Metal Are Assembled in Scroll and Support

By ARTHUR W. JORDAN



THE ornamental grille shown in Fig. 1 was designed by the writer, under whose personal supervision it was made. Intended mainly as an artistic feature in the hall of a mansion in the wealthy center of the West End of London, it was set in the narrow center opening between two wooden pillars. Here it served to divert the movements of the occupants of the house and visitors around to the other side of these pillars, through the two wider outer openings of the three divisions into which one side of the hall was divided.

Expense being of secondary importance, only the best work was contemplated in preparing the design, and the execution of it. As it was intended merely to be seen and had no wear or usage to put up with, the grille was made of rather light material which answered its purpose admirably.

The main portion of the grille, it will be observed, is enclosed by a rectangular frame, three-quarter inches by one-quarter inch. On this the top portion is fixed; the two outer scrolls supporting the pediment at the top being fashioned out of the ends of one bar of three-quarter inch by three-sixteenth inch iron. The flat center portion of this runs along the top bar of the rectangular frame to which it is secured by countersunk screws at intervals.

The pediment is of one piece welded into shape, when hot, at the sharp corners from iron of the same size. The small shield and the leaf scrolls at each side of it are made of sheet metal.

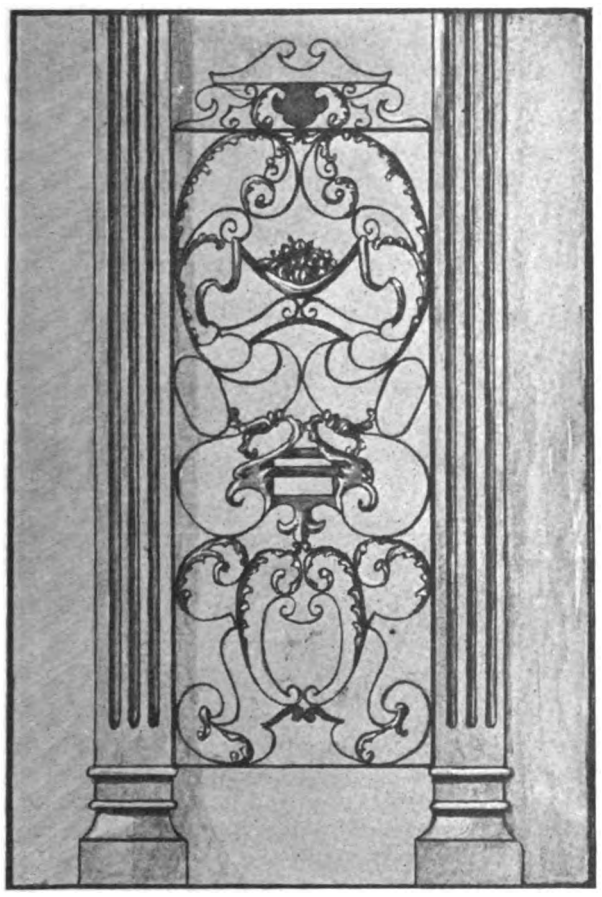


Fig. 1.—General View of Grille in Position.

At the top it is secured by screws through two half circles cut on the shield out of the sheet metal and bent at right angles, one turned one way and the other turned in the opposite direction, and by one similarly treated at the bottom. This permitted the shield to be placed centrally on the width of the bar, top and bottom, and as it is seen from both back and front, this was very important. The same screws hold the small scrolls, which are in one piece with the leaves between them and the shield.

The leaves just mentioned and shown enlarged in Fig. 2, at the left top corner, were produced from one strip of sheet metal hammered to shape.

The festoon of fresit, or "swag," as architects call it, shown below in Fig. 2 was also hammered up out of sheet metal. As this was to be suitable for viewing from both sides it was necessary to consider some way of making it for that purpose.

The ribbon was domed to a narrow basket shape, the ends tapering and being domed on one side to perfect the illusion of hanging carelessly from the supporting scrolls. The fruit was domed out of two pieces of sheet iron. The edges at the top were made to fit together and were brazed together, the lower edges being opened out, just fitted inside the ribbon where they were secured by brazing.

the latter and the flat sheet metal center are secured to the scroll below. This centerpiece was fixed in a manner similar to that adopted for the little shield at the top of the grille as previously explained.

The scrolls at the bottom of the grille are welded on to the shaped pieces, of which a section is given (see I, Fig. 2) at the ends marked H, Fig. 2. These scrolls are of one piece of iron each, and were hammered into shape when hot, where covered by the husk at J. The terminations are indicated by the letters N. O, P, Q and R.

The inner scrolls of lighter stuff are also of one piece, being shaped when hot at M, Fig. 2, and having the piece at the top welded on at L. This was one of the most tricky jobs in the whole piece when it came to getting a perfect shape, but good work was of first consequence and the art of the whole thing was of more importance than a few dollars saved by economy.

The writer remembers the blacksmith was rather prouder of this scroll than of anything else in the grille. The letters J, S and T show

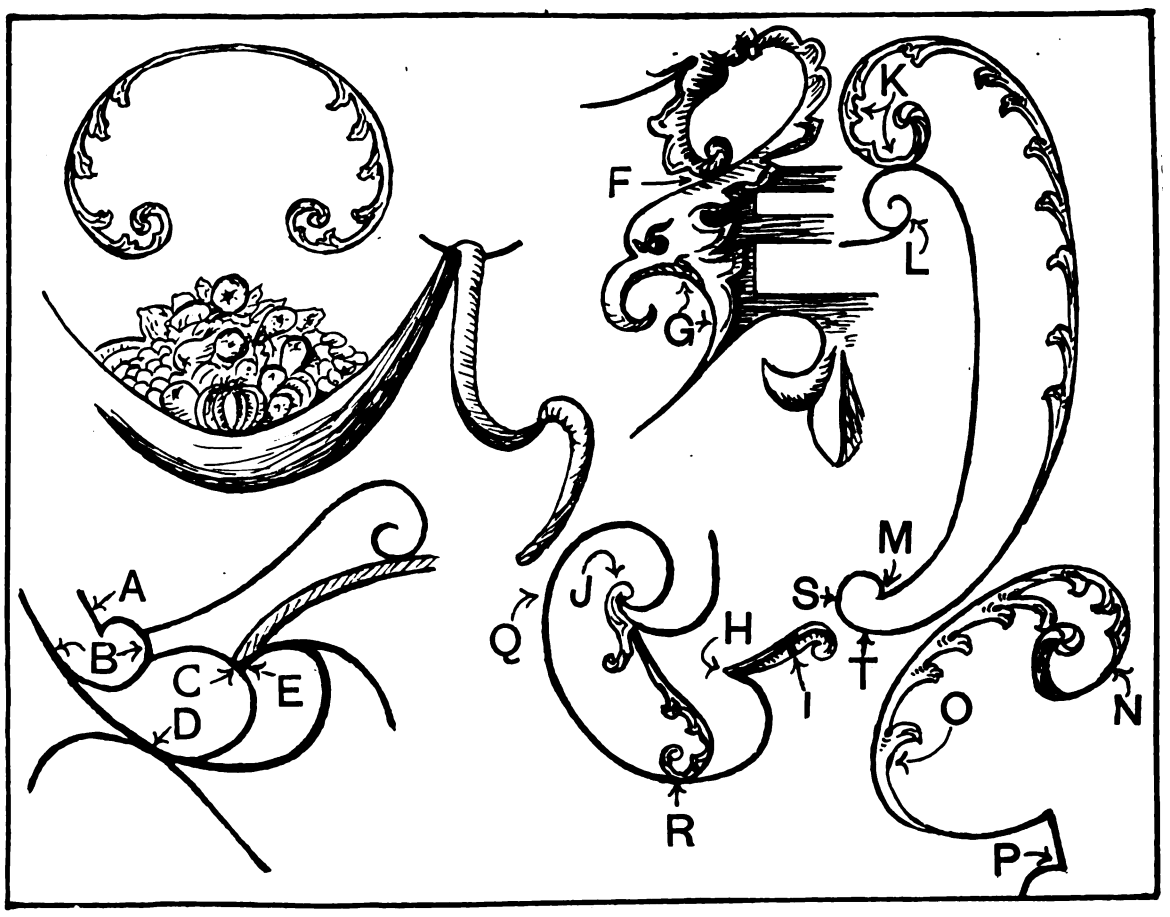


Fig. 2. Some Detailed Points of Interest.

The ribbon is of one piece down to the point at A Fig. 2 where it is secured by screws to a portion of the bar iron of the scroll, purposely left for running up inside a short distance.

The large outer scrolls at the top of Fig. 1 are of one piece down to the point E Fig. 2, where they are welded on to the short circular piece. The former are five-eighth inch by three-sixteenth inch and the latter is one-half inch square, the ends of the scrolls being tapered to it in the welding.

The square iron was used to give boldness and strength at a point where both were needed, although heaviness had to be avoided everywhere. The two pediment shaped scrolls beneath the ribbon are of half inch by eighth inch and they end with the short scrolls from the bottom of the ribbons, beneath the leaves on the large scrolls. The letters B, C and D in Fig. 2 mark the points at which these scrolls are secured by means of countersunk screws or rivets.

Each eagle head was cut out of one piece of sheet metal, being domed and brazed where necessary to secure, when bent into shape. The slotted centerpiece ending in an inverted fleur-de-lis was cut out of heavier sheet metal.

The eagles are secured to the grille by ball knobs which form the eyes, with a screwed pin between, each side being of course the same. The letter F Fig. 2 shows where the husk which comes down from the scroll above is secured to the eagle head and G, where the other points of fixing not previously mentioned when dealing with other scrolls.

The whole grille measures six feet ten inches by two feet seven inches over all, and was much admired when put into its place, which is more years ago than the writer likes to remember. It was painted with two coats of lampblack, the first coat being mixed with one part of linseed oil to three of turpentine and the second coat being mixed with turpentine alone.

There was no gilding at all on the grille, preference being felt for a dead and uniform black all over. It must be admitted that it is doubtful if any gilding would have improved its appearance in the position it was designed for, whereas it showed up well in black.

All the leaf work was repousséd up out of sheet metal of suitable thicknesses and was the work of one of the cleverest repoussé workers in London. The blacksmith was also a very able and painstaking man who was well used to work of the highest class.

There were one or two nice little forging jobs in this grille, as the practical reader will soon pick out, and there was scope for a man to show what he is made of. The writer made full-size drawings of every part for the workmen to see at a glance, if they had any doubt at all, just what was required.

These drawings were made with chalk on brown paper and they were hung up around the shop for reference. Such drawings save all possibility of error.

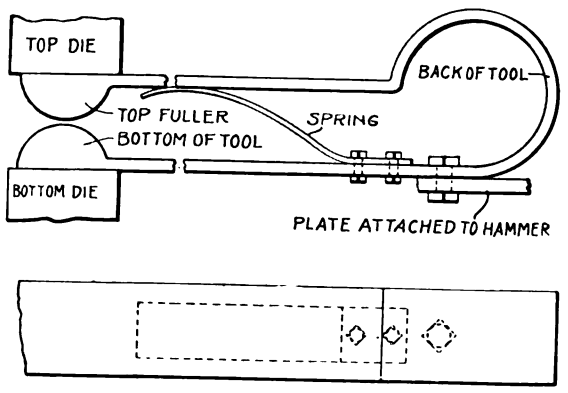
Digitized by Google



A Spring Fuller

From H. F. Towner, California.—I am giving you herewith a sketch of a device which I have found to be mighty handy. It shows the shape of the top fuller and the beveled bottom of the tool. The tool is 2¾ inches wide at the front and about 1¾ inches in thickness. The depth of the tool depends, of course, upon the size of the dies in the hammer.

The spring is used simply to hold the top fuller away from the bottom tool about ⅝ of an inch when the top die in the hammer is up. The curve at the back of the tool is made large so as to allow plenty of movement of the dies. This back curve is made of 2½ by ½ inch soft steel which extends up to the tools.



The sketch at the back shows where the device is attached to the power hammer or to an angle plate which is attached to the hammer bed. The device of course must have side braces to hold it straight.

On a Giant hammer this device can be attached by drilling two holes on the back of the frame and by bolting a piece of wide angle iron on a level with the bottom die. Be sure to use two bolts in the tool, and when the tool is not in use, the front bolt can be removed and the tool swung to the side.

I find that this tool comes in handy and use it frequently both in my Giant hammer and in one of the other machines as well.

Prices in Illinois.

From Harry E. Heath, Illinois.—I am sending you a list of prices adopted by the Kendall County Horseshoers Association, every blacksmith in the county joining and forming a local.

4 new common shoes	$3.00
4 old common shoes reset	2.00
1 new toe calk	.10
4 new steel plug shoes	4.00
4 new Neverslip shoes	4.00
1 bar shoe ..... up	1.25
1 new rubber pad ..... up	1.50
1 leather pad	.25
Packed with oakum	.25

Wagon Woodwork.

New pole only	5.00
New pole complete	7.50
Tongue hounds, pair	2.75
Tongue hound, one	1.50
New bolster front or back, old irons	3.50
Sand board	2.50
Front hounds, pair	4.50
Front hounds, one	2.50
Hind hounds, pair	3.00
Hind hounds, one	1.75
Reaches, 8, 10 or 12 ft	2.00
Axles, front or hind	6.00
Bolster stakes, each	1.00
3 in. rims, ½ in. tires	32.00
3 in. rims, 7/16 in. tires	30.00
3 in. rims, ⅜ in. tires	28.00
½ rim 3 x 1¾	2.25
Sawed fellos, one	.50
Sawed felloes, set	12.00
Spokes, one	.40
Spokes, two or more	.35
Spokes, whole wheel	.30

Wagon Iron Work.

Bolster plates	2.50
King bolt ..... up	.75
One set new tires up to 2 in	16.00
One set new tires up to 3 in	20.00
Four tires reset up to 2 in	3.00
Four tires up to 2 in., bolted	3.50
Four tires reset up to 3 in	4.00
Four tires up to 3 in., bolted	4.50
Four tires cut, welded and set	4.00
Pole cap steel	.75
Box strap irons put on	.50
4 cast skeins put on	12.00
1 cast skein put on ..... up	3.50
Setting box	.50
Singletrees	1.00
Neck yoke	1.50
Singletree end	.35
Singletree center	.50
Neck yoke ends	.40
Neck yoke centers	.75
Tongue hound iron	.65
Tongue hound iron, pair	1.00
Hammer strap	.50
Hind hound plate	1.25

Buggy Wood Work.

Buggy shafts, pair	5.00
Buggy shafts, one	2.50
Buggy pole ..... $3.50 to	5.00
Cross bar weld extra	1.50
Pole circle ..... up	1.50
Buggy singletree	.75
Buggy neck yokes ..... up	1.50
Buggy spokes, one	.40
Buggy spokes, two or more	.30
Buggy rims set ⅞ and 1 in	7.50
Buggy rims, one piece	1.00
Buggy rims, 1½ and 1¼ set	10.00
Buggy rims, 1⅛ and 1¼ one piece	1.50
Buggy reach, one	1.50
Buggy reach, pair	2.75
Wheels, cut down, old tires	12.00
Spring wagon, box seat	18.00
Bow sockets	1.00
Buggy bows	2.50

Buggy Iron Wagon

Buggy axles, per set	12.00
Buggy axles, one	3.50
Axles, set	1.25
⅞ x ¼-inch tire, per set	7.50
⅞ x ¼-inch tire, one	2.00
1 x 5/16-inch tire, per set	8.50
1 x 5/16-inch tire, one	2.25
Resetting buggy tire, set	3.00

Plow Work

Plow moleboards, polished	1.50 up
Plow, pointed	2.00
Plow sharpened	1.00
Walking plow, beams	4.00
Walking plow, handles	1.50 up
Implement, single trees	.60
Four horse eveners	1.50 up
Gopher blades, sharpened, per set	1.75 up
Cultivator shovels, sharpened, per set	1.75
Point shovels, per set	4.00
Drag teeth, sharpened, each	.03
Sickles, welded	1.00
Sickles, sharpened, per foot	.10
Sections, each	.10
Guard plates, each	.15
Mower tongues	6.00
Sickle heads	.75
Implement tongues	3.00 up

PULVERIZERS SHARPENED

Per disc	.15
Cutaway, per disc	.35
Spaders, per disc	.60
Road grader blades, $4.00 and	5.00

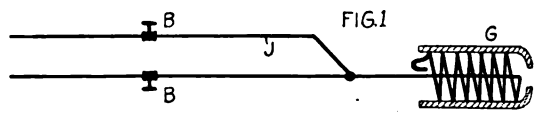
SLED AND SLEIGH WORK

Tongue, complete, old iron	6.50
Pole only	5.00
Tongue, cross piece	1.50
Bolster	2.50
Reach	2.00
Runners, per set	13.00
Runners, one	3.50
New steel shoes, set	10.00
New steel shoes, one	2.75

How to Make a Kerosene Torch

From L. R. Venable, Washington.—In the May and June numbers of your valuable magazine, I notice that C. C. Richter, of Iowa, wants to know how to make a kerosene torch in which he can use air pressure. I will tell him how I made one which gives more than satisfaction; it is simply a joy.

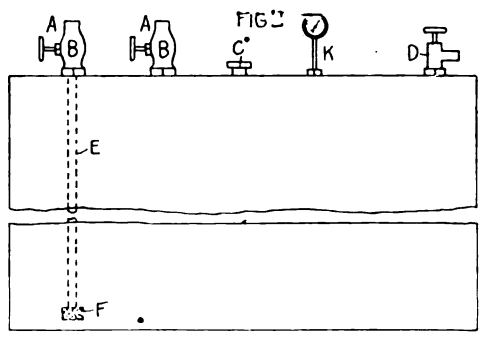
First, secure a length of ⅛-in. D. S. Black pipe and a length of 3 in. Black pipe, 6 in. long. Heat one end of the 3 in. length in a forge and draw down to 1¼ in., as shown at G, Fig. 1. Next, make a straight end on the ⅛ in. pipe, as shown in Fig. 1, between B and G. This part must be about 2 in. long. Now coil back as at G, just large enough to fit snugly (driving fit) in the 3 in. pipe. The end of the coil is drawn down to 1/16 in., and should be made to point toward the end of the torch.



Secure another piece of ⅛ in. pipe and bend and weld to the first piece, as in Fig. 1, first making a ¼ in. hole in the straight pipe and placing the end of the bent piece opposite the hole. The welding may be done with an acetylene torch.

Now, screw in a needle valve on each pipe, as indicated at B, Fig. 1, and screw nipples into the needle valves. Secure a high-pressure tank, equipped as in Fig. 2. The letters AA indicate hose connections; BB, the needle valves; C. is the filling connection; D, the air hose connection. A ⅛ in. pipe, E, extends to within one inch of the bottom of the tank, and has a very fine strainer on the lower end. A pressure gauge is shown at K.

In operating the torch, two lengths of hose about 16 ft. long are connected at AA. After supplying the tank with kerosene, pump up



to about sixty pounds pressure. Open the needle valve in the tank, and let sufficient kerosene flow through the pipe valve, which is connected with the pipe E, to generate the necessary gas. The torch may be further regulated by adjusting the air supply.

A little practice, and you will be able to preheat anything from the smallest gear to a Jumbo bull wheel.

Good Business in Texas

From Samuelson Brothers, Texas.—Everything is blooming in this part of the Golden East where the watermelons and the sweet potatoes grow. This has been about the best year I've ever seen in all my experience. The other day we made a little raise on horseshoeing, and bless my soul, if the Little Preacher from the little backwood church didn't come in to have his horse shod. Well, you can

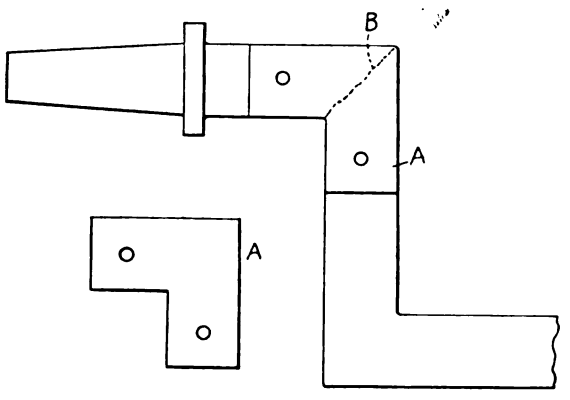
Digitized by Google

imagine, he and I had it up and down. I tried to reason with him, but nothing doing. He had it down pat that I was robbing him when I told him he owed me $2.00. I told him if he thought I had robbed him, I would give back his money. But, oh no, he wouldn't have that. He just kept on kicking and raving, until finally like the rest of us poor, hard-laboring blacksmiths, I "went off my head." I told him that what the matter with this old world now was that such 2 x 4 sky pilots and good-for-nothing shrimps like he were raising sand and kicking when a hard working man was trying to live and let live. I told him gently, that if he wanted to come back, I'd be glad to see him, but if he didn't, I'd lose no sleep over it. You know, there are only two shops in town, and what one has, goes. This is the finest town in the state of Texas. Everybody's like a brother, especially the blacksmiths. We're right next door to each other, and if I want anything they've got, I am just as welcome as rain after a drought. And the nicest way we do business you ever saw! If you come to me for a price of a piece of work, and I give you one, it'll be the same thing over in their shop. Here's a few prices:

Horseshoeing	$2.00
Resetting	1.50
For bad feet, extra	.25
Stallions, $3.00 and	5.00
Setting 2-inch tire, cold	.50
Setting 2-inch tire, hot	.75
Setting 4-inch tire, cold	1.00
Setting 4-inch tire, hot	1.50
Wagon axle	$5.00, 10.00
All plow work, per inch	.02
Turning plows from 25 cents to	1.00
All iron, 10 cents per pound; per hour for time	1.00
Old iron, per pound, 6 cents to	.08
Making new wagon	175.00
Making new wagon bed	25.00
Making all pine timber wood frame	15.00

Welding Drop Axles

From Charles Smith, Pennsylvania.—Here is a drop axle welding job which may be of interest to some of our brethren. The break occurred at *B*, in the illustration. I first filed off all paint and white lead. Then I drilled two one-quarter inch holes three-quarters of an inch deep, as shown. A plate was constructed, as shown at *A*, with similar holes in it. Then I heated the axle red hot and nailed the plate to it. Afterwards I welded the plate to the axle using a slow heat. Dry pulverized borax was used as a coating for the part welded. The plate serves to hold the broken parts together during the process of welding. Cut a "V" on



the opposite side and fit on a broad piece of "V" shaped iron of good quality. Flux both axle and "V" shaped piece and nail together. Then heat and weld fast. This will always give you plenty of metal to work on.

If anyone will try this method, he will find it to be very convenient. Do not think that it is a long method, for it is not. The corner of the axle is hammered up to the required shape. This method prevents undue stress on the metal at the inner corner and makes the weld secure.

Prices From Illinois

From William Long, Illinois.—I always like to have your magazine on file and am therefore taking the present opportunity to renew my subscription. I get a great deal of information from the paper.

I have been settled here only since last November, but I have begun to like this section of the country very much and am doing a good business. My shop is 30 by 70 feet and is furnished with power. We get very good prices here for our work.

The following price list gives an idea of our usual charges:

HORSESHOEING

Four Steel Plugs	$3.50	
Four com	3.00	
One bar	1.25	
Reset, each	.50	
Four Neverslips	4.00	
Stallions, each $1.50	6.00	
Plows, Sharpened, 12", 14"	.50	
Plows, Sharpened, 16"	.60	
Plows, Sharpened, 18"	.75	
Pointing and Sharpening	1.50 to $2.00	ea.
Pointing Shovels	3.50	for set of 6
Wagon Axles	6.00	
Wagon Tongues	5.50	

I do a cash business which saves a whole lot of bookkeeping. I wish I had started this years ago.

What You Give Away

From H. H. Hubbard, New York.—For sometime I have been an interested reader of your paper and am taking the present opportunity of renewing my subscription.

We have here a lively and sociable community with three blacksmith shops. I regret this past year has not been a very prosperous one. My partner was called to the colors but he is now back on the job again, I am glad to say.

I do not believe there is any business in which the public expects so great accommodation as in the blacksmith business. If a farmer goes into the grocery store and buys eight or ten dollars' worth of groceries, and happens to take a stick of candy home to little Willie, also, he would have to put down a penny for the candy. If he comes to your shop to get a horse shod and wants a small bolt to put in his wagon or a few hoseshoe nails, he is charged nothing. If you made a charge, a farmer would tell everyone he met that you were an extortioner and robber.

Just keep account of these small things you give away in a year and see what the cost runs up to.

The prices which we charge for work in this section are as follows:

New Shoes, 0, 1, 2	$0.40	
New Shoes, 3, 4, 5	.50	
New Shoes, 6, 7, 8	.60	
Bar Shoes	.75	and $1.00
Calking and Setting of Shoes up to No. 6	.25	
Same as above, Nos. 7 & 8	.30	

News From Texas

From J. H. Puckett, Texas.—I suppose that I would be called an "old timer," as I have been a reader of the BLACKSMITH AND WHEELWRIGHT for nineteen years most of the time.

I notice that you ask your readers to give their ideas in regard to automobile work. I think it is all O. K. I commenced blacksmithing twenty years ago in a small shop. When automobiles were introduced here, I began repairing them.

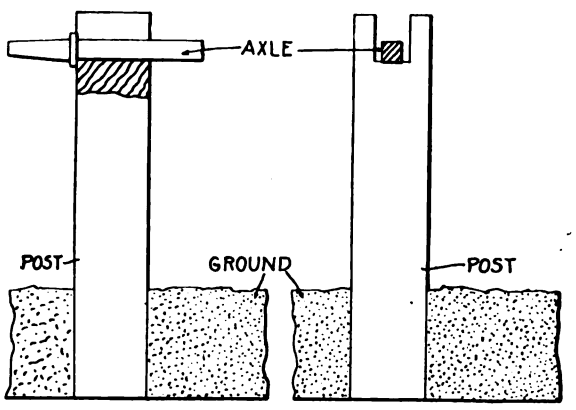
I now have a large shop and am prepared for all kinds of work. I have a 12-horsepower gas engine. I run a grist mill, power hammer, emery grinder, rip saw and small planer. I have a gasoline station and sell cylinder oil. We have a free air supply from a compressor and also sell a full line of Ford car parts.

I employ from two to four men all the year around. We carry a full line of blacksmith and woodwork stock.

There is a welding machine in the shop and all the tools and equipment are paid for. This was not done all at one time. The tools were gradually collected, just a piece or two at a time. I am stating this as it might be of benefit to some other young smith. I can do any kind of work about the shop, although I stay at the forge most of the time as that is my hobby. I like the BLACKSMITH AND WHEELWRIGHT better than any trade paper that I take.

A Wheel Bench

From W. J. Smith, New Mexico.—I thought I would send in a drawing of the wheel bench that we have been using in our shop. We have found this bench very convenient. A post is fixed in the ground, as shown in the figure, and a slot made in the top of it to receive a pin on which the wheel may be mounted. The pin can be arranged at a convenient height so that the wheel will not have to be lifted very high. The method of attaching the pin will be clearly understood from the figure.



Another thing that I have found very convenient in our shop is a tire-heating furnace. This is constructed of brick and built in the wall. The dimensions are five by six feet. Fire grates are constructed so that either coal or wood may be used in the furnace. We always try to keep the shop in order and have a large number of iron pins in the wall for the purpose of hanging the tires on.

Shop Equipment

From Charles E. Windon, West Virginia.

I have been blacksmithing since 1894 and have been in my present location seven years. I own my house and shop. I have four lots. My shop is 26 feet square and one and a half stories high.

I do several kinds of work including some automobile repairing such as welding springs, etc.

There is a garageman near here, but he is not familiar with iron work, so that most of that business comes to me. I do a great deal of horseshoeing. There is no horseshoer close to me. The population of this town is about 800, but we do business for a considerable population in the country.

We get top prices for our work here on both wagon and shoeing jobs. I do track shoeing, and forge my own shoes for track horses. I trust this will be of interest to my brother smiths.

Removal of Tires

From L. T. Tarbell, New York.—I want to say a few words to Maskell Ewing, of New Jersey, on the subject of removing wide tires.

A few years ago we made a tool to take off tires without hammering. This tool consists of a standard with a foot resting on the felloe with a hook which takes hold of the under edge of the tire and is operated by a long-handled lever on top. The arrangement is anchored to the hub and swings from point to point as needed. Of course it would be impossible for anyone to build such a device without detailed drawings.

We wanted to patent this machine, but after a careful search of the patent records, decided not to go on with it. We have made quite a few devices for blacksmiths some of which we have patented. One of these is a machine for sharpening horseshoe calks and is the only machine that will sharpen a steel toe calk. Well, we lost a few hundred dollars. The patent has now expired.

We make the best forge we have any knowledge of, also hoof trimmers and some other tools.

I will say a word more about taking off wide tires without special tools. What causes the principal trouble is the fact that the diameter is a little greater in the center than at the edges. I lay the wheel flat and hammer the felloe at a particular point until it loosens. Then, turn the wheel over and hammer at a point diametrically opposite. By repeating this process the felloe will work loose and the tire will come off.

Digitized by Google

Index to Advertisers

Adjustable Wagon Tire Mfg. Co., tires, Front cover
Aetna Nut Co., horseshoe calks.....Front cover
Akron-Selle Co., gears..... 24
American Calk Co., calks.....Front cover
American Horse Shoe Co., horseshoes..... 5
Anti-Borax Compound Co., welding compounds 4
Armstrong Mfg. Co., bolt dies..... 24
Armstrong-Blum Mfg. Co., punches and shears .....Front cover

Barcus Mfg. Co., horse stocks.....3rd cover
Barnett, G. H., files and rasps.....Front cover
Bertschy-Bermo Co., welding plants..... 24
Bicknell Mfg. & Supply Co., punches and shears, spark plugs..... 8
Bradley, C. C., & Son, shaft coupler..2nd cover
Bryden Horse Shoe Works, horseshoes..... 6
Buffalo Forge Co., blacksmiths' tools..... 7
Burden Iron Works, horseshoes.....3rd cover
Bush Motor Co., automobiles..... 25
Butterfield & Co., taps, dies and screw plates.. 8

Campbell Iron Co., supplies.....Front cover
Canedy-Otto Mfg. Co., blacksmiths' tools... 4
Capewell Horse Nail Co., horse nails..Front cover
Champion Blower & Forge Co., blowers..... 3
Champion Tool Co., blacksmiths' tools..... 2
Chase, L. C., motor topping.....Front cover
Columbus Anvil & Forging Co., anvils..... 1
Columbia Forge & Iron Co., anvils.....3rd cover
Cortland Welding Compound Co., welding compounds 26
Cray Bros., blacksmiths' tools 27
Crescent Machine Co., woodworking machinery .....4th cover

Diamond Calk Horseshoe Co., horseshoes.... 23
Doxey, N. D., welding compounds..... 24
Edwards, C. D., Mfg. Co., shears..... 25
Electric Blower Co., blowers..... 27
Electric Wheel Co., wheels..... 24
Empire Mfg. Co., wheels.....4th cover

Felton, Sibley & Co., paints..... 1
Firestone Tire & Rubber Co., tires..... 26
Fisher & Norris, anvils and vises..... 8
Franklin Steel Works, toe calks..... 24

Giant Grip Horseshoe Co., horseshoes 2nd cover
Gogel Mfg. Co., tire heaters..... 28
Greb Co., grip pullers..... 1
Greenfield Tap & Die Corporation, screw plates and blacksmiths' machinery..... 28
Gwilliam Co., ball bearings.....4th cover

H. B. Tempering Process Co., tempering process .....4th cover
Hart Mfg. Co., stocks and dies.....4th cover
Harvey Spring & Forging Co., auto springs.. 25
Hay-Budden Mfg. Co., anvils.....4th cover
Heller Bros., horse rasps, tools, etc..... 8
House Cold Tire Setter Co., tire setters, hollow and spoke augers .....4th cover

Jenner, H. W. T., patents..... 23

K. & W. Rubber Co., tire reliners..... 24
Kerrihard Co., hammers 27
Kitowski, F. J., blacksmiths' tools..... 24

Lancaster Foundry Co., fifth wheels....3rd cover
Little Giant Co., hammers..... 1
Linde Air Products Co., oxygen..... 8
L. S. P. Calking Machine Co., calking machines 4

Macgowan & Finigan Cordage Co., hammers 4th cover

Ness, Geo. M., Jr., steel stamps.....Front cover
New Era Spring & Specialty Co., springs.. 27
Nicholson File Co., files and rasps.....2nd cover

Parker, C. L., attorney..... 24
Parks Ball Bearing Machine Co., woodworking machinery 27
Paro, H. G., Co., grease guns..... 27
Peck, Stow & Wilcox Co., pincers..... 28
Phillips-Laffite Co., welding plates..... 25
Phoenix Horseshoe Co., horseshoes and toe calks 2
Porter, H. K., bolt clipper.....4th cover
Prentiss Vise Co., vises.....4th cover
Plymouth Foundry & Machine Co., punches and shears .....4th cover
Prest-O-Lite Co., Inc., gas..... 8

Rosewater Electric Co., blowers..... 1
Rowe Calk & Chain Co., horseshoe calks, Front cover

Sheldon Axle & Spring Co., axles..... 6
Sherwood, W. L., woodworking machinery.. 25
Standard Horse Nail Co., horseshoe nails 4th cover
Star Mfg. Co., agricultural implements..... 24
Sterling Tire Corp., hoof pads.....2nd cover
Stokes Bros. Mfg. Co., rasps.....Front cover
Strite Governor Pulley Co., plow blade sharpeners 25

Thompson Tuyere Iron Co., tuyere iron, 4th cover

Union Horse Nail Co., horse nails..... 1
Universal Wheel Compressor Co., wheel compressors 27

West Tire Setter Co., tire setters, hammers.. 27
Wheel B. Top and Hardware Co., supplies 4th cover
Whisler Mfg. Co., nut splitters, jointer heads 24 and 4th cover
Witte Engine Works, engines..... 25
Young, W. F., veterinary remedies..... 24

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co..... 24

Anvils
Columbus Anvil & Forging Co..... 1
Columbus Forge & Iron Co.....3rd cover
Fisher & Norris..... 8
Hay-Budden Mfg. Co.....4th cover

Attorneys
Parker, C. L..... 24

Automobile Accessory

Automobiles
Bush Motor Co., Automobile..... 25

Automobile Springs
Harvey Spring & Forging Co..... 25

Axles
Sheldon Axle & Spring Co..... 6

Ball Bearings
Gwilliam Co. .....4th cover

Blacksmiths' Machinery
Greenfield Tap & Die Corp..... 28

Blacksmiths' Tools
Buffalo Forge Co. 7
Butterfield & Co. 8
Canedy-Otto Mfg. Co. 4
Champion Blower & Forge Co..... 3
Champion Tool Co..... 2
Cray Bros. 27
Heller Bros. Co..... 8
Kitowski, F. J..... 24
Nicholson File Co. .....2nd cover
Peck, Stow & Wilcox Co..... 28

Blowers
Buffalo Forge Co. 7
Champion Blower & Forge Co..... 3
Champion Tool Co. 2
Electric Blower Co. 27
Rosewater Electric Co..... 1

Bolt Dies
Armstrong Mfg. Co..... 24

Bolt and Rivet Clippers
Porter, H. K.....4th cover

Calking Machines
L. S. P. Calking Machine Co..... 4

Calks, Horseshoe
Aetna Nut Co.....Front cover
American Calk Co.....Front cover
Rowe Calk & Chain Co.....Front cover

Calks, Toe
Franklin Steel Works..... 24

Catalogue and Reference Book

Chisels
Champion Tool Co. 2
Peck, Stow & Wilcox Co..... 28

Chucks
Buffalo Forge Co..... 7

Disc Sharpeners
Little Giant Co. 1

Engines
Witte Engine Works 25

Farriers' Tools
Barnett Co., G. & H.....Front cover
Champion Tool Co..... 2
Heller Bros. Co. 8
Peck, Stow & Wilcox Co..... 28

Files and Rasps
Barnett Co., G. & H.....Front cover
Nicholson File Co. .....2nd cover
Stokes Bros. Mfg. Co.....Front cover

Forges
Buffalo Forge Co. 7
Champion Blower & Forge Co..... 3

Gas
Prest-O-Lite Co., Inc..... 8

Gasoline Engines
Witte Engine Works..... 25

Gears
Akron-Selle Co. 24

Grease Guns
Paro, H. G., Co..... 27

Grip Pullers
Greb Co. 1

Hammers
Champion Tool Co..... 2
Kerrihard Co. 27
Macgowan & Finigan Cordage Co.....4th cover
Little Giant Co. 1
Peck, Stow & Wilcox Co..... 28
West Tire Setter Co..... 27

Hollow Augers
House Cold Tire Setter Co.....4th cover

Hoof Nippers
Champion Tool Co..... 2

Hoof Pads
Sterling Tire Corp. .....2nd cover

Hoof Parers
Champion Tool Co..... 2

Trucks
Akron-Selle Co. 24

Hoof Shears
Champion Tool Co..... 2

Horseshoes
American Horseshoe Co. 5
Bryden Horse Shoe Works 6
Burden Iron Works .....3rd cover
Giant Grip Horseshoe Co.....2nd cover
Phoenix Horseshoe Co. 2
Rowe Calk & Chain Co.....Front cover

Horseshoe Calks
Diamond Calk Horseshoe Co..... 28
Rowe Calk & Chain Co.....Front cover

Horseshoe Nails
Capewell Horse Nail Co.....Front cover
Standard Horse Nail Co.....4th cover
Union Horse Nail Co. 1

Horse Stocks
Barcus Mfg. Co. .....3rd cover

Iron Castings

Jack Mfrs.
Rowe Calk & Chain Co.....Front cover

Kerosene Engines
Witte Engine Works..... 25

Lawn Mower Grinders

Motor Topping
Chase, L. C. .....Front cover

Nut Splitters
Whisler Mfg. Co. .....24 and 4th cover

Oxygen
Linde Air Products Co..... 8

Paints and Varnishes
Felton, Sibley & Co..... 1

Patents
Jenner, H. W. T..... 23
Parker, C. L. 24

Pincers
Peck, Stow & Wilcox Co..... 28

Plow Blade Sharpeners
Strite Governor Pulley Co..... 25

Pullers

Punches
Champion Blower & Forge Co..... 3

Punches and Shears
Bicknell Mfg. & Supply Co..... 8
Peck, Stow & Wilcox Co..... 28
Plymouth Foundry & Machine Co.....4th cover

Schools

Screw Plates
Butterfield & Co. 8
Buffalo Forge Co. 7
Champion Blower & Forge Co..... 3
Greenfield Tap & Die Corp..... 28

Shaft Coupling
Bradley, C. C. & Son.....2nd cover

Shears
Edwards, C. D., Mfg. Co..... 25

Shock Absorbers

Spoke Augers
House Cold Tire Setter Co.....4th cover

Springs
New Era Spring & Specialty Co..... 27

Starters

Steel Stamps
Ness, George M., Jr.....Front cover

Stocks and Dies
Butterfield & Co. 8
Champion Blower & Forge Co..... 3
Hart Mfg. Co. .....4th cover

Supplies
Campbell Iron Co. .....Front cover
Wheel B, Top and Hardware Co.....4th cover

Swages
Champion Blower & Forge Co..... 3

Tempering Process
H. B. Tempering Process Co.....4th cover

Tires
Firestone Tire & Rubber Co..... 26

Tire Bending Machines
Buffalo Forge Co. 7
Champion Blower & Forge Co..... 3

Tire Coolers

Tire Heaters
Gogel Mfg. Co. 28

Tire Reliners
K. & W. Rubber Co..... 24

Tire Repair Outfits

Tires
Adjustable Wagon Tire Mfg. Co...Front cover

Tire Setters
Buffalo Forge Co..... 7
House Cold Tire Setter Co.....4th cover
West Tire Setter Co..... 27

Tire Shrinkers
Buffalo Forge Co. 7
Champion Blower & Forge Co..... 3

Tongs
Champion Tool Co. 3

Tool Grinders
Phoenix Horseshoe Co. 2

Tuyere Irons
Champion Blower & Forge Co..... 3
Thompson Tuyere Iron Co.....4th cover
Buffalo Forge Co. 7

Veterinary Remedies
Young, W. F..... 24

Vises
Butterfield & Co..... 8
Fisher & Norris..... 8
Prentiss Vise Co. .....4th cover

Wagons
Akron-Selle Co. 24

Welding Compounds
Anti-Borax Compound Co. 4
Cortland Welding Compound Co..... 26
Doxey, N. D. 24

Welding Outfits

Welding Plants
Bertschy Bermo Co. 24

Welding Plates
Phillips-Laffitte Co. 25

Welding Supplies
Linde Air Products Co. 8

Wheel Compressors
Universal Wheel Compressor Co..... 27

Wheel Dishers
Crescent Machine Co. .....4th cover

Wheels
Electric Wheel Co. 24
Empire Mfg. Co. .....4th cover

Wheels, Fifth
Lancaster Foundry Co. .....3rd cover

Woodworking Machinery
Buffalo Forge Co. 7
Crescent Machine Co. .....4th cover
Parks Ball Bearing Machine Co..... 27
Sherwood, W. L..... 25

Wool Fat Compound

Wrenches
Champion Tool Co..... 2
Peck, Stow & Wilcox Co..... 28

Topping the Wagon Body.

Sometimes, a wheelwright or blacksmith is called upon to retop a wagon or automobile, and it is very essential that the right kind of fabric is used, especially if the job is to be one to brag about.

A fabric is being marketed by L. C. Chase & Co., of Boston, Mass., that is said to meet all requirements. It is sold under the trade name of "Drednaught." A body equipped with this fabric withstands the weather and also presents a very desirable appearance. Communication to the company are always courteously received.

The U. S. Booster.

The latest quarterly number of the *U. S. Booster and Horseshoers' Advocate* contains interesting matter that is bright and up-to-date. Among the interesting ideas advanced is the opinion that the horse will once more become prominent, even if the automobiles do not decrease in numbers. There will always be those who love a horse and will ride one whenever suitable roads can be found.

The *U. S. Booster* is published by the United States Horse Shoe Co., of Erie, Pa.

Tempering Process.

A reader gives his experience in tempering steel as follows:

"I am proud of the privilege to recommend to all brother blacksmiths the use of the H-B Tempering Process, which I have used in my shop for the last eight months. The H-B Tempering Process has improved my business 100 per cent, and there is no reason why it would not do the same for you.

"Now, Mr. Smith, just stop and think whether I am right or wrong. Tempering steel is the biggest fall-down with all shops. I have been in the business for the last 15 years and I know it to be a fact. No matter how good the workmanship, the tempering is the principle part to make complete the working of steel.

"I have great success in tempering plow shares, not in the old fashioned hit or miss way, but with complete satisfaction, so that I can tell my customers that if a share is not as good as when it came from the factory and better, I will return the money. How many of us smiths could make a business of drawing out axes and guarantee them to be as good as new and better? Tests that have been made in my shop are surprising. I have an old rail lying on the floor that has been all cut up with tempered axes and grub hoes. I find that it is very seldom we are able to chip or break the edges.

"I would never think of running a shop again without this great aid. Don't let your customers go to your competitor, but order this process and get the same kind of success that I have been able to receive by this simple means.

"By all means, brother, do not spoil hard labor and good workmanship with poor tempering when the good is knocking at your door trying to get in. All necessary directions are furnished by the company who manufactures the process, and it really is a whole lot more simple tempering with this process than with the old means (water).

"I trust that you will try this means and be one of many happy blacksmiths."

This tempering process can be procured from the H-B Tempering Process Co., Clearbrook, Minn.

The man who does not advertise because he doesn't know how to write an advertisement should quit eating because he can't cook.

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

will be inserted under this head at 3 cents a word, including the address, for each insertion, payable in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York
PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT

Patents

PATENTS FOR INVENTIONS.
H. W. T. JENNER, patent attorney and mechanical expert, 622 F Street, Washington, D. C. Established 1883. I make an examination and report if a patent can be had and the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trademarks registered.

For Sale

FOR SALE
1 No. 408 Champion steel horseshoer's forge, $25; 1 heavy floor emery stand, $10; 1 No. 1 Eureka, new style tire bender, $10; 1 iron split pulley, 28 in. diameter, 5 in. face, for 1 11/16 shafting, $5; 1 new steel shafting, 1 11/16 x 12 ft. long, $5; 1 steel shafting, 1 7/16 x 16 ft. long, $4; 9 adjustable 12 in. iron drop hangers for 1 7/16 in. shafting, $2 each; 1 "one cow" Viking cream separator, good as new, $20. Address Andrew Bjerk, Box 105, Colgate, N. D.

FOR SALE CHEAP
Blacksmith shop. Stock and tools, machinery including gas engine, band and rip saws, planer, drill, emery stand, Shaler's vulcanizing machine, plumber's taps and dies, and blow torch. No other shop near. Plenty work for 2 or 3 men. Good place for a garage. Address M, care Blacksmith and Wheelwright, 71 Murray Street, New York City.

FOR SALE
Well equipped blacksmith shop, good location, doing good business; two-story shop, three thousand feet floor space, also residence property close to business. This is a splendid opportunity. Mack Thomas, Curtisville, Tipton County, Indiana.

FOR SALE
If you can't get the nuts off from old bolts that turn when taking machinery apart, try one of our Nut Splitters. Splits all nuts three-quarter inch and smaller. Get circulars. Whisler Mfg. Co., Gibson, Iowa.

FOR SALE, GOVERNORS FOR AUTO ENGINES
We make governors for Auto and Cycle engines when used as stationary. Write today for circular. C. L. H., Box 774, Dept. C, Taft, California.

FOR SALE
Blacksmith shop and garage combined, building 30 x 80 feet; galvanized iron, equipped throughout with modern machinery; only shop in town. Big trade already established. Will take half price of new stuff, and it is all as good as new. L. L. Warren, Pendleton, Texas.

FOR SALE
Arco wand vacuum cleaner, large size, the kind installed in large residences and runs by ¾ motor or moved from room to room on small truck and attached to lamp socket. In perfect condition. Priced to sell. Have no one to operate it now. If interested, write Mrs. M. A. Tuttle, Lake Charles, La.

FOR SALE
Well established blacksmith, horse shoeing, auto and wagon shop. Equipped with machinery and power. On one of Denver, Colorado's principal streets. Owner wishes to retire. L. A. Pfeiffer, 1447 So. Broadway, Denver, Colo.

FOR SALE
Blacksmith, implement, hardware and garage business. Oil and gas station. All corner property. Ill health reason for selling. Write for particulars, W. J. Ott, Woodlake, Cal.

FOR SALE
Country Blacksmith's shop and tools in good location. Also house and barn with half acre land; price $2,000. Address David Young, Wadsworth, Ill.

FOR SALE
A garage and blacksmith shop combined. Good business. Plenty of work for two men. Good location, one hundred miles from railroad or any other garage. Good opening for wide awake man. Reason for selling is, I have bought a place and want to move on it. Address Ed. Tinney, Highway Garage, Reserve, New Mexico.

FOR SALE
PRINTING FOR BLACKSMITHS
75 best grade envelopes and letter heads for a dollar. Guaranteed. Five day delivery. Liberty Press, 1102 Barry Avenue, Chicago, Ill.

Wanted

WANTED
Steady employment by soldier. Will be discharged by August 1st. Ten years experience as a Blacksmith and Horseshoer. State wages willing to pay. Sgt. Johnson, Q.M.C., Fort Crockett, Galveston, Texas.

The man who does not advertise simply because his grandfather did not, should wear knee breeches, silk stockings, and a wig.

Tires

Telephone Circle 2460

B. LIBEN & CO.
DEALERS AND JOBBERS
in all Makes of Auto Tires and Tubes
261 WEST 54th STREET, NEW YORK

Biggest Drop in History in

Double Tread Tires

Greatest selection in factory seconds and blemished tires.

Write for information.

Tire Dealers Attention!

REDUCED PRICES ON DOUBLE TREAD TIRES

30 x 3 Plain - $5.00
30 x 3½ NonSkid $6.75

All other sizes on request. 20% deposit on C. O. D. orders required. Write for list to

M. LIBEN & CO.
793k 7th AVE. NEW YORK CITY

PRICE WRECKERS
Double Tread Tires with Double Lock Stitch

30x3	N. S.	$5.50	34x4½	N. S.	$11.00
30x3½	"	6.50	35x4	"	10.00
32x3½	"	7.25	36x4	"	10.25
31x4	"	7.50	36x4½	"	11.00
32x4	"	8.00	36x5	"	12.00
33x4	"	9.50	37x4½	"	12.25
34x4	"	10.00	37x5	"	13.00

We carry a full line of Firsts and Factory Blemished Tires and Tubes at moderate prices.

ROYAL TIRE EXCHANGE
282 Halsey St. Newark, N. J.

DOUBLE TREAD TIRES
We carry a full line of new and used tires and tubes. H. GINSBERG & SONS, 236 W. 48th Street, New York City.

Wagon Maker's Outfit.

W. L. Sherwood, of Kirksville, Mo., is putting on the market a valuable tool for the wood worker known as "The Wagon Maker's Outfit," which consists of a nine-inch jointer head as shown by the accompanying illustration.

The company manufactures a large line of wood working tools at prices well within the reach of small shops. Smiths who intend enlarging their plants should write for the 1919 catalog, No. 15.

Horseshoes Well Made.

One of the oldest companies in the horseshoe business is the Phœnix Horse Shoe Co., of Chicago. The Bull Dog Toe Calks are of particular note. The shoes turned out by this firm are well made and are giving universal satisfaction.

The reader who writes the firm for a catalogue is sure to get satisfaction. Now is the time to get information on the subject. See the latest descriptive circulars.

Eye-Turning Device

An interesting little machine has been placed on the market by F. J. Kitowski, of St. Cloud, Minnesota, the object of which is the easy construction of a complete and perfect eye. One turn of a lever is all that is necessary in the process, which is simplicity itself.

Eyes formed by this machine are of any size desired, and the dimensions are readily determined. The maker of the device will be only too glad to answer any questions from persons interested.

Our readers will realize that there is scarcely a device which is more necessary to a blacksmith shop than one of this sort. The machine is very simple in construction.

Two New Developments in Halladay Line.

The L. P. Halladay Company, Streator, Ill., has recently put a new bumper bar, named from its construction the "Truss Spring," on the market. This bar is made in two pieces each, full length of the bar joined at the ends by a flexible connection.

The inside or rear bar is curved forward at the center and is secured to the front member forming a truss that greatly stiffens the bar, yet allows it to yield under impact.

The lines are graceful and the strength enormous, making a bar that is both attractive and affords the utmost protection to the car without the disastrous smashing effect to the object struck, that accompany the rigid type of bar.

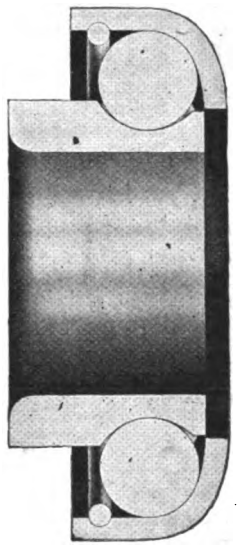
This bar is supplied with the Halladay improved under frame clamp fittings or with any of the Halladay frame connections.

Another new Halladay bumper fitting is especially designed for use on cars equipped with snubbers. For this purpose the frame connection is short, extending back only a few inches from the frame end. It has a wide range of adjustment to conform with any angle and curvature of the frame extension, and is supplied, equipped, with any of the Halladay bars, including the truss spring bar, above described.

A New Ford Bearing.

The Burgess-Norton Mfg. Co., of Geneva, Ill., are manufacturing a new bearing for Ford and Chevrolet front wheels, which combines quality with low cost. This is an addition to the present complete line of Ford replacement parts. The bearing is known as the "B-N Long Life" and is guaranteed to last indefinitely. It is a ball bearing, but constructed in such a way that the cones cannot separate from the ball races, thereby allowing the balls to be pounded and jammed.

From the cut it can readily be seen that it becomes a unit bearing. It is possible to run with a loose adjustment of the front wheel, without any damage being done.

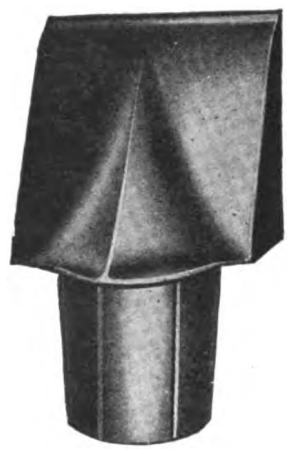


A Cross-Sectional View of the New "B-N Long Life" Bearing for Ford and Chevrolet Front Wheels.

This company has introduced a new innovation, in that every article that they manufacture will be stamped "B-N." This protects the dealer and jobber against inferior goods, and will go a great ways toward obtaining rapid orders. For further information in regard to the "B-N Long Life" bearing and the "B-N" Ford accessories, address the Burgess-Norton Mfg. Co., Geneva, Ill.

ADVERTISE

Believe that you are destined to win, whatever be the odds. The quitter is sure to be a failure.



Quality and Service

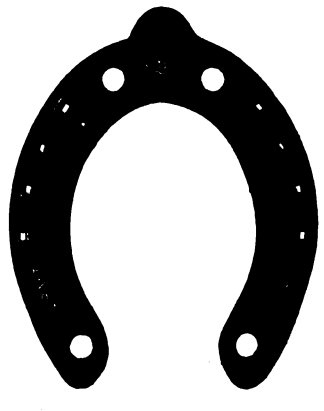
in *design*, *wear*, *fit*, *finish* and all-around efficiency have been, are and always will be, the first consideration in the manufacture of

DIAMOND
CALKS and SHOES

We aim to make our product of such superior excellence in everything that makes for satisfied dealers and satisfied users that they will not only ask for, but insist on the DIAMOND line because they cannot buy a better one.

Your good will and your customers' good will are what we want above all else.

Diamond Calk Horseshoe Co.
Duluth, Minn.



Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

Extract from page 324 of the June, 1917, issue of The Horseshoers' Journal

Horseshoeing business in Albany opened very quietly this spring. In fact, we still feel the harmful effect that the drive calks has done the business, but strikes in the building line has also effected trade, a large number of horses owned by contractors are remaining unshod, and are still carrying (to May 10th) their winter shoes of drive calk variety.

CHAS. W. KIRK.

ARE YOU *in this boat?*



John Wiseman Says to Bill from Missouri:

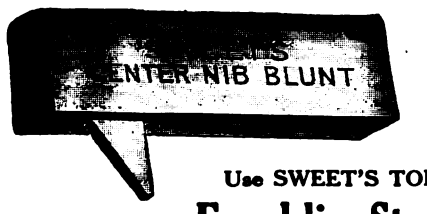
"It's time for a lot of you fellows to wake up. Ram your hand down into your pocket and see if the cash jingles with the merry sound as of yore.

"If not, why not?"

"There's a Reason, of course. And that reason is that you've been using calks that the owner can replace himself. Naturally his horses come less frequently to your shop. You have less business—less cash to jingle in your jeans.

"Do you get the idea?"





Every set of welded calks you put on helps to keep your shop full because the horses must be brought to you to have the worn calks replaced. And the users are satisfied users, too.

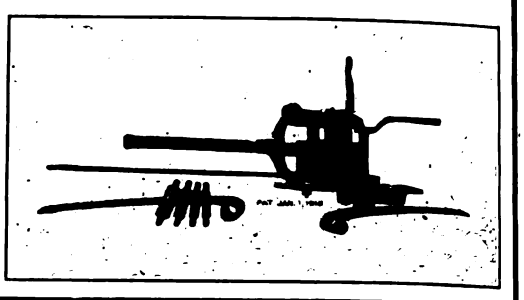
Use SWEET'S TOE CALKS—"The Cold Cut Dreadnaught."

Franklin Steel Works, JOLIET, ILL. CAMBRIDGE, MASS. HAMILTON, ONTARIO

No. 2.

THE KITOWSKI EYE TURNING DEVICE

The one and only machine that will make a complete and perfect eye of any desired size with one turn of the lever. Price is very reasonable. For particulars write



F. J. KITOWSKI
St. Cloud, Minnesota

STAR STEEL SHAPES

ARE A GUARANTEE OF QUALITY

PLOWSHARES	SHOVEL POINTS
LISTERSHARES	DRILL POINTS
MOLDBOARDS	PLOW POINTS
SUBSOILERS	SEEDER POINTS
LANDSIDE POINTS	LANDSIDE PLATES
CULTIVATOR SHOVELS	



Made from Soft Center, Solid Cast or Crucible Steel.
BEST MATERIAL AND WORKMANSHIP.
STAR MANUFACTURING CO.
CARPENTERSVILLE, ILL.

WELDING PLANTS, $25.00 to $300.00

Designed for all purposes. Small cash payment; balance, three to six months. Every mechanic and shop should have one.

BERTSCHY-BERMO CO. **OMAHA, U. S. A.**

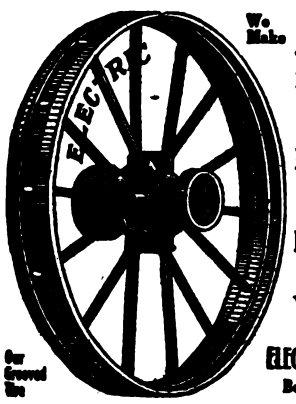
THE ARMSTRONG MFG. COMPANY

BRIDGEPORT CONN., U.S.A.
NEW YORK OFFICE 248 CANAL STREET

like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



"Makers of the Genuine ARMSTRONG Stocks and Dies."



We Make **STEEL WHEELS** To Fit Any Axle Plain or Grooved Tire

Steel or Hickory Axles Any Size

A Full Line of **Wood and Steel Farm Trucks** With Steel or Wood Wheels

Write for Large Catalog and Prices

ELECTRIC WHEEL CO.
Box N, Quincy, Ill.

Our Grooved Tire



ABSORBINE ***STOPS LAMENESS***

from a Bone Spavin, Ring Bone, Splint, Curb, Side Bone, or similar troubles and gets horse going sound. It acts mildly but quickly and good results are lasting. **Does not blister or remove the hair** and horse can be worked. Page 17 in pamphlet with each bottle tells how. $2.50 a bottle delivered. **Horse Book 9 R free.**

ABSORBINE, JR., the antiseptic liniment for mankind, reduces Painful Swellings, Enlarged Glands, Wens, Bruises, Varicose Veins; heals Sores. Allays Pain. Will tell you more if you write. $1.25 a bottle at dealers or delivered. Liberal trial bottle for 10c stamps.

W. F. YOUNG, Inc., 55 Temple St., Springfield, Mass.

DON'T JUNK YOUR WEAK TIRE

and lose from $5.00 to $35.00 worth of mileage. Strengthen it on the "inside" and use it from 1,000 to 4,000 miles longer. Save that money.

MAXOTIRES
MAKE ALL TIRES TROUBLE-PROOF

They prevent blowouts (even at rim), punctures, stone bruises — taking grief out of motoring. Are reliable. Dealers re-order them in Car Load shipments.

FREE MAXOTIRE catalog and name of nearest dealer costs only the price of a postal card and may save you hundreds of dollars.

K&W RUBBER COMPANY
50-60 Channing Street DELAWARE, OHIO
RELIABLE—ESTABLISHED 1908



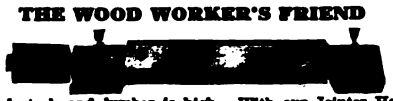
SAMPLE OF WELDING COMPOUND FREE

BLACKSMITHS! Anchor Welding Compound has no equal for strength. It welds the hardest steel. Good for both big and little jobs. Try it.

Write to-day and mention The Blacksmith and Wheelwright.

N. D. DOXEY, ELMIRA, N. Y.

THE WOOD WORKER'S FRIEND



Wood stock and lumber is high. With our Jointer Heads you can buy rough lumber of any kind and dress it to suit your job. Saves time, money and lumber. Would this be any object to you? If so, get circulars and prices. Sold on 30 days' trial. Manufactured by

Whitaker Mfg. Co. Gibson, Iowa

"GEARS AND WAGONS"

Selle Gears Forty years of success has placed "Selle Gears" and Wagons in the hands of the largest wagon users in the world. Express and Transfer Companies, Department Stores, etc., specify "Selle Gears" and will take no other after once tried. 230 Page Catalog Free.

THE AKRON-SELLE CO. Akron, Ohio

PATENTS

C. L. PARKER
Ex-Member Examining Corps, U. S. Patent Office
Attorney-at-Law and Solicitor of Patents
American and foreign Patents secured. Trade marks registered. Searches made to determine patentability, validity and infringement. Patent suits conducted. Pamphlet of instructions sent upon request.
McGill Building WASHINGTON, D. C.

Laffite Brazing Powder.

The Laffite brazing powder is used to replace ordinary borax and makes an excellent substitute. No blistering results, and the formation of oxides is avoided. A perfect braze is made, and it can be easily and quickly cleaned.

The brazing powders can be used alone or mixed with spelter in the proportion of about fifteen pounds of powder to eighty-five pounds of spelter. This mixture may be used dry or in the form of a paste, as desired. Moisten according to requirements.

Samples of these brazing powders are gladly furnished by the Phillips-Laffite Co., Pennsylvania Bldg., Philadelphia, Pa.

Reinforced Nail Points.

A nail that bends when being driven is dangerous. That goes without saying, and yet with the old-fashioned nail there was much trouble experienced through bending. Many a good horse went lame as the result of the use of poor nails in the shoes.

A nail that resists bending as well as any on the market is manufactured by the Union Horse Nail Co., of Chicago, Ill. One of the features is a reinforced point which makes the nail easy to drive and safe to use. The manufacturers will furnish readers with any descriptive matter and samples desired.

Ready-Made Springs.

It is not always easy or wise to repair a spring, especially when new ones ready-made can be obtained at the figures now prevailing. A blacksmith may not have the right grade of stock handy for making springs, or he may not have had the experience in that particular line to make a spring quickly and satisfactorily. In such cases, it is well to have a list of makers on hand, so that orders can be sent at once and the new article obtained quickly.

Those interested in such matters would do well to write for catalogues and lists provided by the New Era Spring & Specialty Co., 1138 Hamilton Ave., Grand Rapids, Mich.

Company and Town Celebrate.

Because of the centennial celebration of one of its industries, the town of Southington, Conn., will have one of the most elaborate "Welcome Home" ceremonies and festivities for its soldiers of any town of its size in the country.

The Peck, Stowe & Wilcox Company, hardware manufacturers, will celebrate on August 29 and 30, the closing of one hundred years of hardware manufacturing in Southington. In recognition of the occasion they are having built, to donate to the town, a massive memorial to all of its soldiers, which shall serve as a base for a flag pole and flag, also to be given by this company.

Because of the presentation of this memorial, the town decided that these dates would be most fitting ones on which to pay honor to their returned soldiers of the great war, and the occasion has developed into a general "home-coming" time for former residents of Southington as well.

Speakers of national, military, and political standing will make the addresses of the day and express to the returned soldiers something of the gratitude which the country as well as their home town extends to them.

A pageant dramatizing the military and industrial history of Southington and the State of Connecticut will be given following the unveiling ceremonies, and a military parade will take place at the close of the pageant.

The Peck, Stowe & Wilcox Company will give a huge community picnic the day before these features of the celebrations, and it is expected that at least ten thousand will attend this.

A Study in Horseshoes.

A company that has made a study of horseshoes clear back to the earliest historical times is the Bryden Horse Shoe Co., of Catasauqua, Pa. Not only has this study been made, but it has resulted in many modifications in shoe structure which otherwise would not have been undertaken.

The company dates back to the year 1882, and has been actively in the trade ever since. The factory is characterized by the thorough inspections of the various products as they come from the hands of the workmen. Any article not up to the high standard maintained is cast out at a loss. It pays to do this in the long run.

The trade names of the shoes and racing plates are "Boss," "Banner," and "C and K." Racing plate steel is also one of the specialties supplied. Catalogue furnished on request.

Digitized by Google

GET DOWN TO BUSINESS
AND YOU'LL GET UP TO THE BIG PROFITS!
JUSTRITE PLOW BLADE SHARPENER

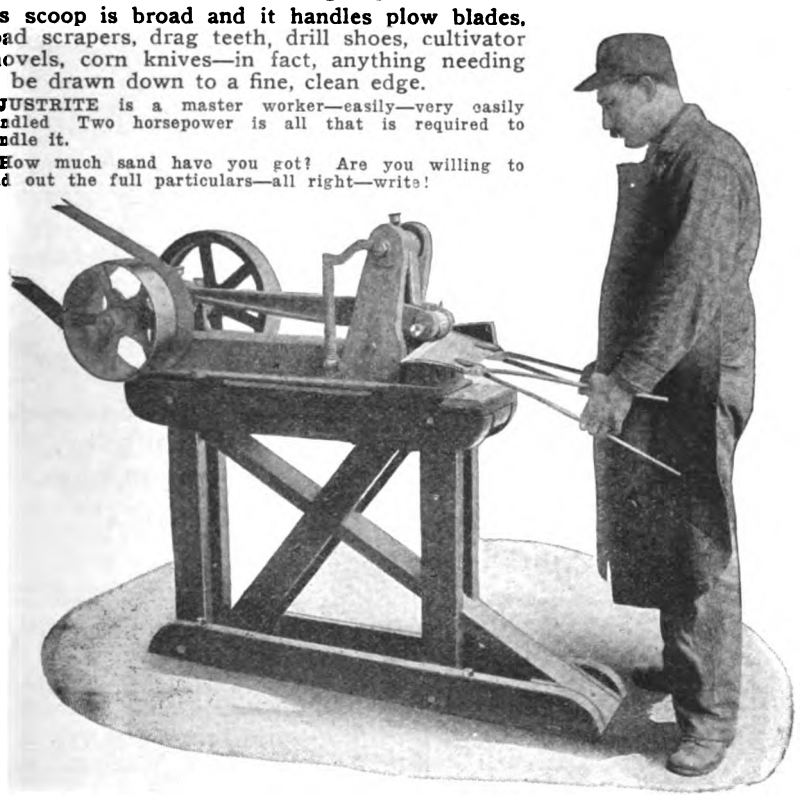
Gets the money for you hand over fist! No fooling around—no lagging behind—it pays for itself in double quick time. You can't beat it for speed and accurate, smooth work—no battering or nicks—no chance work—no guess work. Justrite is right—it is sure—it is strong—it will be your good friend and it is almighty reasonable in price.

This ROLL is what makes the Justrite the most modern and the most profitable method of sharpening implements.

Its scoop is broad and it handles plow blades, road scrapers, drag teeth, drill shoes, cultivator shovels, corn knives—in fact, anything needing to be drawn down to a fine, clean edge.

JUSTRITE is a master worker—easily—very easily handled. Two horsepower is all that is required to handle it.

How much sand have you got? Are you willing to find out the full particulars—all right—write!



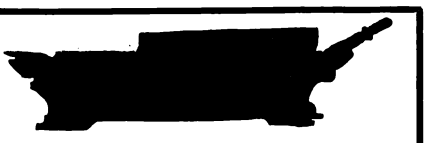
STRITE GOVERNOR PULLEY COMPANY
307-309 SOUTH THIRD STREET MINNEAPOLIS, MINNESOTA



HERE'S YOUR CHANCE

This 5 Passenger, 4 cylinder, 37 H. P. BUSH Car—Timken Bearings—Willard Batteries—2 Unit Starting & Lig.—116-inch whl. base. Write at once for the best Automobile Offer in existence—Don't wait—Cars guaranteed or money back.

BUSH Address J. W. Bush, President. Dept. H-5 MOTOR CO., Bush Temple, Chicago, Illinois



5" Hand Planer or Bench Jointer for $36.00

Same quick easy adjustable features used on our larger sizes of machines. Cast iron and steel construction.

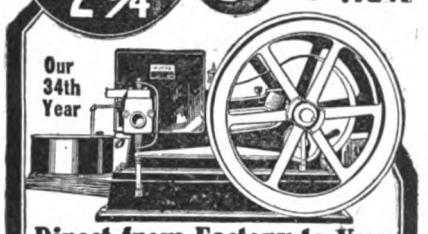
Catalogue No. 15 gives further information on the above and other sizes.

W. L. SHERWOOD, Kirksville, Mo.

Do you want anything? Is your shop for sale, or do you want to buy a shop or hire a man? If so, a "Want" advertisement in THE BLACKSMITH AND WHEELWRIGHT will bring you good results. See terms at the head of the "Want" Department on another page.

WITTE

2 H.P. ENGINE PULLS 2¾ $39.95 NOW



Direct from Factory to You

ALL SIZES AND STYLES
2, 3, 4, 6, 8, 12, 16, 22 and 30 H-P.

LOW PRICES

Don't wait if you need an engine for any purpose. NOW is the time to buy.

Life Guarantee Against Defects

Big surplus horse-power. Above price includes engine complete on skids, ready to operate when you get it. Safe delivery guaranteed. Immediate factory shipment. Write or wire for big, new catalog of these wonderful engines.

WITTE ENGINE WORKS
2443 Oakland Ave. KANSAS CITY, MO.
2443 Empire Bldg. PITTSBURGH, PA.

Edwards Shears

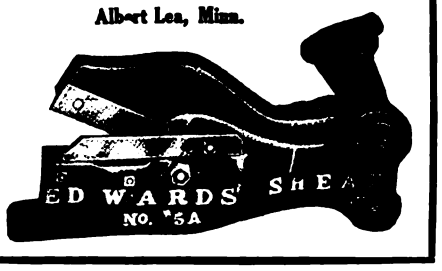
For twenty-four years the **Two Leading Low Priced Shears** in the U. S., representing the **Greatest Value** for the **Least Money.**

No. 5, weighs 200 lbs., cuts 4x¼ inch soft steel.
No. 10, weighs 430 lbs., cuts 4x¾ inch soft steel.

At their price you should have had one long ago. **Order one** from the first iron man that calls on you. **They All Sell Them.**

Write for descriptive circular and prices.

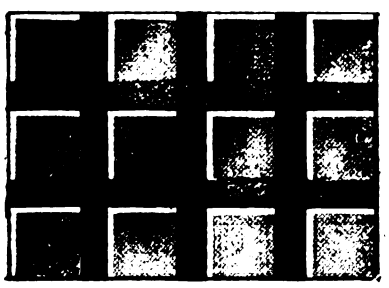
C. D. EDWARDS MFG. CO.
Albert Lea, Minn.



LAFFITTE
BRAZING PLATES
DOES AWAY WITH THE USE OF BORAX

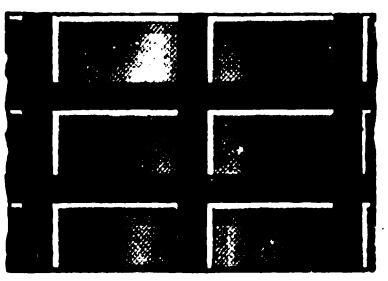
Each contains the necessary amount of it respective grade of Spelter and will effect a perfect braze without swelling, blistering or oxides.

No. 1



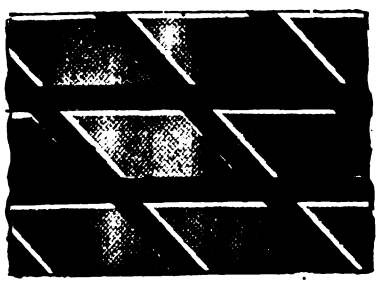
FOR BRAZING BRASS RED COPPER and BRONZE

No. 2



FOR BRAZING RED COPPER and IRON

No. 3



FOR BRAZING IRON and STEEL

High Speed Tool Steel Points to Carbon Steel Shanks

Samples Free **At All Dealers**

THE PHILLIPS-LAFFITTE CO.
PENNA BLDG. PHILA, PA.

There's a Harvey Jobber near you who can supply you, on a moment's notice, with a Harvey Spring for any make or model of automobile.



Car-owners naturally place more confidence in dealers who handle the Harvey Spring.
They have learned to look for and insist upon this trademark that guarantees quality—

Send to your jobber for the Harvey Spring Book or write

Harvey Spring & Forging Co.
1088 17th Street Racine, Wis.

Harvey RACINE Boltless Automobile Springs
Easy Riding - Guaranteed

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google



THE tallyho or the small buggy; the dressy turnout or the doctor's gig—it's all the same! Equip them with Firestone Tires for long, easy, good-looking service.

And *you* have the profit in light weight, the value in good-measure size and the convenience of standard design.

Write for Information.

FIRESTONE TIRE & RUBBER CO.
FIRESTONE PARK AKRON, OHIO

Branches and Dealers Everywhere

Firestone Carriage Tires

YOU CAN WELD STEEL AS EASILY AS IRON



Especially adapted for welding tires, axles, springs and all lap welding.

Either of these compounds will weld steel at the lowest possible heat that steel can be welded. Also protects steel at high heat.

Owing to our improved process of manufacturing, these compounds do not boil off and waste in the fire but adhere to the metal when applied.

FOR SALE BY ALL LEADING DEALERS IN BLACKSMITH SUPPLIES IN UNITED STATES AND CANADA



PREPARED ESPECIALLY FOR WELDING
FAR SUPERIOR TO COMMON BORAX

A flux which causes the steel to weld like iron. Not necessary to apply between the lap, but may be applied to the outer surface of the work, the same as borax. Has no equal for plow work. Just the thing for welding toe-calks so they can't knock off.

Large Free Samples Sent upon Request

CORTLAND WELDING COMPOUND CO.
CORTLAND, N. Y.

940 Pages instead of 824 — **NINTH EDITION** — 3362 Illustrations instead of 2000

$4.46 prepaid DYKE'S AUTO ENCYCLOPEDIA $4.46 prepaid

Entirely re-written, hundreds of illustrations and many new subjects added. Practically a new book. A non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 50 Instructions—Simplified and Practical.

3362 Illustrations—the kind you understand at a glance.

2 Supplements, part printed in two colors, treating on the construction, operation, repairing and adjusting of the FORD and PACKARD—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.

778 illustrations and 279 pages on Electric Ignition, Electric Starters and Generators, etc.

81 pages and 79 illustrations on the Delco system alone.

60 pages and 254 illustrations on Adjustments, Tests, etc., of leading Electric Systems.

154 pages and 1139 illustrations on Repairing.

Oxy-Acetylene welding. Axle, Differential and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.

27 pages and 180 illustrations on Tires and Tire Repairing.

44 pages and 119 illustrations on Carburetion.

89 pages and 291 illustrations on Engines and Parts.

16 pages on Digest of Troubles.

6000 lines to the Index. This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. Index begins on colored paper, easy to refer to.

Dictionary is also included, which gives the meaning of motoring terms

Inserts: There are five—printed in colors. New features you never before saw or heard of in one of the inserts.

Additions to the Ninth Edition:

TRUCKS, TRACTORS, MOTORCYCLES, AIRPLANES and LIBERTY ENGINE

HOW TO BECOME AN EXPERT AUTOMOBILE MECHANICIAN

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion subject so thoroughly, you can adjust any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

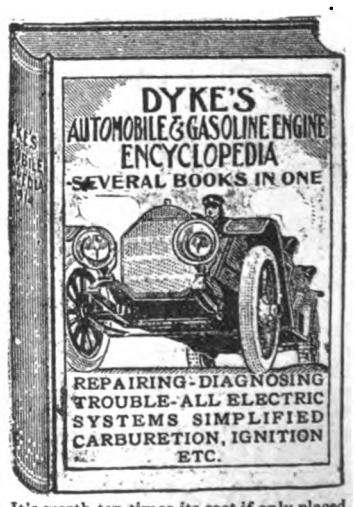
Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical Automobile book in America. Price $4.46, prepaid.

Price will advance to $5.00 September 1st.

Address all orders to

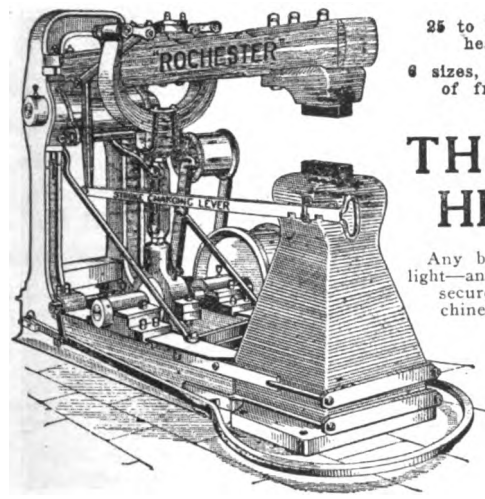
THE BLACKSMITH & WHEELWRIGHT
73 MURRAY STREET NEW YORK



It's worth ten times its cost if only placed on the shelf and used as a reference.

Digitized by Google

KEEP UP WITH THE TIMES



25 to 100 lb. heads

6 sizes, 2 styles of frames

If you don't, these days of rapid transit, quick decisions, 100% efficiency in all departments, you'll be lost as sure as fate. A post card will bring you and this machine in contact with each other.

THE ROCHESTER HELVE HAMMER

Any blow, long or short, fast or slow, heavy or light—any length, weight and force of blow instantly secured on the Rochester "Helve" while the machine is running. This feature alone saves so much time where there is a variety of small work to be forged, swaged or welded, that it recommends the tool without reference to its other distinctive features. Made in 6 sizes, 2 styles of frames; 25-lb. to 100-lb. heads. For Welding and General Forging the "Rochester" is peerless in efficiency. Full description in catalog.

GET OUR HELVE HAMMER BOOK

THE WEST TIRE SETTER CO. :: :: Rochester, N. Y.



Free 448 PAGES OF BARGAINS

POST PAID

WE WANT TO SEND YOU THIS 448 PAGE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

Tells how you can work up a profitable auto supply and repair business.

Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories
1117 W. 11th Street, Cleveland, Ohio, U. S. A.



NEW ERA "Better" Springs ARE TOUGHEST

The reason for the popularity of our low priced Springs lies in the fact that they are perfectly tempered over their whole length and properly annealed, to add toughness to their temper.

NEW ERA "Better" Springs last longer under the roughest use.

Your customers driving all makes of cars, will not be satisfied with anything else, once they have tried this TOUGHEST SPRING.

EVERY SPRING IS GUARANTEED AGAINST SAGGING OR BREAKING and will be replaced free of charge if shipping costs to and from the factory are paid.

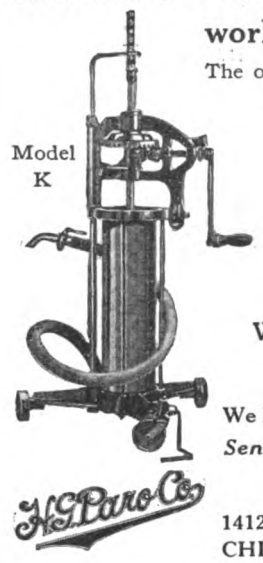
YOUR CUSTOMERS WILL APPRECIATE THIS AND YOU WILL PROFIT FROM THIS POPULARITY.

NEW ERA SPRING & SPECIALTY COMPANY
1111 Hamilton Ave. Grand Rapids, Michigan

Ekern's Portable Garage Grease Guns

work the heaviest grease as well as oil.

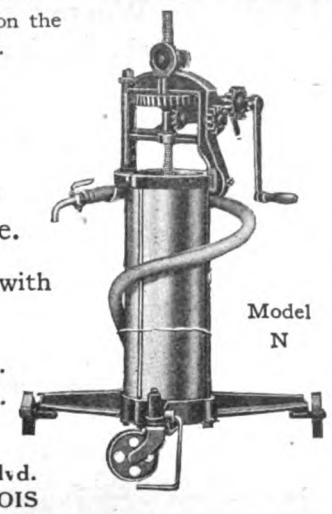
The only hand-operated guns on the market that will do this.



Model K

Quick, Clean,
Saving,
Always Ready,
Easy to Operate.

We back the jobber with our guarantee.



Model N

We have other shop devices.
Send for complete Catalog.

H. G. Paro Co.

Department B
1412-14 South Michigan Blvd.
CHICAGO - ILLINOIS

THIS PROFIT PRODUCER

OUGHT TO BE IN YOUR SHOP RIGHT NOW!

UNIVERSAL WHEEL COMPRESSOR

If you buy it *NOW*—at the end of a year you will know that your machine has paid for itself five times over. Why wait a year?

Just imagine your being able to compress wheels and close joints perfectly before putting on the tire or rim—a splendid, masterful job—completely and professionally finished. Imagine the pleased expression on the Auto or Truck Owner's face when his work is done so good—and so long before he expected it. That's the man who will pay a good price willingly—gladly—and thank you in the bargain—yes, and recommend your good work besides. Don't stand stock still and let everybody else get ahead of you!



This machine is constructed so the compressing ring can be moved like a turntable. No belts, pulleys nor power needed. Takes up very little space. Can be easily moved.

Don't Put it Off—Write to Us Today

UNIVERSAL WHEEL COMPRESSOR CO.
CEDAR RAPIDS, IOWA

PARKS WAGON SHOP SPECIAL

You may think you don't need this practical woodworker in your shop. Take advantage of our trial offer, and be convinced how much it will save you. **Machines sent on trial anywhere in United States and Canada.**

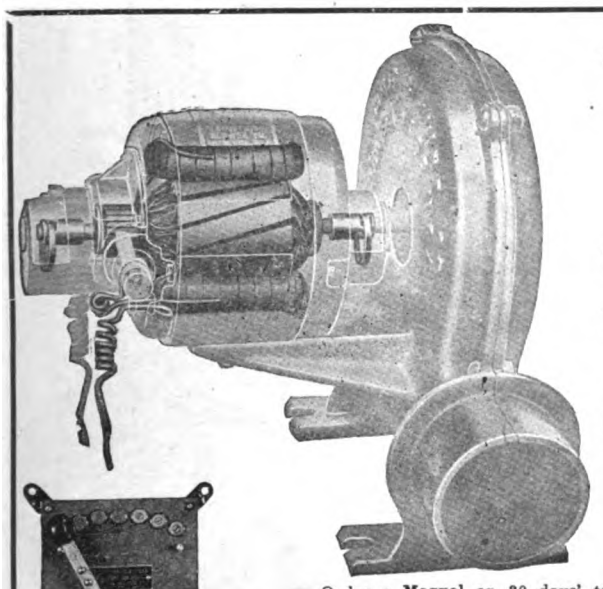


Machine is a combination of Circular, Rip and Cross Cut Saws,
22" Band Saw,
12" Jointer,
Rim Rounder,
Felloe Borer,
Spoke Tenoner,
All ready for instant use. No Changing.

Light size takes 2 to 3 H. P., heavy size 3 to 4 H. P.

Write for catalog and full information about how a woodworker should be arranged to be convenient to operate.

Parks Ball Bearing Machine Co.
North Side Station
Cincinnati, O.



"ONE FIRE" MARVEL

A. C. or D. C.
or
UNIVERSAL MOTORS

Extra Large Ring Oil Bearings

Case Hardened Armature Shaft

$38.00 Net

Order a Marvel on 30 days' trial through your Dealer, or your Electric Light Company

Electric Blower Co., 352 Atlantic Avenue BOSTON, MASS.

THERE'S NOTHING

mysterious about it. Efficiency is simply doing the right thing first! Can you beat that for truth? What's the answer? Why, put in that

Kerrihard Power Hammer

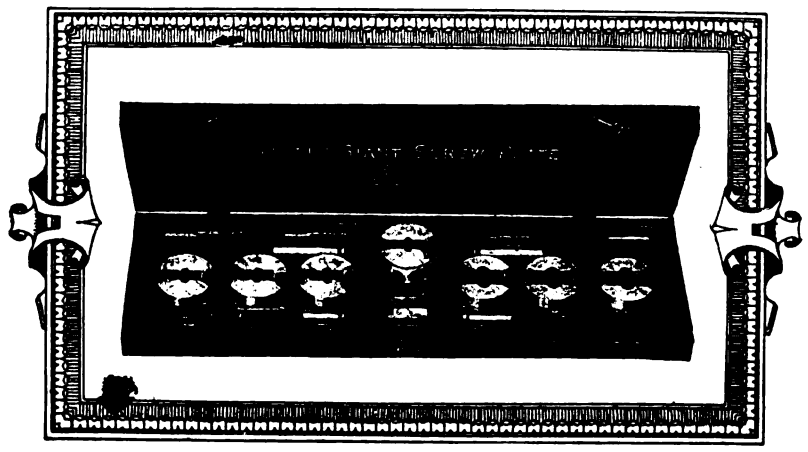


You've been promising yourself a Kerrihard for a long time. Why not do it today—instead of eventually?

Write for full particulars.

THE KERRIHARD CO., Kerrihard Sta., Red Oak, Ia., U.S.A.

Digitized by Google



Finished On Time?

The jobs you promise and don't deliver on time are the ones that drive business to your competitor.

Where screw-threads are required, there's just one sure way to get the work done on schedule. Use

GTD
Look for the trademark

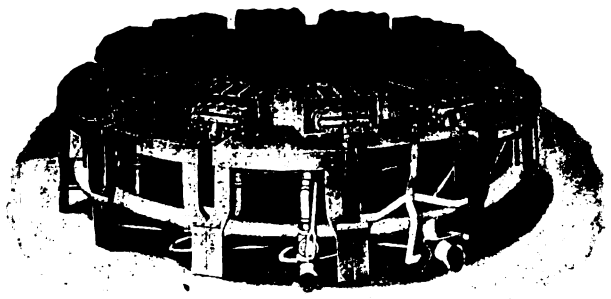
SCREW PLATES

Designed by the best mechanical skill, built of dependable steel, handy for every imaginable use in garage or machine repair shop — these tools have been the first choice of experts for nearly forty years.

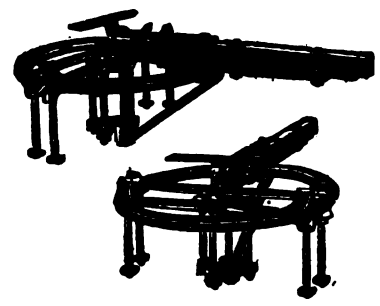
"Little Giant," "O. K.," "Green River," "Lightning."
The Screw Plates that save you dollars.

Our catalog shows cuts of special Screw Plates for all kinds of auto repair work. Requests will be promptly complied with.

GREENFIELD
TAP & DIE CORPORATION
Greenfield, Massachusetts, U.S.A.
World's Largest Manufacturers of Screw Cutting Tools







TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas, Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.
OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.

Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE COCEL MFG. CO, TOLEDO, OHIO.

ROBERGE'S GREAT BOOK

"THE FOOT OF THE HORSE"
By DAVID ROBERGE

The author of this book for many years enjoyed the entire confidence of Robert Bonner, who, in his day, owned many of the fastest trotters the world has ever seen. Bonner and Roberge worked together in shoeing the former's horses. Many believe that David Roberge was the ablest horseshoer this country has ever seen. His book is filled with plates and illustrations showing proper methods of shoeing horses for every kind of lameness. We have sold large numbers of these books and they have always given entire satisfaction. The work represents the life experience of its author. Sent to any address, postage prepaid, on receipt of price, **$5.00.** Address
M. T. RICHARDSON CO., Publishers, 71-73 Murray Street, New York.

Advertising has saved many a business man when his ship was near the rocks — but why wait that long?

PEXTO TOOLS

Husky
as They Make 'Em

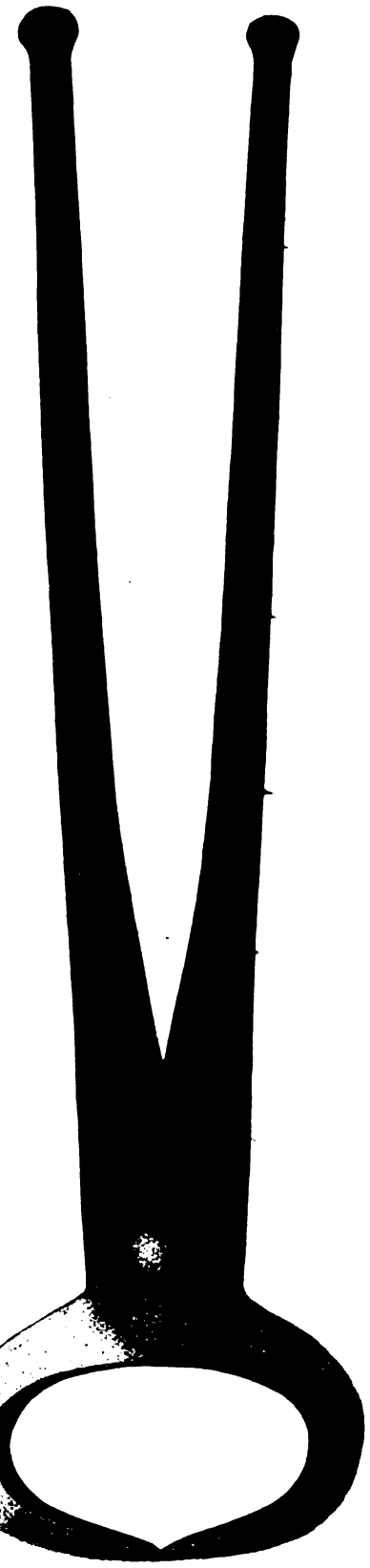
Built strong where the strain comes. Built with the accuracy and precision farriers like. Built by Pexto.

If it's Pexto-made, it's made right. Pexto Farriers' Pincer below has oil-tempered and polished jaws, extra heavy rivet at the joint, close-biting jaws.

Insist on Pexto Blacksmiths' and Farriers' Tools — pincers, nippers, parers, butterises, farriers' hammers, etc.

If your dealer cannot supply you, write us.

THE PECK, STOW & WILCOX COMPANY
Manufacturers Mechanics' Hand Tools, Tinsmiths' and Sheet Metal Workers Tools, and Machines, Builders' and General Hardware.
Southington, Conn. **Cleveland, Ohio**
Address correspondence to 209 W. Center St., Southington, Conn.



Digitized by Google

ESTABLISHED 1880

The Pioneer Journal of its Class

THE BLACKSMITH & WHEELWRIGHT

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U. S. Patent Office.

Entered as Second-class Matter March 4, 1880, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Published Monthly.

Vol. LXXX. No. 3 NEW YORK, SEPTEMBER, 1919 TERMS: One Dollar a Year. Foreign, $1.50. (6s. 3d.)

GUIDE AND INDEX TO ADVERTISEMENTS, PAGE 22.

THE ART OF HORSE SHOE MAKING



WE MAKE

SHOES

TO MEET EVERY REQUIREMENT

Here Are a Few of Our Specialties

Sideweights—Bryden "C" Horse and Mule Ideal Calked — Toeweight — Clipped Goodenough.

Send for Descriptive Catalog which Shows Our Full Line with Weights, Etc., Etc., Etc.





Bryden Horse Shoe Works

Catasauqua, Pa.

Maximum Service—
Minimum Expense



When you put Capewell nails into a hoof you can rest assured that they will uphold the reputation of the very best workmen.

They will not cause dissatisfaction on the part of your customers by breaking at the head or the clinch, or damaging the hoof.

The ease with which you can drive Capewell nails make them an economical factor in any shop, and highly satisfactory to the man who drives them.

All the nails are good. No waste to pay for—no nails to throw away. Each is specially inspected by hand.

WHEN YOU ORDER NAILS

order the best. You who pay for them are entitled to perfection in form and finish, and to the highest quality procurable.

In the long run Capewell nails give the best service at the lowest cost.

The Capewell Horse Nail Company

HARTFORD, CONN., U. S. A.

New York, Philadelphia, Baltimore, Buffalo, New Orleans, St. Louis, Chicago, Cincinnati, Detroit, Denver, Portland, San Francisco, Toronto

Hi-Lo-Jacks

Six Sizes



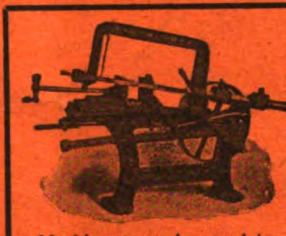
Close to 6 in.
Extend to 17 in.

Capacities ½ to 12 tons

Made by

The RoweCalk & Chain Co.

Plantsville, Conn.



Saw Those HeavyBars ON A MARVEL Power Hack Saw

Machine stops when work is cut off. Requires very little power.

Price is Low. Write Us.

Ask for reply by return mail.

ARMSTRONG-BLUM MFG. CO.

340 N. Francisco Ave., Chicago, Ill., U. S. A.

THE TEETH IN

BLACK DIAMOND RASPS

ARE MINGLED

So as to Cut Clean and Free and Leave no Furrows In the Work

Twelve Medals of Award by Jurors



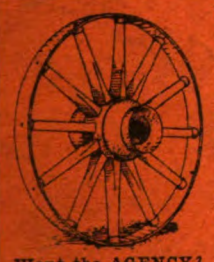
At International Expositions

C. & H. BARNETT COMPANY

Black Diamond File Works, PHILADELPHIA, PA.

Owned and Operated by NICHOLSON FILE CO.

Copy of Catalog sent Free to any interested file users upon application.



WONDERFUL INVENTION

Makes the repaired WOOD Wheel better than new. Guarantee every wagon against loose tires or dished wheels.

PLEASE EVERY CUSTOMER

Saves Time, Costs Less, A Business Builder, A Money Maker.

Want the AGENCY? Then WRITE TODAY.

ADJUSTABLE WAGON TIRE MFG. CO.

Shipping Point Near You. OKLAHOMA CITY, OKLA.



SUREGRIP CALKS

American Calk Co.

DETROIT, - - - MICH.

AETNA STEEL TOE CALKS

Made by THE AETNA NUT CO., Southington, Conn.

BLACK HORSE BRAND

BEST SHAPE
BEST SPUR
TO DRIVE
BEST STEEL



TOE AND HEEL CALKS

SOLD BY ALL DEALERS

Stokes Bros.' Improved Horse Rasps

Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A

THE WOOD WORKER'S FRIEND



Wood stock and lumber is high. With our Jointer Heads you can buy rough lumber of any kind and dress it to suit your job. Saves time, money and lumber. Would this be any object to you? If so, get circulars and prices. Sold on 30 days' trial. Manufactured by

Whisler Mfg. Co. Gibson, Iowa

STEEL STAMPS

BURNING BRANDS

RUBBER STAMPS

STENCILS

GEO. M. NESS, JR.

61 FULTON ST. NEW YORK

Send for price list.

Digitized by Google

UNIFORMITY

SHELDON AXLES AND SPRINGS

HAVE LONG BEEN

INTERNATIONALLY FAMOUS

For Their Superiority In

DESIGN, MATERIALS and WORKMANSHIP

REASON:

Sheldon Took Guesswork Out of Axle and Spring Manufacturing

which means

UNIFORMITY OF PRODUCT

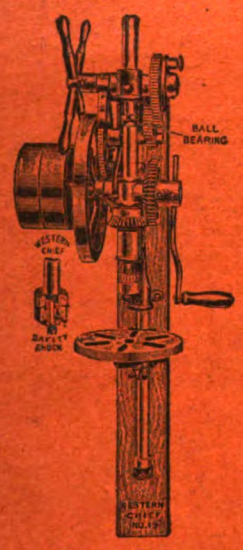
Sheldon Axle & Spring Co., Wilkes-Barre, Pa.

The Better Your Equipment The Bigger Your Profits

Buy CANEDY-OTTO

AND INCREASE YOUR INCOME

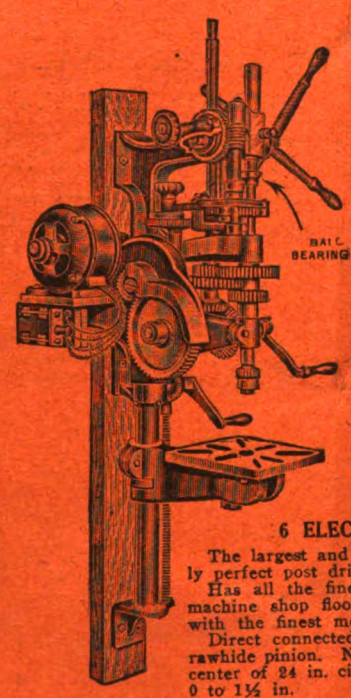
Once Tried, Always Used : There's a Reason—Quality



No. 19 DRILL

A low-priced combined hand and power self-feed drill.

Drills to center of 16½ in. circle.



6 ELECTRIC DRILL

The largest and most mechanically perfect post drill manufactured.

Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.

Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1¼ in.

OVER 200 DIFFERENT STYLES

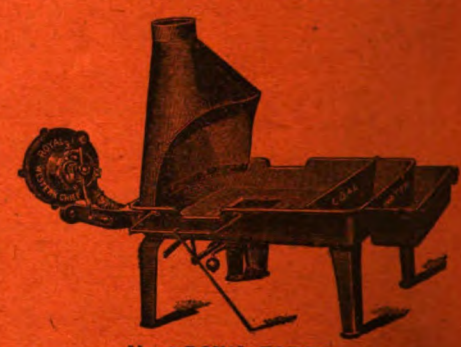
SEND FOR CATALOGUE No. 12



No. 100 ROYAL FORGE

The most popular forge ever made.

Fan, 12 in. Hearth, 31½x45½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x56 in. Blower, 12 in.



Blower, 12"
Wt., 135 lbs.
Height, 47"

ROYAL BLOWER

(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.

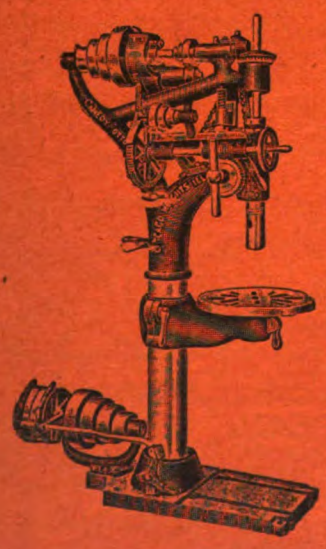
Fire pot is 8x9 in. inside.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS

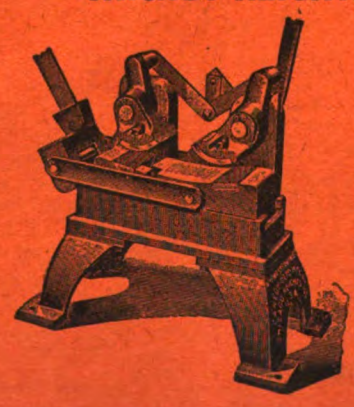


No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.

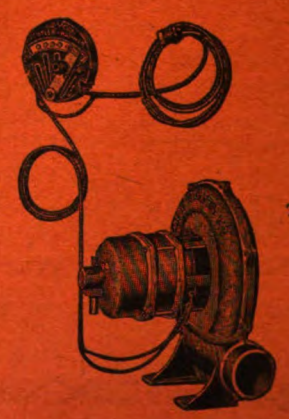
All machines are tested before leaving the factory, and guaranteed in every respect.

Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.



No. 1½ SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



No. 8 ELECTRIC BLOWER

The best outfit money can buy.

Digitized by Google

"F-S" PAINTS



"F-S" Products Stand the Most Rigid Inspection.

Your good work will stand even higher at inspection when you use "F-S" Superfine Coach Colors on your carriage, coach and automobile bodies. The best of material is used as in all "F-S" products—ground in gold-size Japan.

FELTON, SIBLEY & CO., Inc.

Manufacturers of Colors, Paints, Varnishes since 1863

136-140 North Fourth Street, Philadelphia

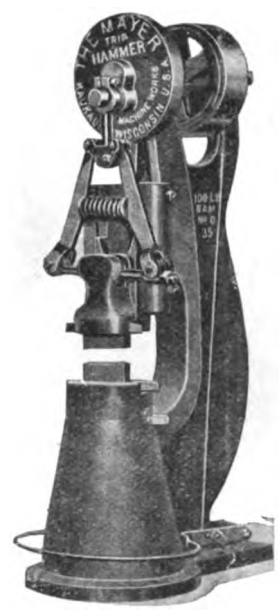
(147)

YOU

can't afford to take anything for granted. You don't have to if you purchase

THE MAYER POWER HAMMER

Because the MAYER trade mark is to Power Hammers what the Sterling mark is to silver, or Uncle Sam's signature on a Liberty Bond.



If you base your selection upon definite knowledge you'll get "The Mayer"—an investment that needs no watching. The wide demand for The Mayer Power Hammer is extremely significant to the man who is about to purchase. It points out to him the unmistakable trend of workshop opinion.

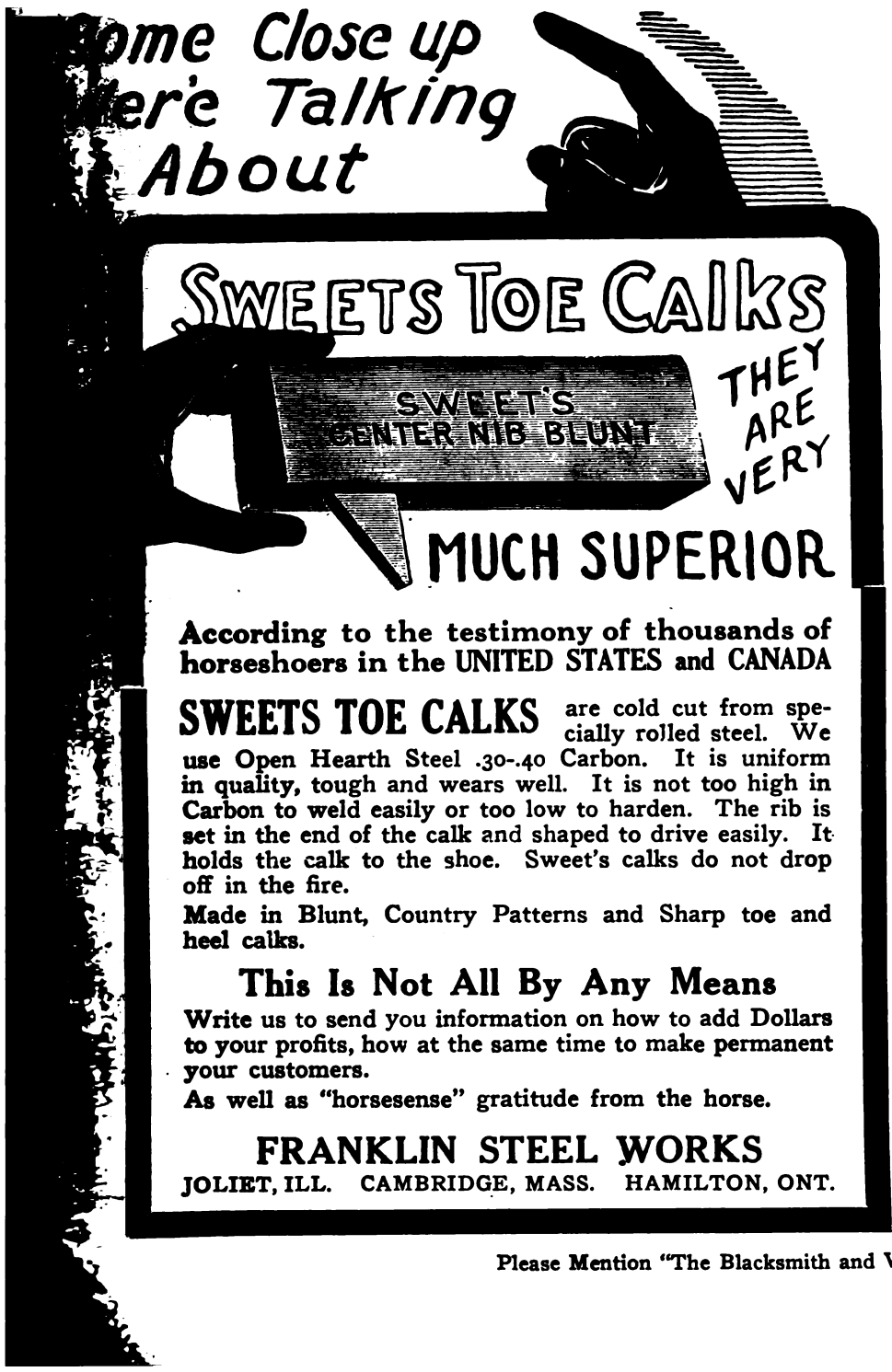
The Mayer Power Hammer reflects in full measure today's supreme accomplishment in the development of power hammers. It renders a service unparalleled in this day of specialization. There is really only a small difference in price between a good, dependable power hammer and a poor one.

But what a difference stands out when the hammer is up against a real job!

Made in 5 sizes. All details of capacity—quality points, advantages and price given by return mail—upon receipt of your letter—write.

KAUKAUNA MACHINE WORKS

KAUKAUNA, WISCONSIN



According to the testimony of thousands of horseshoers in the UNITED STATES and CANADA

SWEETS TOE CALKS are cold cut from specially rolled steel. We use Open Hearth Steel .30-.40 Carbon. It is uniform in quality, tough and wears well. It is not too high in Carbon to weld easily or too low to harden. The rib is set in the end of the calk and shaped to drive easily. It holds the calk to the shoe. Sweet's calks do not drop off in the fire.

Made in Blunt, Country Patterns and Sharp toe and heel calks.

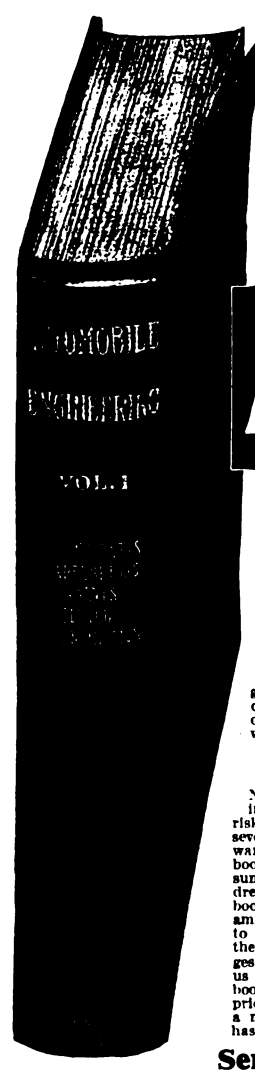
This Is Not All By Any Means

Write us to send you information on how to add Dollars to your profits, how at the same time to make permanent your customers.

As well as "horsesense" gratitude from the horse.

FRANKLIN STEEL WORKS

JOLIET, ILL. CAMBRIDGE, MASS. HAMILTON, ONT.



AUTO BOOKS

NEW 1920 EDITION

Now ready for you — this marvelous six-volume Library on Automobile Engineering! The newly-written reference work covering the construction, care and repair of pleasure cars, motor trucks and motorcycles. The most complete and advanced information in Ignition, Starting and Lighting Systems, Garage Design and Equipment, Welding and other Repair Methods. Six wonderful volumes beautifully bound in flexible covers, gold stamped; 2650 pages (5¾ x 8¼ in.), 2,100 illustrations, tables and explanatory diagrams. This great automobile library, combining the knowledge of the greatest experts in the business, now yours on payments so small as to average only 50 cents a week, or only 7 cents a day.

7c. A Day

SHIPPED FREE

No money in advance. Not a cent. See the books in your own home or shop absolutely free, at our risk. Read them, examine them, study them for seven whole days before you need decide whether you want to keep them or not. Send no money to get the books for free examination. Make no deposit. Assume no obligation. Simply put your name and address on the coupon below and mail it to us. The books will be promptly shipped to you for your examination. Take seven days to ascertain their value to you. If you are not more than delighted with them and do not consider the books one of the biggest bargains you ever made, just send them back to us and you won't owe us a penny. If you value the books and see them to be worth many times their price to you, send only $2 in seven days and then $2 a month until the special introductory price of $19.80 has been paid.

Partial List of Contents

More than 100 blueprints of wiring diagrams. Explosion Motors, Welding, Motor Construction and Repair, Carburetors and Settings, Valves, Cooling, Lubrication, Flywheels, Clutch, Transmission, Final Drive, Steering Frames, Tires, Vulcanizing, Ignition, Starting and Lighting Systems, Shop Kinks, Commercial Garage Design and Equipment, Electrics, storage Batteries — care and repair, Motorcycles, Commercial Trucks, Glossary.

Send No Money

Every repair man, every auto mechanic, every auto driver and owner will prize this magnificent library. Even the most experienced veteran in the business will find a wealth of practical information and help in this work. Prove their value to yourself at our risk. See the books without cost or obligation to you. Not a cent do you risk by sending the coupon. So do it today — NOW — while this special offer is open. You have nothing to lose, and much to gain.

FREE
Consulting Service.
With each set we give you free, a year's Consulting Membership in the American Technical Society. The regular price is $12. Put your problems to our Staff of Experts, for one entire year.

American Technical Society
Dept. A66
Chicago, Ill.

American Technical Society
Dept. A66 Chicago, Illinois

Please send me the 6-volume Automobile Engineering for 7 days' examination, shipping charges collect. If I decide to buy, I will send $2 within 7 days and the balance at $2 a month until the $19.80 has been paid. Then you send me a receipt showing that the $30.00 set of books and the $12 Consulting Membership are mine and fully paid for. If I think I can get along without the books after the seven days' trial, I will return them at your expense.

Name.....

Address..... Reference.....

Digitized by Google

All Roads Lead To

AMERICAN HORSE SHOES

They Are On Sale Everywhere

While the man who owns a horse is willing to please his friend the blacksmith—the blacksmith knows that he's got to please the horse—or there'll be a kick—a mighty stiff kick, too!

Put on American Horse Shoes if you want to please the horse—he's the one that's got to wear 'em—he likes that extra metal rolled into the heel—it made a hit with the horse and the mule too—that's why it made a hit with the trade.

Everyone concerned in handling this product is benefited in many directions—the horse gets the best end of it.

A misplaced Catalog is only an aggravation
Send for another

AMERICAN HORSE SHOE COMPANY

Rolling Mills, Works and Offices

PHILLIPSBURGH - - NEW JERSEY

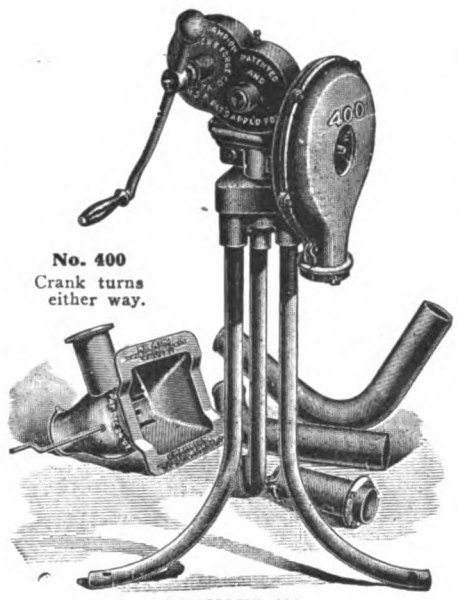


IF YOU SEE THE **A** THE SHOE'S O. K.

Digitized by Google

WORK WITH THE FAMOUS CHAMPION BLACKSMITH TOOLS





No. 400 Crank turns either way.

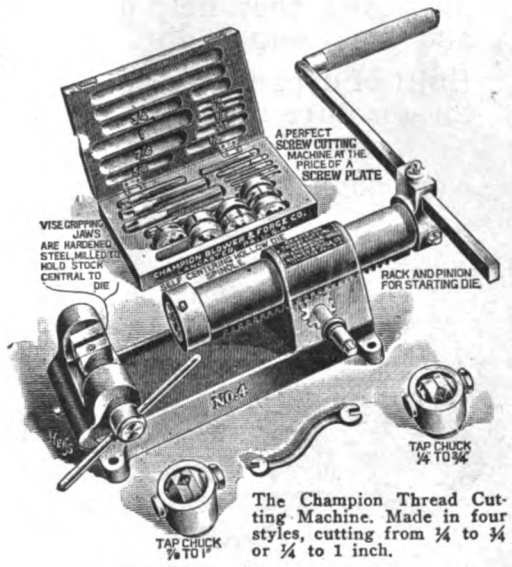
FAMOUS 400

Don't Fail to Get Our 1918 Catalog

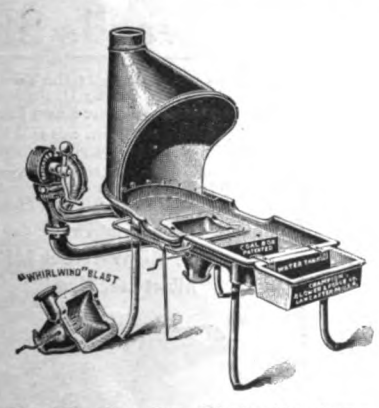
Before purchasing a Hand Blower Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



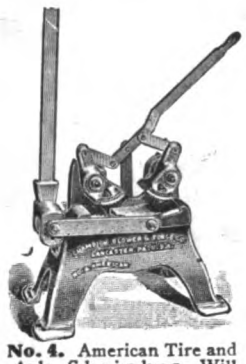
The Champion "Columbian" Tire Bender. Made in 8 sizes.



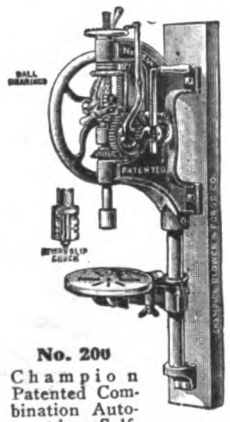
The Champion Thread Cutting Machine. Made in four styles, cutting from ¼ to ¾ or ¼ to 1 inch.



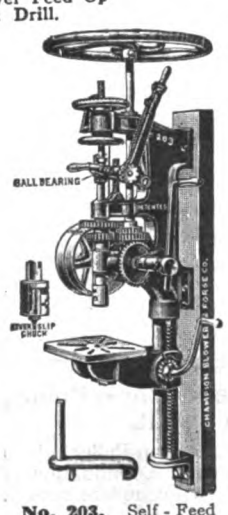
No. 433. Cast Iron Blacksmith's Forge.



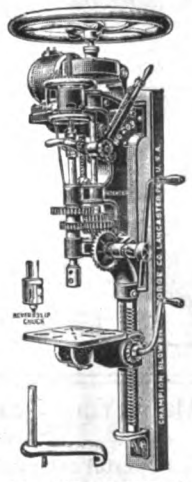
No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



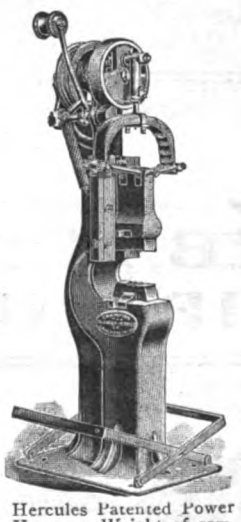
No. 200 Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



No. 203. Self-Feed and Double Compound Lever Feed Drill.



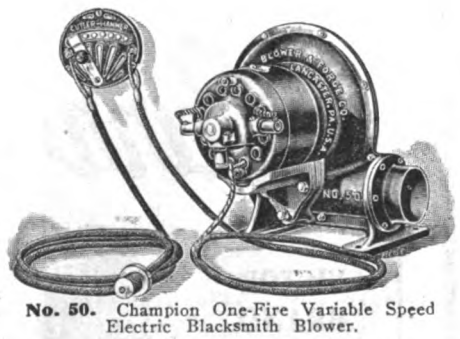
No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.



Hercules Patented Power Hammer. Weight of ram, 65 pounds.



No. 408. Steel Blacksmith's Forge.

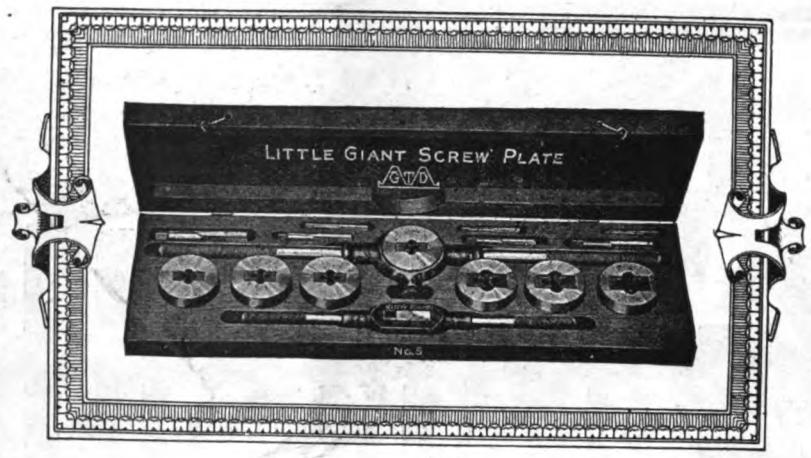


No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

Digitized by Google



Saving the Farmer Money

Farmers have been losing thousands of dollars because they did not keep their implements in good repair. But they are watching these things more closely now.

Are you ready for the farm repair business that is coming to you?

You will be, if your equipment includes

GTD
Look for the trademark

SCREW PLATES

These tools do the sort of work that meets the farmer's most critical standards.

Moreover, they help get work done on "Promise Schedule" and get it done right.

Built of dependable steel, reasonable in price, they have been an absolute necessity in good shops for nearly fifty years.

"LITTLE GIANT," "O. K.," "GREEN RIVER," "LIGHTNING,"
The Screw Plates that save you dollars.

Our catalog shows cuts of special Screw Plates for all kinds of auto repair work. Requests will be promptly complied with.

GREENFIELD
TAP & DIE CORPORATION
Greenfield, Massachusetts, U.S.A.
World's Largest Manufacturers of Screw Cutting Tools

For Sale - Bargain Price

1 1/16 Axles, Fan Tail and Coach.
Buckboard and Light Delivery Bodies.
Saddle Brewster Side Bar and Spring Bar Clips.
All sizes Screw Clamps.
Also Light Bobs, Cutters, and Runner Attachments.

AMERICAN CARRIAGE COMPANY
KALAMAZOO, MICH.



ABSORBINE
TRADE MARK REG. U.S. PAT. OFF.

Reduces **Bursal Enlargements, Thickened, Swollen Tissues, Curbs, Filled Tendons, Soreness from Bruises or Strains;** stops Spavin Lameness, allays pain. Does not blister, remove the hair or lay up the horse. $2.50 a bottle at druggists or delivered. **Book 1 R free.**

ABSORBINE, JR., for mankind—an antiseptic liniment for bruises, cuts, wounds, strains, painful, swollen veins or glands. It heals and soothes. $1.25 a bottle at druggists or postpaid. Will tell you more if you write. Made in the U. S. A. by

W. F. YOUNG, Inc., 55 Temple St., Springfield, Mass.

TRADE MARK

SAMPLE
OF WELDING COMPOUND
FREE

BLACKSMITHS!
Anchor Welding Compound has no equal for strength. It welds the hardest steel. Good for both big and little jobs. Try it.

Write to-day and mention The Blacksmith and Wheelwright.

N. D. DOXEY, ELMIRA, N. Y.



We Make STEEL WHEELS
To Fit Any Axle
Plain or Grooved Tire

Steel or Hickory Axles
Any Size
A Full Line of Wood and Steel

Farm Trucks
With Steel or Wood Wheels

Write for Large Catalog and Prices

ELECTRIC WHEEL CO.
Box N, Quincy, Ill.

Edwards Shears

For twenty-four years the **Two Leading Low Priced Shears** in the U. S., representing the **Greatest Value** for the **Least Money.**

No. 5, weighs 200 lbs., cuts 4x¼ inch soft steel.
No. 10, weighs 430 lbs., cuts 4x¾ inch soft steel.

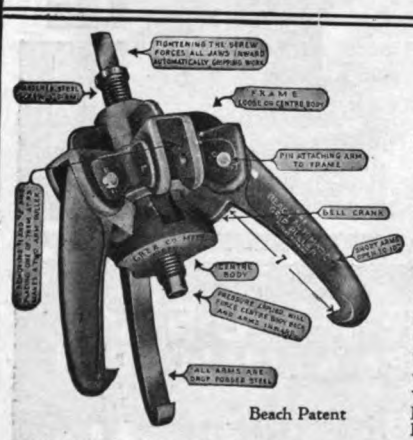
At their price you should have had one long ago. **Order one** from the first iron man that calls on you. **They All Sell Them.**

Write for descriptive circular and prices.

C. D. EDWARDS MFG. CO.
Albert Lea, Minn.



GREB AUTOMATIC GRIP PULLER



Beach Patent

Make Your Gear and Wheel Pulling Show a Profit.

A Powerful automatic one-man Puller, whicn adjusts to work instantly. Combination of two or three arms. Two complete sets of three arms.

Senior Size for heavy work, Capacity 1 to 18 in.
Junior Size for small work, Capacity 1 to 7 in.

Ten Days' Trial

If your jobber does not have them, we will send you one. Try it ten days. If not satisfactory, return it to us and we will refund your money.

We also make the Greb Rim Tool and Grebford Extension.

10 DAYS TRIAL

THE GREB COMPANY, 219 State St., Boston, Mass.

Carriage Tires



VICTOR BRAND
37c. lb.
In Full Reel Lots

Less than Reel Lots
40c. lb.

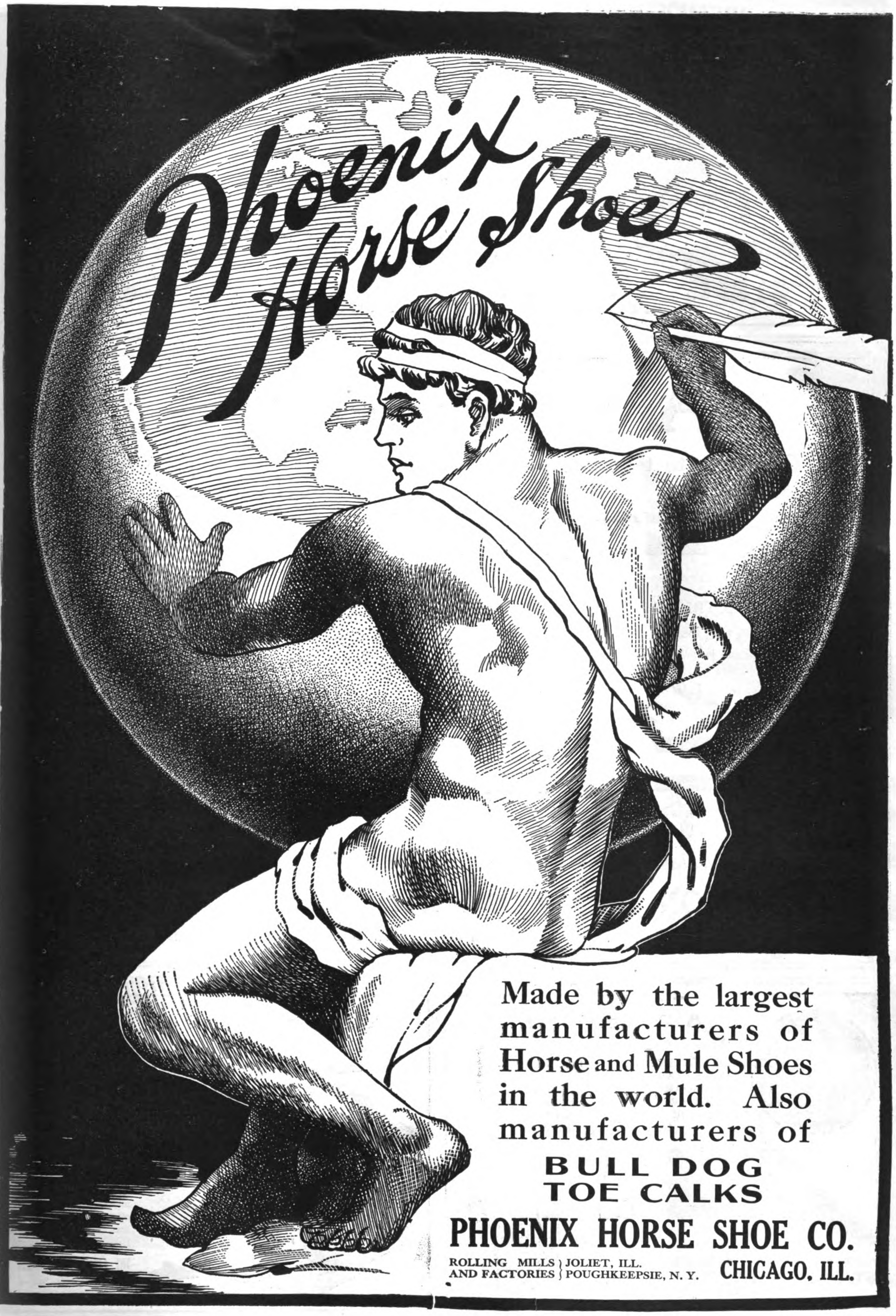
Get our prices on wheels, rims, spokes, tires, shafts, bolts, etc.

ASK FOR CATALOG No. 61

WHEEL TOP & HARDWARE CO. Department W 2 CINCINNATI, O.

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google



Digitized by Google

BREMER BABBITTERS MEANS MORE MONEY TO YOU

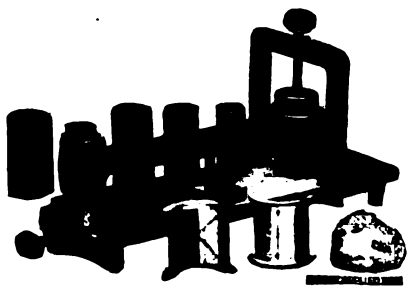
N-A-SIZE BABBITTER

For Any Size Connecting Rods

This Babbitter will babbitt any size auto engine connecting rod bearing, and do it quickly, accurately, and in a serviceable manner. It casts the bearing to the size required, either solid in the rod or the removable type. This tool will enable you to turn out your work quickly, giving the auto owner immediate service, and eliminate the long delays caused by waiting on factory shipments on new rods or bearings.

There is no other tool on the market today that will compete with the N-A-Size Babbitter and do the work it will do with as great a degree of satisfaction.

Babbitter furnished complete with four wooden mandrels and instructions. Price, $10.00. Weight, 15 lbs.



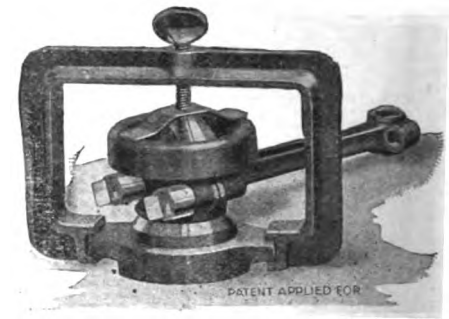
BABBITTER

For Ford Connecting Rods

Why send Ford connecting rods to the factory to be rebabbitted when you can do it in your own shop with this machine and make big money besides saving all the delay and inconvenience to the motorist?

The Babbitter casts the bearing exactly the right shape and size to fit the crankshaft — all in one operation. The work is done quickly (four rods in an hour); it is done accurately (to one-thousandth of an inch); it is done economically (saving from $1.75 to $2.50 on each set of four rods); it can be done easily by anyone — even by an apprentice.

Babbitter furnished complete with metal mandrel and instructions. Price, $11.00. Weight, 8 pounds.



Combination of both Babbitters complete $18.00. **Weight nineteen pounds**

WRITE FOR DESCRIPTIVE MATTER

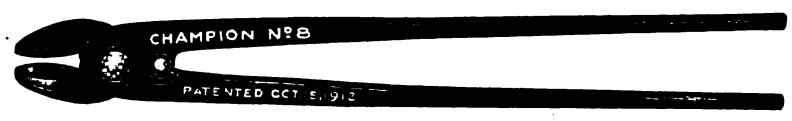
ORDER FROM YOUR JOBBER.

O. A. BREMER COMPANY, MANUFACTURING MACHINISTS

222 Division Street BURLINGTON, IOWA

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge



Nothing to get out of order.
Will hold securely any size of shoe.
No. 8 16 inches long

This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR — YOU WILL BUY MORE.

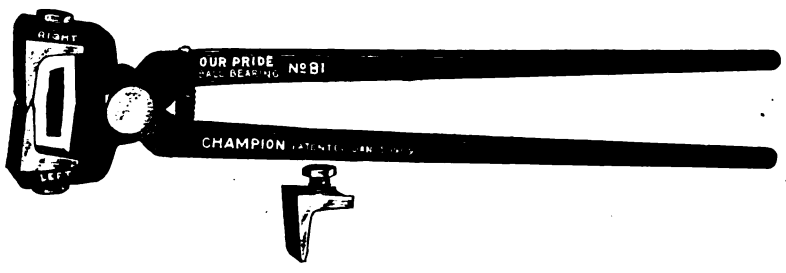
No. 12 ELECTRIC SHARPENING HAMMER

Weights, 1¾ to 3 lbs. Corrugated Pein.

This Hammer is the most popular Sharpening Hammer on the market.

IT GIVES RESULTS





OUR PRIDE — BALL BEARING HOOF SHEAR

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.

Blades easily replaced when worn out.

All parts interchangeable.

Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY Meadville, Pa., U.S.A.

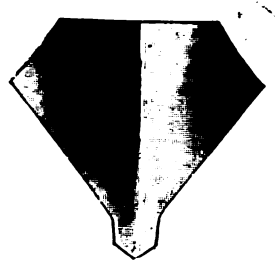
THE LIVINGSTON CO., 131 E. 23rd Street, NEW YORK, Eastern Representatives

STAR STEEL SHAPES

ARE A GUARANTEE OF QUALITY

PLOWSHARES
LISTERSHARES
MOLDBOARDS
SUBSOILERS
LANDSIDE POINTS
SHOVEL POINTS
DRILL POINTS
PLOW POINTS
SEEDER POINTS
LANDSIDE PLATES
CULTIVATOR SHOVELS





Made from Soft Center, Solid Cast or Crucible Steel.

BEST MATERIAL AND WORKMANSHIP.

STAR MANUFACTURING CO.

CARPENTERSVILLE, ILL.



CRESCENT Wood Working Machines

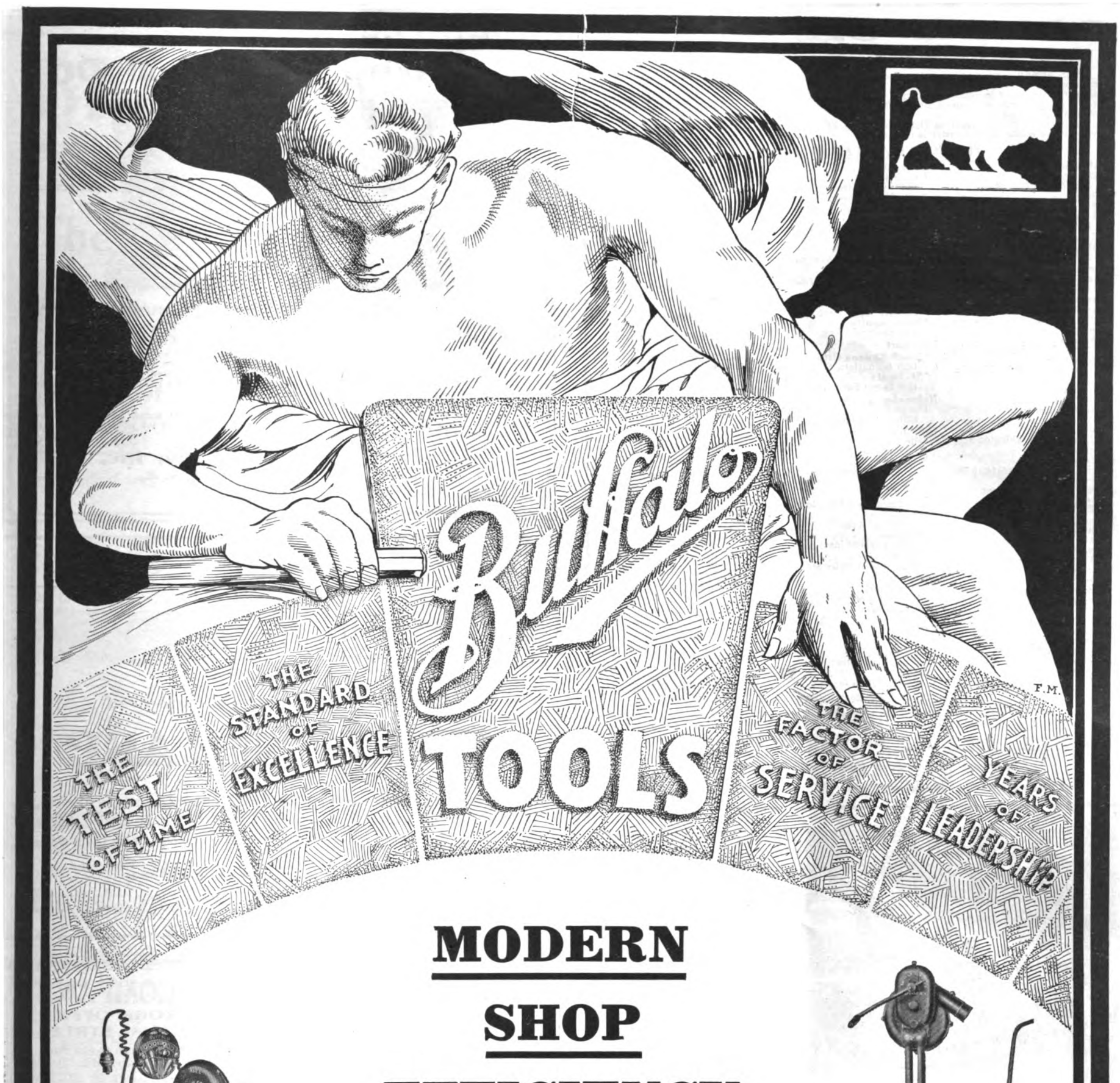
will always satisfy those particular users who want the highest quality at reasonable price.

Send today for catalog of band saws, saw tables, shapers, jointers, variety wood workers, planers, planers and matchers, swing saws, cut off table, disk grinder, borers, hollow chisel mortiser, Universal wood workers.

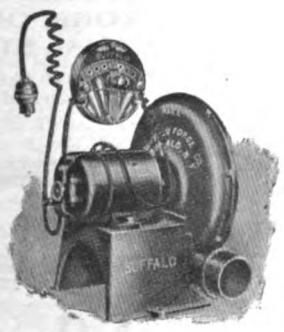
THE CRESCENT MACHINE CO.
203 Main Street
LEETONIA, OHIO, U.S.A.

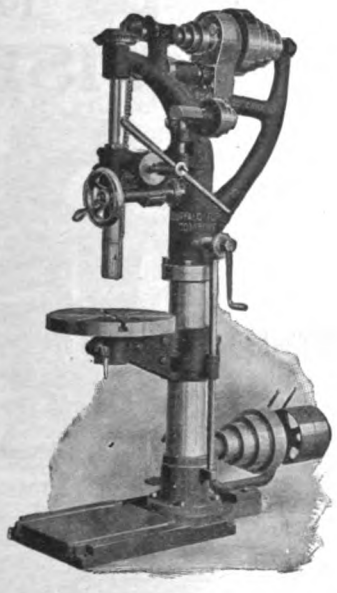
Please Mention "The Blacksmith and Wheelwright" when writing

Digitized by Google



MODERN SHOP EFFICIENCY





BLACKSMITHS AND GARAGEMEN are determined to have the best that may be had in Blacksmith Shop Equipment.

The work of the modern shop demands modern efficient tools—tools that will stand up under severe service.

Forges; electric blowers; drills—floor and post type; shears—for cutting angles, bars and sheets—and of every size from the little bench type hand power shear to the heaviest power shear made—these are the tools you should know about.





Buffalo Forge Company, Buffalo, N. Y.

WRITE DEPT. 6 FOR CATALOG

Digitized by Google

LINDE OXYGEN

From Coast to Coast 65 Producing Plants and Distributing Stations provide an unlimited supply of Linde Oxygen for users everywhere.

LINDE SERVICE means no investment except for oxygen actually received—no expensive overhead or upkeep charges.

Linde Oxygen may be obtained from any of the following Linde Plants and Distributing Stations where a large suppply of charged 100 to 200 cu. ft. cylinders is kept on hand constantly to insure immediate shipments.

Mail or telephone your order to THE LINDE AIR PRODUCTS CO., at the nearest point. Shipments will be made on day order is received.

PRODUCING PLANTS AND WAREHOUSES

Alabama
*Birmingham
10th Ave. & 28th St.
California
*Emeryville, Oakland
*Los Angeles
1405 Mission Road
Colorado
*Denver
S. B'way & Exposition Ave.
Connecticut
Hartford
1095 Main Street
District of Columbia
Washington
9th & Maryland Ave., S. W.
Georgia
*Alanta
Plyant St. & Southern R. R.
Savannah
OgeecheeCanal,So.of BaySt.
Illinois
*Chicago
3633 Wall Street
East St. Louis
6th & Walnut Ave.
Peoria
721-731 So. Washington St.
Indiana
*East Chicago
S.E.Cor. Kennedy& 145th St.
Fort Wayne
414 E. Columbia Street
*Indianapolis
2819 Roosevelt Ave.
Iowa
Davenport
118 Harrison Street
Des Moines
117 W. 5th Street
Kansas
Wichita
Rock Island Ave. & 2nd St.
Kentucky
Louisville
126 East Main St.
Louisiana
New Orleans
861 Fulton Street
Maryland
*Baltimore
25th & Montebello Ave.
Massachusetts
Cambridge
25 Waverly Street
Springfield
Napier Street
*Worcester
961 Southbridge St.
Michigan
*Detroit
St. Aubin Ave. & Newton St.
Grand Rapids
Pearl Street by the Bridge
Minnesota
Duluth
Seventh Ave., West
*Minneapolis
1809 Hennepin Ave.
Missouri
*North Kansas City
14th & Charlotte St.
*St. Louis
4218 Forest Park Blvd.
Nebraska
Omaha
1007 Jones Street
New Jersey
*Elizabeth
Linden Ave.
Newark
354 Plane Street
New York
Albany
Montgomery & Colonie Sts.
*Brooklyn
475 Driggs Ave.
*Buffalo
Broadway and Ideal Sts.
*Utica
Walnut & Schuyler Sts.
Ohio
*Cleveland
802 East 72nd Street
*Cincinnati
Stanton & Mellish Aves.
Columbus
310 Dublin Ave.
Dayton
521 E. First Street
Lima
338 East High Street
(Star) * Designates Plants.
Ohio
Toledo
441 South Erie Street
*Youngstown
601-621 Jones Street
Oklahoma
Oklahoma City
27 E. Grand Ave.
Tulsa
1 North Boulder St
Oregon
Portland
15th & Hoyt Streets
Pennsylvania
Allentown
211 Gordon Street
Erie
1502 Sassafras Street
*Norristown
*No. Philadelphia
18th & Cambria Streets
Pittsburgh
16th & Pike Streets
*Trafford
Tennessee
Chattanooga
212-238 King Street
Memphis
203 Washington St.
Texas
*Dallas
Harwood and Coombs St.
Houston
Cedar and Baker Sts.
San Antonio
512 Dolorosa St.
Utah
Salt Lake City
112 West Second St., South
Virginia
*Norfolk
22nd St. and Colonial Ave.
Richmond
1709 E. Carey Street
Washington
*Seattle
Henrietta St. & 8th Ave., So.
Spokane
121-123 S. Madison St.
Wisconsin
Manitowoc
810 Quay Street
*Milwaukee
36th St. & National Ave.

Other Plants and Distributing Stations are planned for other industrial centers throughout the country and will be established as fast as and wherever the local demand for oxygen warrants.

THE LINDE AIR PRODUCTS COMPANY
Largest Producers of Pure Oxygen in America
Forty-Second St. Building NEW YORK



Here's Proof of
"The Universal Service"

ALASKA or Atlanta—no matter where you do business—you'll find one of the 40 Prest-O-Lite Plants and Warehouses your best and handiest source of acetylene supply.

Wherever repairs are needed, there you will find good welders using and depending upon

Prest-O-Lite

DISSOLVED ACETYLENE

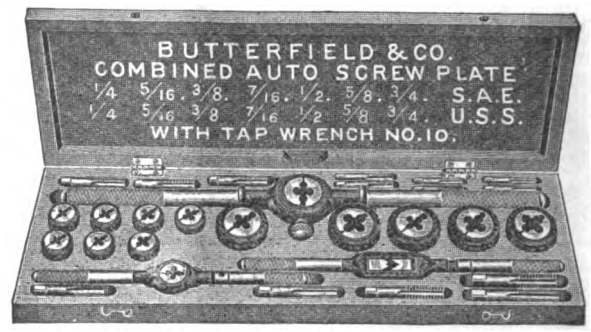
Prest-O-Lite, the Universal Gas With the Universal Service, goes wherever you can go; does any kind of a welding or cutting job for the least time and money cost.

Write for the Service Plan, It's Interesting

THE PREST-O-LITE COMPANY
Incorporated
General Offices
30 East 42nd Street, New York
Kohl Building, San Francisco
In Canada
PREST-O-LITE CO. OF CANADA
Limited, Toronto

130

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.
New York Store: 126 Chambers Street

THE HORSE RASP OF QUALITY



Ask Your Dealer for the *Improved*

HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, "Slim," "Light," "Slim Light" and "Fine Cut." Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial.

New catalogue mailed free on application.

HELLER BROTHERS CO., *Established in 1836,* Newark, N. J.

THE ARMSTRONG MFG. COMPANY

BRIDGEPORT
CONN., U.S.A.

NEW YORK OFFICE
248 CANAL STREET

like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



"Makers of the Genuine ARMSTRONG Stocks and Dies."

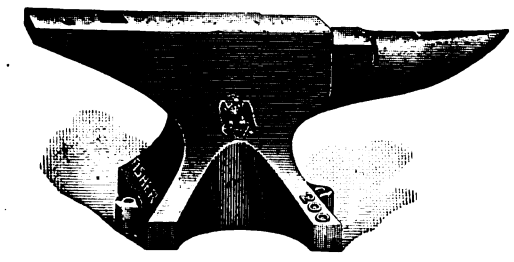
1843 **EAGLE ANVILS** 1919

AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE

BLACKSMITH AND WHEELWRIGHT

Vol. ~~LXXIX. No. 9~~ 603 NEW YORK, SEPTEMBER, 1919 TERMS ONE DOLLAR A YEAR

The Car Hospital and the Surgeon

The First of Three Articles, Dealing With Sick Cars Garage-Hospital Equipment and Ambulance Construction



IT has been some time since we have published an article relative to automobile work and so we take the liberty of starting a series of articles entitled "The Sick Car Series." These are not written in the usual dry mechanical way but along lines which have never before been attempted by other mechanical writers. We feel sure that they will meet with your approval and help to solve a great many of the problems which confront the repairman from time to time, whether he is a blacksmith or a regular automobile repairer.

* * *

I really believe that Mr. Butterworth's old automobile has got dyspepsia, and I would be sure of it if dyspepsia were catching, for if I ever saw an automobile with stomach trouble, it surely is that machine.

I happened to overhear this statement made by a certain garage man not long ago, and it was his statement that brought to my mind the comparison between automobiles and human beings. An automobile surely acts human at times. It seems to have its own special likes and dislikes,, its eccentricities, and is affected by the weather. Though it cannot choose its own master, it can protest, and often does, against hard work, by ceasing to work entirely. It acts similar to many people that we meet, by lying down on the job, or tries not to over-exert itself.

The mechanical construction is very similar to the physical make-up of man. Its skeleton is its frame, its wheels are its feet, and its gears are its muscles. It may develop indigestion in its carburetor from trying to digest heavy gasoline; it may become frost-bitten and crack its water jacket; it may fracture its connecting rod or be overcome by the heat in the summer months.

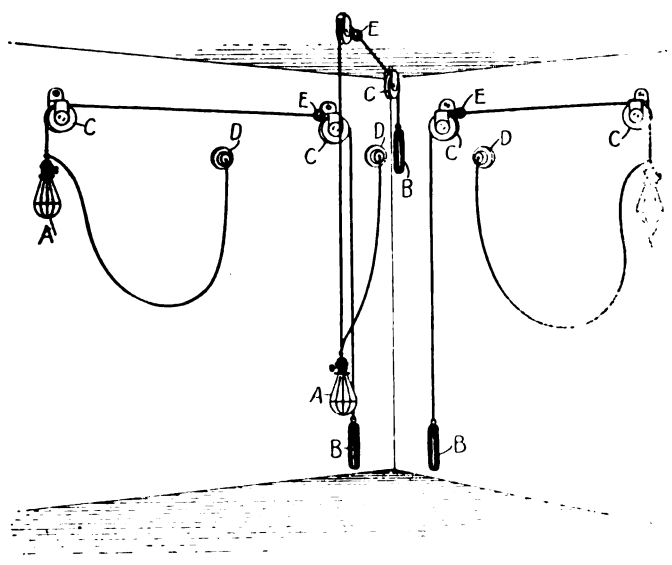


Fig. 1—Suggested Arrangement of Lights in the "Hospital."

Should anything go wrong with our internal machinery we are carried to the hospital. If trouble develops in the automobile, it takes a trip to the hospital as well, only in this case we term the hospital "the garage."

The repairman might be likened to a surgeon and in order to do good work the repairman must have proper tools just as the surgeon must have the best of instruments.

To a certain extent a mechanic may be said to be no better than his tools. He cannot do good work with poor tools, any more than the surgeon can perform a successful operation by the use of improper or inferior instruments. No matter how large or how small the shop may be, there are certain tools and equipment which are indispensable. Even the car owner himself in a good many instances practices automobile surgery and should have his own little hospital equipped with its operating table, which he calls his work bench, and other necessary tools for performing the various operations.

Proper Light Necessary

Perhaps the most important thing to be considered in a car hospital is the lighting arrangement. No mechanic, however adept he may be in the art of performing an engine operation, can do satisfactory work unless he can see the parts upon which he is operating. A garage should have as many windows in the sides as possible. Even the doors should be fitted with large glass panels and if possible, a skylight should be fitted into the roof. In addition to this there should be a number of drop lights furnished, all distributed around the garage in such a way that the mechanic need not spend time in finding an extension light and connecting it with a wall receptacle.

Some time ago I was in a shop where the repairman was working on his back underneath an automobile. If I remember rightly, he was scraping in connecting rod bearings and he would lift the drop light frequently to examine the bearings. About every five minutes he would crawl out from beneath the car and take up a broken portion of the wiring that was dragging on the floor.

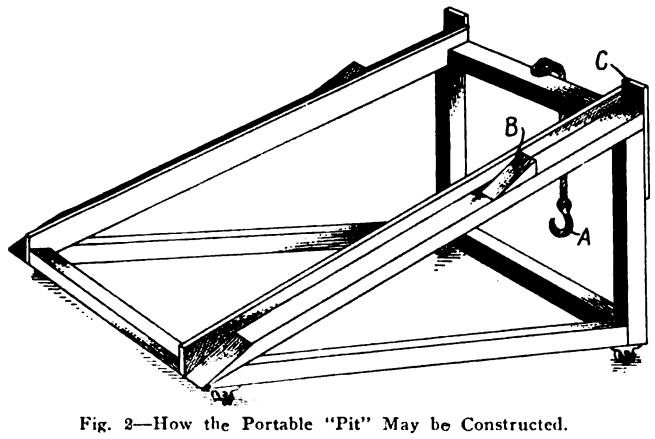


Fig. 2—How the Portable "Pit" May be Constructed.

Occasionally, he would burn out a fuse, all because the insulation on the wire had been destroyed by contact with metallic pieces and with oil, from dragging on the floor. I figure that the time the mechanic spent in repairing the lighting system was greater than the time consumed in making the engine repair. Quite frequently he would receive a severe shock from the light socket which was not conducive to steady nerves and good work.

A Handy Drop Light System

At my suggestion a drop light was installed similar to those shown in Figure 1. The drop light A was connected through a flexible cord with the wall socket D and to A was attached a long heavy cord which was passed through two blocks, as shown at C and attached to a weight B. A knot was tied in the cord E to prevent the light A from being drawn out of reach by the weight. When the mechanic desired light on his work he simply pulled down one of the lights, and as soon as he was through with the light, he released it. The flexible cord was immediately drawn away from the floor and away from contact with oil and grease.

The lights might be arranged on the sides and across the ceiling as shown in our first figure. In all cases, however, the weights must be carried to the side of the room or preferably to a corner where they may be enclosed in a box.

Few shops are built with pits in the floor. In many cases the city or state fire laws prevent such an arrangement, and there are few repairmen that care to do work while in the pit. The mechanic may crawl beneath the car and lie in the oil and grease upon the floor. If, however, he is enterprising he will not care to do this, for he realizes that he cannot do good work lying on his back with his eyes only a few inches away from the work.

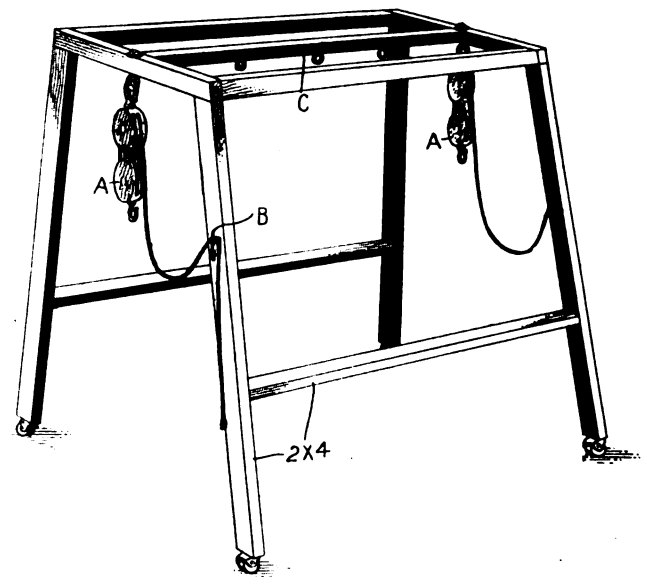


Fig. 3—An Automobile Cradle, Which Should be Found in Every Garage

A Portable Pit

There are two ways to overcome this trouble, and in Figure 2, a suggestion is given which should prove interesting both to the large shop owner as well as to the private car owner. This device can be made of odd pieces of lumber, preferably heavy joists, which may be obtained at almost any lumber yard. The illustration shows just how the device should be built. The inclined runways should each have an adjustable wedge, B, bolted into place and so arranged that it may be placed at a number of different points. The sides of the runways should be protected with boards to obviate any danger of the car wheels running over the sides. Stops should be provided at C to prevent the car from running over the end.

If work is to be done upon the front end of the car the device is pushed against a wall and the car run up the plane and fastened

Digitized by Google

into place with the iron hook A. As an added protection, the blocks B are put into place to prevent the car from rolling backward. The car with the device in place may be wheeled to any position in the garage, for runway is provided with casters upon the bottom. The mechanic can crawl beneath the car much more easily with it up in the air and do his work much better than if the car rested upon its own wheels.

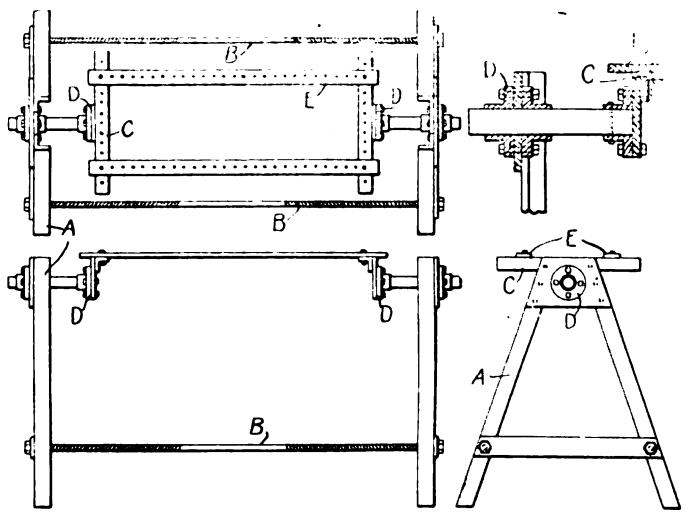


Fig. 4—Details of Construction, Showing How the Engine Stand is Made.

An Automobile Cradle

Another form of hoist which should be built for every large garage is shown in Figure 3. Four by four joists should be used throughout, and these joists should be reinforced at the corners by means of angle irons. Across the center at C a joist should be arranged and fitted with numerous large eyebolts.

Two sets of block and tackles are used for lifting the whole car from the floor and a heavy clamp should be provided at B around which to wind the end of the rope from the tackle. A car may be suspended in this cradle-like arrangement and an additional tackle hung upon the joist C for lifting out the engine or removing the transmission. As in the device shown in Figure 2, casters are provided so that the whole arrangement may be moved to any part of the garage even after the car wheels have been taken from their places.

An Engine Operating Table

In Figure 4 is shown what might be termed an "operating table," and though there are many of these devices now on the market, the garage man can construct one for himself very easily from pipe fittings, angle iron and cold-rolled steel shafts.

Two large A frames are made from angle iron and reinforced across the bottom with a strip of flat iron. Upon the upper parts of these A frames are two large plates with holes cut through them large enough to carry two inch hydraulic piping. Around these holes should be punched a number of smaller holes to accommodate bolts. Upon one end of a short piece of hydraulic piping is welded or pinned a floor plate D, and this floor plate is bolted to a piece of channel or angle iron as shown at C.

The hydraulic piping should be threaded its full length and provided with two more floor plates. The purpose of these floor plates is to clamp the piping in place upon the A frames, and if the holes in the A frame are properly bored, the frame shown at C may be tipped at practically any angle.

Two more pieces of flat iron are provided as shown at E and both C and E are punched with holes evenly spaced their entire length. upon this frame an engine may be placed bolted to the cross pieces E and tipped at any angle for repairs. At a slight additional expense casters may be mounted upon the legs and the motor operating table may be wheeled into the machine shop or to the work bench. I want to lay special stress upon this piece of equipment for a shop, as I feel that it saves considerable time.

Device Saves Much Time

I visited a supposedly up-to-date repair shop in New England where the owner did not care to invest in a motor operating table such as I have mentioned. I watched one of the mechanics remove an engine from the car, and this is about what happened:

The mechanic loosened all of the bolts in the engine and called two other mechanics from their work-bench to help him. The three men, after much talking and arguing, lifted the engine from its place and carried it to the work-bench where the first mechanic did a little work upon it. He then decided that the whole machine would have to go to the machine shop for repairs, and so he called the two mechanics to help him again. After considerable more trouble they managed to get the engine into the machine shop where two of them remained to hold it beneath an upright drill. The third did the work.

For this one repair, three mechanics were kept busy approximately half an hour each. I didn't stay to watch them put the machine back into the automobile again, but I should judge another half hour might have been consumed in this performance. Three hours of wasted effort per day in overhauling one engine might have been the item charged against this particular repair. It would have been a needless expense had the garage been provided with the device which we have mentioned above.

What a needless waste of time there is in locating small tools! A mechanic crawls beneath a car and discovers that he lacks a hammer. Out he crawls again, goes to the work-bench, hunts around and finds that implement, then crawls beneath the car again.

If he does not find the hammer upon the work-bench, it is very possible that he borrows the tool from the mechanic working under the car next to him. In a few minutes that mechanic misses the hammer and he goes through the same performance, and so it goes. Every day each wastes a dollar's worth of time hunting around for a forty-five cent hammer.

Again, small tools have the extremely bad habit of disappearing. They seem to be equipped with the necessary limbs for their own locomotion, so quickly do they get out of reach. If they are thrown indiscriminately into a general box of tools, their absence is never noticed until they are wanted.

If one arranges repair tools in a box as shown in Figure 5 he will have no trouble in locating them, for the very reason that there is a place for each particular tool, and its absence may be noted as soon as a particular job is completed. The boxes may be made in varying depths, and each one should be made to fit a particular set of tools. One box may hold hammers, chisels, pipe wrenches, pliers, etc., and marked on the outside "general tools."

Another may be fitted to contain tire and valve grinding tools, another woodworking tools, and still another Ford and other special wrenches. After the tools have been selected for a particular box, the box should be made to fit them. Each tool should be put in place and staples driven upon each side of it. Through these staples a length of heavy cord should be passed and the cord fastened to an ordinary flagpole rope fastener. If the tools are longer, two or more ropes may be used to hold them in place.

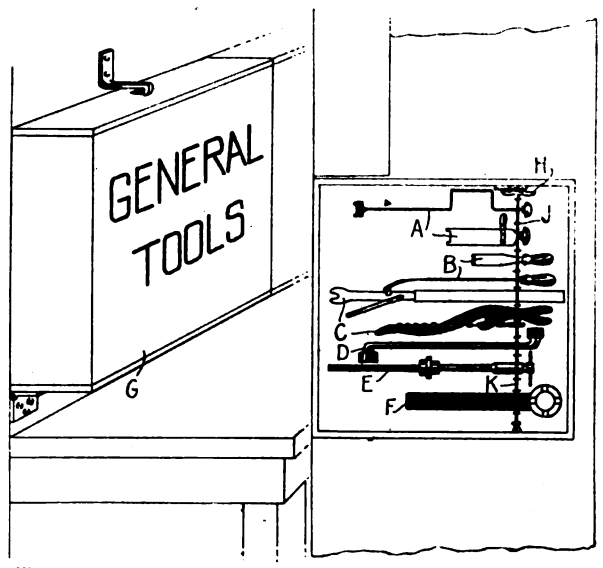


Fig. 5—If Tools Are Kept in Boxes and the Boxes Mounted as Shown, Much Time May be Saved.

The above box shown in Figure 5 contains valve tools and special valve wrenches.

In mounting these boxes on the wall above the bench be sure to have the hinges high enough from the bench so that the box can be opened flat upon the top of the table.

Wall space in a garage should be utilized as much as possible. Many of the heavier tools may be mounted upon the walls rather than thrown beneath the benches.

A Washing Tank

In Figure 6 is shown the unique washing vat combination. The vat is made in two sections of heavy galvanized iron and lined throughout with wood of at least half an inch in thickness. For the heavier pieces, the vat shown upon the left is used. Across the bottom of this vat extending lengthwise are a number of slats, and near the partition, the bottom is cut and a large box-like arrangement soldered beneath it. The front of this box-like arrangement is fitted with a cover held in place by a long bolt, as shown by the dotted lines, and a wing nut. Inside the box is placed a square screen of fairly fine mesh. The purpose of this screen is to prevent dirt from clogging the drain cock at the bottom.

The compartment shown at the right is fitted with two wooden runners in each side

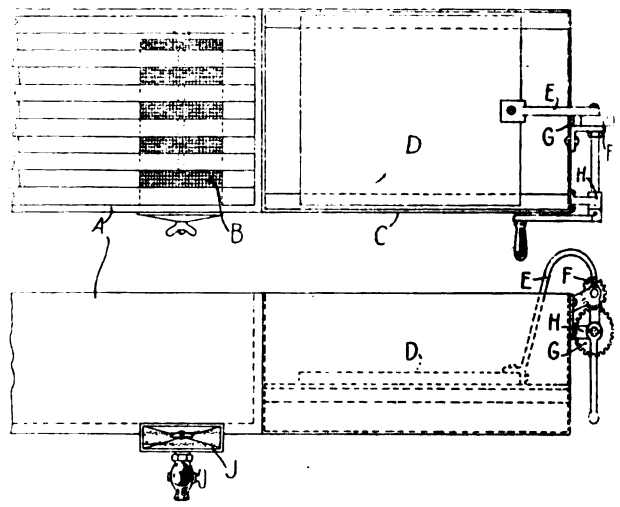


Fig. 6—Illustrating Construction of the Washing Vat for Large and Small Parts.

upon which is rested a flat wooden tray. This flat wooden tray slides back and forth upon the runners a distance of approximately two inches. To the tray is fastened an arm E, and this arm fits upon a small gear, F. The gear F is driven by a larger gear, G, and supported by suitable bearings at H. The larger gear is driven by a hand crank. As the crank is rotated, the tray D is shaken back and forth in the oil thus freeing small nuts, bolts, screws, cotter pins or other parts, from grease and dirt.

After the oil has absorbed much dirt and grease, the drain is opened and it is drawn off through the strainer B. The strainer B may then be removed, the dirt dumped out, and the strainer replaced again, putting the cover J back into place and tightened up with the wing nut.

Strong washing soda, potash lye, or kerosene oil may be used in this vat, though kerosene is to be recommended. The whole device may be mounted in one corner of the shop out of the way, or even beneath one of the large machine tools.

I have spoken above about the various trips which a mechanic would be obliged to make from car to the work-bench for tools. Where the work to be done is extensive, such as the tightening of connecting rods or similar work, the mechanic would be obliged to make at least two trips to the bench for necessary tools, thus wasting considerable time. Each mechanic working in the shop should be provided with two heavy boxes measuring two feet in width, three feet in length, and one foot in depth and mounted upon casters.

In these boxes are placed all of the tools required for the particular job upon which he is working, the necessary new parts and other articles required. He can then wheel the box to the machine and remove the tools, putting them beneath the machine or upon the running boards, as convenient.

Digitized by Google

Each particular box should be numbered, and if any parts are removed from the engine or the automobile, these parts should be placed in the boxes; never upon the floor. In this way there is no danger of losing anything or mixing the jobs.

As an additional equipment for the mechanic, a board of the same dimensions as the box, measuring one inch in thickness, should be mounted upon wheels. This board may be used for wheeling heavy castings or even units from the automobile to the work-bench or to the machine shop.

Of course not all of the devices and features mentioned can be used in every shop. For instance, the automobile hoist shown in Figure 3 may be too large to be used in a small shop, but the idea itself can be applied to any shop no matter how small. Even an individual car owner can work out a scheme similar to this by fitting the roof of his garage with proper cross boards.

Practical Horse Shoeing

The Horse's Gait and How He Stands or Points When His Shoes Are Not Fitted Properly

WHEN the horny hoof is in place, there are horny ridges which lie in these grooves. There may be as many as 500 or 600 of the fleshy leaves in a single foot. They cover the coffin bone on the outside and extend underneath at the rear and form part of a *bar region there.*

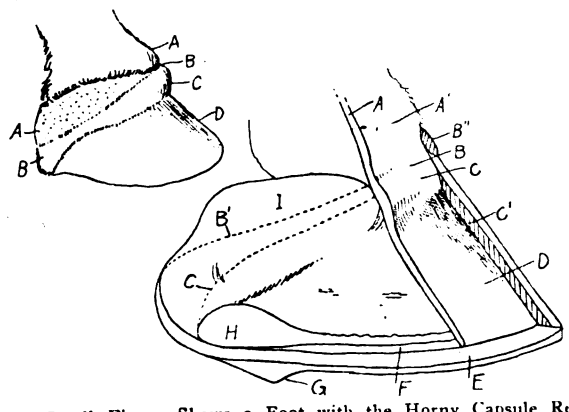
The horny hoof and the hoof-skin are very firmly attached to each other, so that it requires a very great effort indeed to force them apart. The strength of this union is attributed largely to the dovetailing of the fleshy leaves and the inner ridges of the horny hoof. These horny ridges are produced by the fleshy leaves.

(4) The *velvety tissue of the sole* is located underneath the foot. It is part of the hoof-skin. It constitutes the front and side parts of the sole, extending back for perhaps two-thirds of the total length. The two side parts are separated by the wedge-like plantar cushion. The fleshy sole produces the horn-like covering called the horny sole.

(5) The *velvety issue of the frog* is a comparatively soft tissue and underlies the plantar cushion. The horny frog is produced by it.

Review of Hoof-Skin

The hoof-skin is a continuation of the dermis of the ordinary skin of the body. It has no sub-cutaneous tissue, but does have a protective horny covering. There are five parts of the hoof-skin: (1) the perioplic band, (2) the coronary band, (3) the fleshy wall, (4) the velvety tissue of the sole, and (5) the velvety tissue of the frog. The outside shell of the horny wall of the hoof is produced by the perioplic band; the middle layer is produced by the coronary band; and the interior horny ridges, by the fleshy wall. Further, the velvety tissue of the sole and the



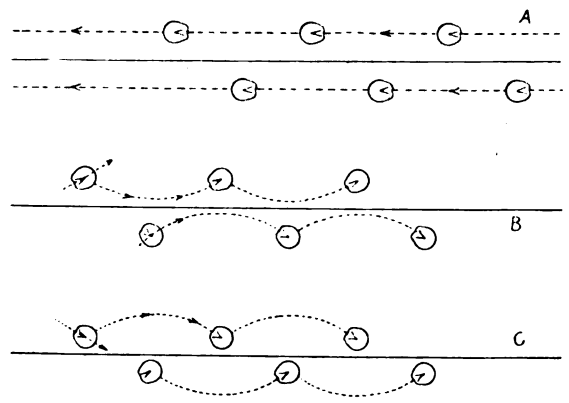
The Small Figure Shows a Foot with the Horny Capsule Removed. *A* is the Corium, on which are Hairs. *B* is the Perioplic Ring; *C*, Coronary Band; *D*, Sensitive Wall. The Large Figure Shows Foot from which Parts of Horn Wall and Sensitive Structure Have Been Removed. *A'* is the Hairless Part of Corium; *B*, indicates the Perioplic Ring, and *B'*, the Upper Border of Same; *B''*, Section of Perioplic Horn; *C'*, Section of Wall at Toe; *C*, Upper Border of Coronary Band; *D*, Sensitive Wall; *E*, Horny Sole; *F*, White Line; *G*, Horny Frog; *H*, Planter Cushion; *I*, Lateral Cartilage.

velvety tissue of the frog produce, respectively, the horny sole and the horny frog.

The Hoof

The hoof of the horse is a part with which the practical horseshoer has to deal not only continually, but in a most intimate way. It is vitally necessary to a proper conduct of his work that he shall understand its principal characteristics. The hoof is a capsule or sheath of horny material whose evident function is the protection of what it incloses. It is a kind of box. There are three distinct parts: the wall, the horny sole and the horny frog.

The *wall* is what is in view when the horse stands at rest. It consists of a thick shell of horny material. There is an outside layer, thin and shiny. This is the *periople.* It is produced by the perioplic band. The upper edge or rim which overlies the perioplic band is called the perioplic ring. The horny ma-



A, Normal Foot Movement in Straight Line; *B*, Movement of Out-Turning Toes; *C*, In-Turning Toe Movement.

terial in this ring is comparatively soft. Both the narrow ring and the extensive shiny layer are products of the perioplic band. We shall probably not be far wrong in viewing the periople as a kind of overflow from the perioplic ring. It flows down—as more is produced by the band—onto the main layer of the horny wall lying below.

Just below the perioplic ring, there is, when viewed on the inside, a groove into which the coronary band of the hoof-skin fits. The wall from this groove down is thick and solid. The thickness is, however, not everywhere the same. Nor is the front hoof identical with the hind hoof in this matter of thickness. In general, whether the hoof is part of a forefoot or of a hind foot, the steeper part of a hoof wall is thinner than the flatter part.

Again, in a front hoof, the wall will, in general, be thicker at the toe than towards the rear. In a rear hoof, the wall will not vary much, when toe, sides and quarters are compared. The wall thickness at the toe of a hoof may be as thick as 5/8-inch or it may be as thin as 3/8-inch. Back at the quarters, the thickness may be anywhere from 1/5 to 2/5-inch. All this is quite important, as it is upon the lower under edge of the horny wall that the horseshoe is set. The variations in thickness of wall depend in part upon the size of the horse and also in part upon the stock from which he comes.

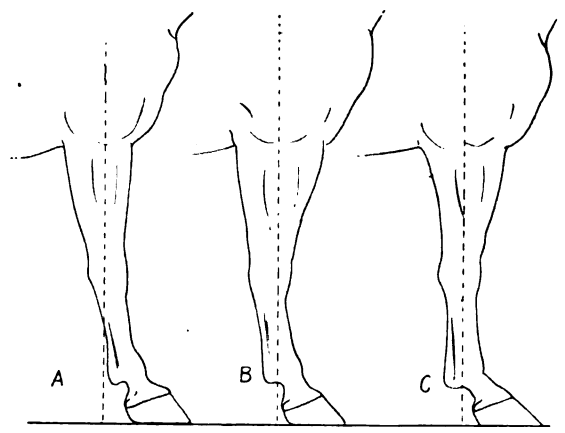
The following table will give some idea as to the wall thickness under various conditions.

Thickness of Horny Wall

	Toe Inch	Side Inch	Rear Quarter Inch
Pure Arab (fore-foot)	0.36	0.28	0.20
Pure Arab (hind-foot)	0.34	0.28	0.24
Well-bred horse (fore-foot)	0.52	0.32	0.28
Well-bred horse (hind-foot)	0.44	0.32	0.30
Common horse (large fore-foot)	0.64	0.44	0.40
Common horse (large hind-foot)	0.52	0.40	0.36
Steep foot (small fore-foot)	0.42	0.34	0.20
Steep foot (small hind-foot)	0.40	0.24	0.22
Average	0.44	0.33	0.27

The *horny sole corresponds* to the fleshy sole. When the hoof is raised in such way as to show the under part, the horny sole is observed included within the wall and is roughly shaped like a circle from which a part has been cut, as one cuts a piece from a pie. The piece not belonging to the horny sole has an angle of perhaps 80 to 90 degrees. The horny sole is, accordingly, a rough circle from which about one-fourth has been taken. The thickness of the horny sole will, after the loose flakes have been eliminated, be of about the same thickness as the wall itself.

The horny sole is not flat. The interior surface is covered by a host of little open-



In Posture *A*, the Supporting Strain is on the Tendons; in *B*, the Knee Curves Backward; *C*, Shows Oblique Pasterns.

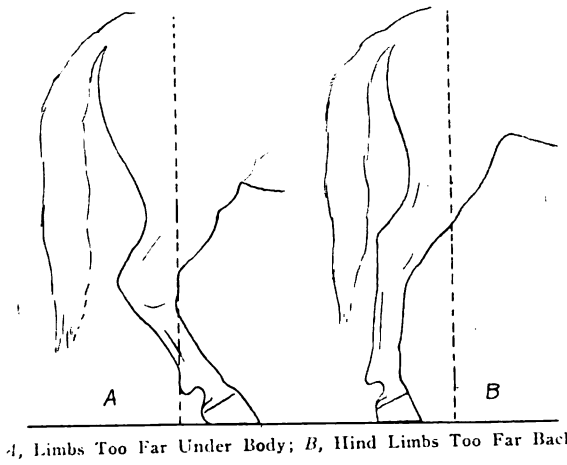
ings of the shape of a funnel. The villi, or hair-like projections of the velvety tissue of the sole extend down into these openings. The under, or exposed, surface of the horny sole is uneven and rough. Then there are apt to be present scales of dead horn. The round edge of the horny sole joins the inner surface of the horny wall through the agency of the "white line."

The *horny frog* is a wedge-shaped covering of horny material which overlies the fleshy frog and is produced by the velvety tissue of this fleshy frog. The velvety tissue itself covers what is called the planter cushion, which consists of elastic and fibrous material. The horny covering acts as a protection. Its material is a very soft and elastic horn. The horny frog, like the fleshy frog, is broad at the rear and tapers towards the front. It is partially split into two parts at the rear. The point is sometimes called the summit.

When a horse's hoof is shod and is in normal condition, the horny sole will form more or less of a valley, looked at with the bottom of the foot held up. This valley will lie between the horny wall and the wedge-shaped horny frog. It will, accordingly, not be a straight valley, seeing that it begins on one side of the horny frog and extends round its point to the other side. However, when the horse is unshod, this valley tends to disappear, thus bringing pretty much all the under parts into contact with the ground.

The White Line

This is a narrow strip of soft white horn running round the under part of the hoof

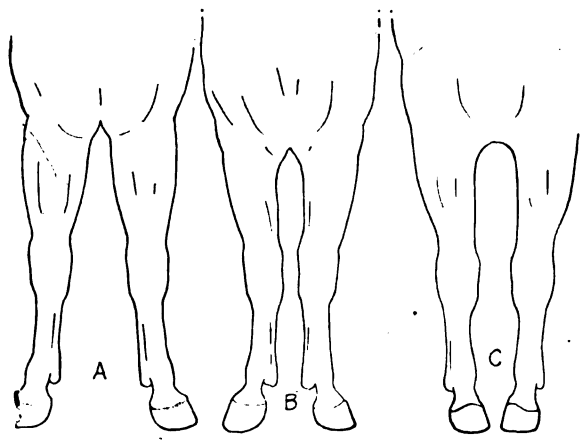


A, Limbs Too Far Under Body; *B*, Hind Limbs Too Far Back.

and marking the junction of the horny sole and the horny wall. It circles from heel

Digitized by Google

to heel, thus covering about three-quarters of a full circle, and is also discernible, in the rear of the foot, in the immediate region of the horny frog. The white line is a most important thing in connection with horseshoeing. In the first place, it serves to give a clear indication of the inner surface of the horny wall. It thus serves as a guide to the exact thickness of this wall throughout practically all the region where the horseshoe is to be placed and in fact indicates the

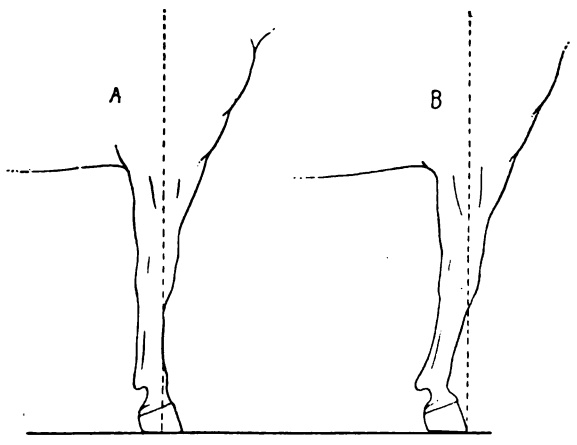


A, Normal Position; *B*, Hocks Turned In; *C*, Hocks Turned Out.

inner margin of this location. Second, the white line is to be pierced by the horseshoe nail.

Sometimes the white line will not be everywhere present. The shoer will then have to judge from what is there. When not freshly cut, the white line is ordinarily not white at all, but of a gray-black color. This color is to be explained by the presence of dirt and the penetration of liquid manure into the soft horn. The white line is the joint production of the horny leaves forming the innermost layer of the wall and of the fleshy leaves. The villi at the bottoms of the fleshy leaves produce short plugs of tubular horn. It is these plugs which constitute the contribution of the fleshy leaves to the formation of the white line.

The horny protective covering that boxes in the lower part of the horse's foot differs in character at different points. Thus, the periople, the white line and the horny frog are all soft horn; while the middle layer of the wall and the horny sole are hard horn. As between wall and sole, however, the mid-



At *A* is Shown Upright Pastern and Limb; at *B*, the Inclining Knees.

dle layer of the wall is harder and stronger than the horny sole.

As evidence of the more friable character of the sole may be cited the regular peeling off of scales or flakes from this part of the horny envelope of the foot. Then horn differs from other horn in that some is of good quality, while other horn is of poor quality. But all horn, whether good or bad, strong or weak, hard or soft, is a poor conductor of heat. We have excellent evidence that horny material does not conduct heat very well in the fact that it is possible to fit a hot shoe up against the bearing edge of the wall.

The Standing Horse

Horses are a good deal like people. Some spread their feet apart, some are knock-kneed, some are bow-legged, and so on. Naturally, the way a horse stands will affect the relative positions of his feet. Standing squarely in front of a horse and observing his fore-legs, one says that his position is normal for this pair of legs, provided a vertical line dropped from the point of either shoulder will divide the corresponding leg into two equal halves, one to the right and the other to the left. The line should reach the earth at the middle of the toe of the hoof.

But there are a great many horses which could not pass examination in this respect. Sometimes, it is the whole leg which is out of line; sometimes, it is merely the lower part. Thus, a horse may stand with his fore-feet spread apart. Both legs may be straight enough, but not vertical—that is, the legs spread regularly from the level of the body down to the feet. Other horses will have the fore-feet wide apart, but it will be only the feet themselves that are much out of line.

Similarly, a horse viewed squarely from the rear will be standing normal, provided a vertical line dropped from the rearmost point of either buttock divides the corresponding leg into two equal halves, one to the right and the other to the left. The line should meet the ground just back of the middle of the rear of the foot. But some will have the legs inclined inward towards each other, while others will have the feet spread apart.

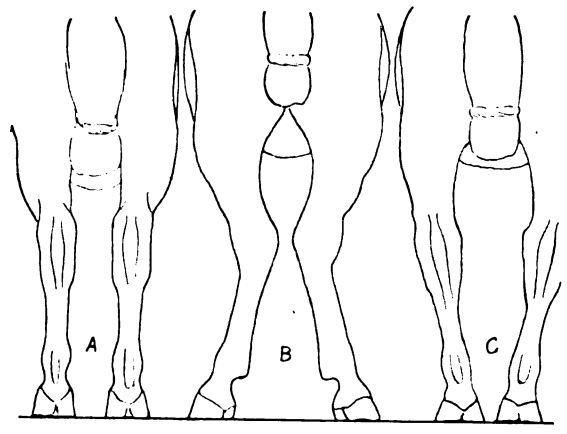
Viewing the horse from the side, one puts him further to the test. The fore-leg will now have normal position, provided a plumb line let fall from the middle point of the shoulder blade will divide the leg into equal forward and rearward halves down to the fetlock joint. The line meets the ground just back of the bulbs of the heel. The front of the foot from the fetlock joint down over the upper pastern, the coronary and the coffin bones should give a line making an angle of 45 or 50 degrees with the ground. An angle of 45 degrees is rather easy to judge, if one remembers that then the angles made with the horizontal and with the vertical are both alike.

It will now be understood, perhaps, that whether the foreleg has a fully normal position or not, it will be necessary to view it *both* from in front and from the side.

Viewing the hind leg from the side, a normal condition will be one where a plumb line let fall from the middle point of the hip joint will meet the ground very close to the halfway point between toe and heel. Hind legs may have the hocks spread apart or bent towards each other. These are similar conditions to knock-knees and bow-legs in front. A horse is not perfect when such conditions exist either in front or behind. Sometimes, the hock angle is too small. The effect is to throw the hind foot too far forward. A horse with his rear limbs thus shaped and set will perhaps be speedier than he would, otherwise, have been. But it is scarcely anything to be desired from other points of view.

Foot Positions

It has already been pointed out, in effect, that the front of the foot from the fetlock joint to the toe is normally a fairly straight line set at an angle of 45 or 50 degrees with the ground. There are horses, however, where the angle is greater and others where it is less. The angle may drop to 35 or 40 degrees. This condition is sometimes expressed by saying that the hoof is *acute-*



A, Toes Turned Out; *B*, the Calf-Kneed Limbs; *C*, Pigeon-Toed Horse.

angled. If the angle is, however, 55 or 60 degrees, the hoof may be called *obtuse-angled, steep-toed* or *stumpy.* The uses here made of the expressions, "acute-angled" and "obtuse-angled" are, from a mathematical point of view, incorrect, but they seem to have the willing or unwilling sanction of educated men.

There is a peculiar position of the foot, called *bear-foot,* or (improperly) club-foot. The line from the front of the fetlock joint down the front of the foot to the toe of the hoof is not straight. The upper pastern is too flat and the hoof too steep.

Movements of Feet

The way a horse stands may indicate, to some extent, the manner in which he will throw his feet when in motion. A horse that stands normally, will likely, when in motion along a level road, swing his hoofs in straight lines parallel to the line in which he himself is moving. The bases of the hoofs will strike the ground squarely and evenly, and will point forward. But, if the horse stands base-wide—that is, with the feet set too far apart—the hoofs will not move straight ahead but in curves bent in towards each other.

When the hoofs strike the ground, they will not strike squarely and evenly but will tend to strike with the other edge of the toe. Besides, the position of each hoof on the ground will be pointed outward. If, however, the horse stands base-narrow—that is, with the feet too close together—his forward movement will be just the opposite of that just described. The hoofs will swing in curves bent outward and at the moment of striking the ground will be pointed inwards.

These two irregularities do not necessarily mean that the horses which manifest them are not fitted for ordinary service, unless the irregularity is especially marked. It should be understood that the foregoing account of the movements of the feet is general. It is not implied that there are no exceptions.

When horses are climbing hills or are engaged in heavy service or are doing anything in which their movements are under constraint, one is to expect considerable variations from the way they move their feet when going at ease.

SUGGESTIONS IN WELDING CUTTING TOOLS

IT has been discovered in connection with welding experiments, that it is practicable to weld high-speed tool-steel bits to common cold-rolled steel shanks for lathe and planer tools, drills, reamers, etc., with very satisfactory results.

Electric welding high-carbon to low-carbon steel is not a difficult operation, although a little care should be exercised, as a slightly different condition exists than where materials of the same analysis are employed.

Experiments have demonstrated that best results are obtained if the thickness of tool steel is from one-quarter to one-third the total thickness of tool at the weld. Where two pieces of the same kind of steel are spot welded together they heat evenly; but care must be taken in welding high-speed steel to common steel, the former heating more quickly owing to its offering greater resistance to electric current.

The high-speed steel should be thinner in order to generate greater heat at the junction of the pieces. As the copper points used in making these welds are subject to very extreme heat and pressure, they will last longer and do better work if cooled by a stream of water passing through them while in use.

When both metals have reached a welding heat, the current is cut off and pressure applied forcing them together. It is not necessary to use any flux in welding, but it is sometimes advisable to apply a solution of borax water, which has a tendency to improve the weld.

If it is desired to temper the tool at the same time it is being welded, it should be plunged while white hot into a bath of good hardening oil. When welding a large tool-bit to a shank, it is advisable to corrugate the welding seats in a perpendicular direction, and keep them free from oil, dirt or rust.

After the butt weld has been made, the stock must immediately be heat-treated or annealed, in order to keep the high-speed steel from checking or breaking.—C. A. Hart in the *American Machinist.*

Digitized by Google

An Illustrated History of Smithing

Part V—Photographs of Drawings Which Show the First Forms of Foot Protection for Horses

BY H. H. MANCHESTER

THE idea of shoeing horses is so familiar to us that we often fail to realize that it was several thousand years after man domesticated the horse before he learned to nail shoes to its hoof. In fact the invention was really a bold one. No other one in connection with the domesticated animals compares with it, and until recent years it was still unknown in Japan and certain other countries far advanced in civilization.

Although the need of protection for horses' feet was well recognized by the Greeks and Romans, no nailed-on shoes were in use of the classic era. The references of that period which speak of shoes for horses refer to a leather or hemp sandal which sometimes had an iron bottom, but was invariably tied on to the feet.

No horseshoes are mentioned in Xenophons treatise on horsemanship, nor in the later ones of Polybius or Julius Pollux.

Perhaps the earliest known specimens of protective devices for hoofs have been found in an Etruscan grave at Corneto, Etruria, in Italy, and probably date back to about 400 B. C. The Etruscans, it will be remembered, were Greek in race, but settled in Italy, and were powerful there before their conquest by Rome.

These shoes are of bronze, and in shape are like a crescent with a long prong in the center. Various other prongs around the inner edge suggest that they were used to keep the animal from slipping.

They are small enough to be intended for mules or asses, and it should be kept in mind that these animals were more common throughout the whole Graeco-Roman period than horses.

The holes at the ends of the shoes were probably for tying them on to the feet or fastening them to the part of the sandal which extended up the leg.

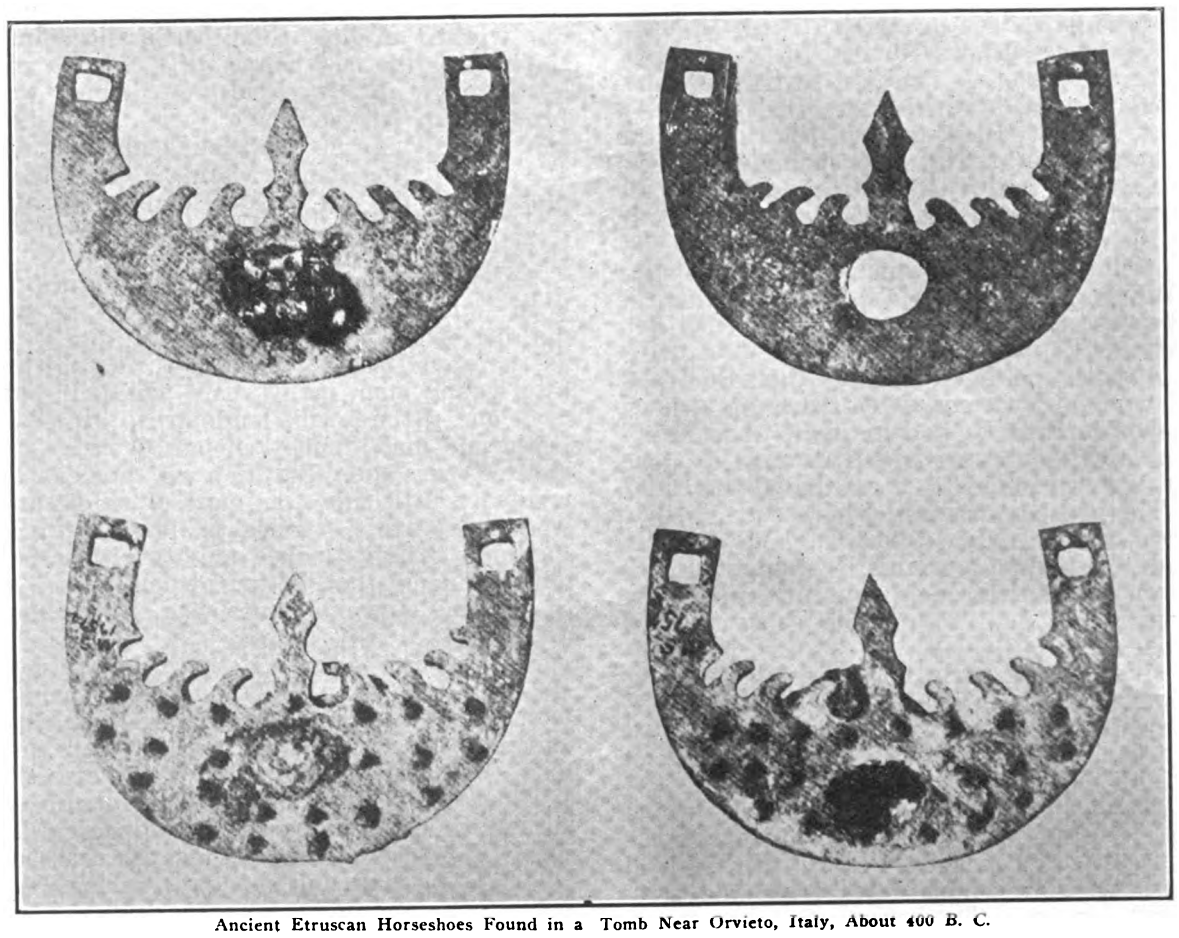
Alexander the Great's cavalry, according to Diodorus Siculus, gave him great concern because the hoofs of the horses were ruined from the long marches.

About this same period, however, Aristotle wrote that camels which were on long journeys sometimes had their feet protected by shoes of ox leather.

In the first century, B. C., according to Appian, Mithridates, who was besieging Cyzicus, had to send his horses to Bithynia because their hoofs were entirely worn out.

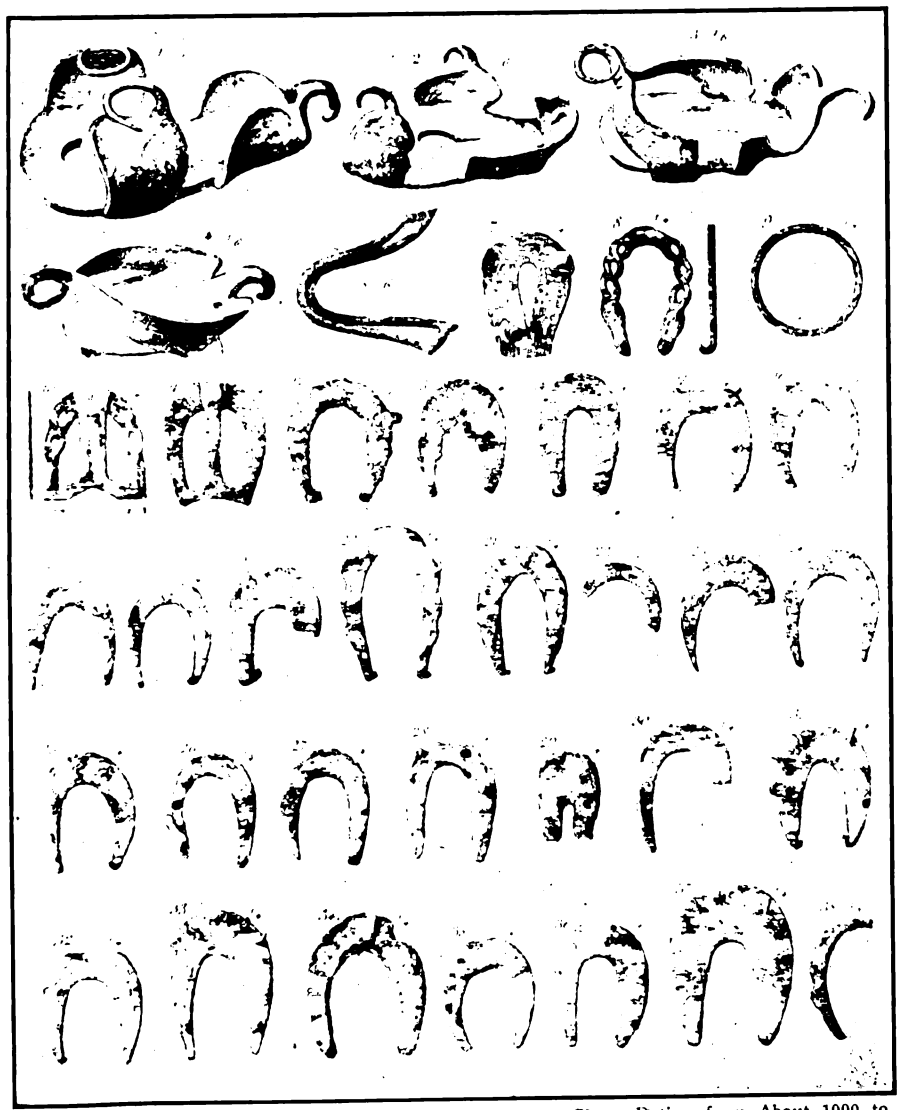
No horseshoes are shown in ancient sculpture, probably because the sandals of the time were awkward and inartistic, and the modern horseshoes were unknown. Graeco-Roman sculpture entered so much into details that nailed shoes would probably have been indicated if in use.

In the early part of the Roman Empire, the extravagance of the time showed itself in silver sandals for Nero's mules, especially when on long journeys, and in still more ostentatious gold ones for the mules of his notorious wife, Poppæa. The coachman of the Emperor Vespasian, according to Suetonius, gave the monarch considerable uneasiness by stopping his carriage to put the sandals on his mules. This in itself indicates that they were still simply tied on.

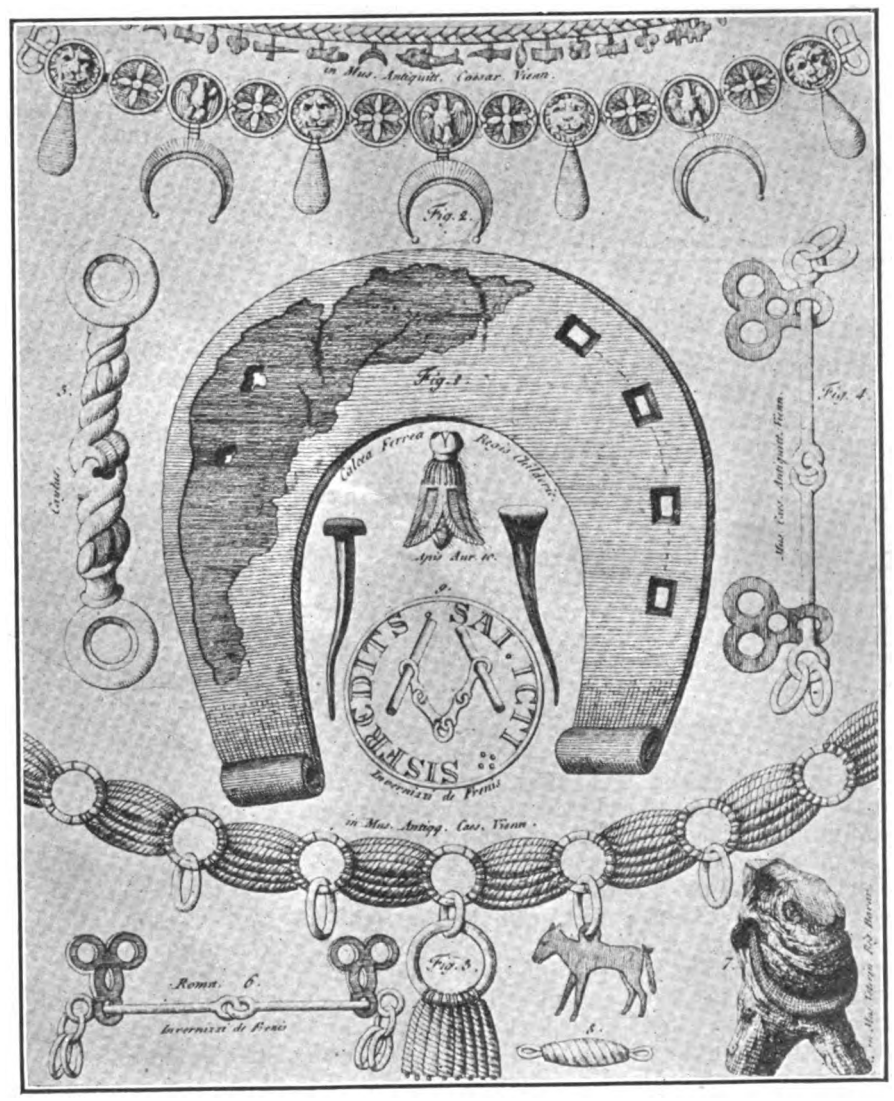


Ancient Etruscan Horseshoes Found in a Tomb Near Orvieto, Italy, About 400 B. C.

At what date horseshoes were first nailed to the hoofs is still uncertain. If an article found in the grave of Childeric, King of the Franks, who died in 681 A. D., is correctly



Ancient Roman Horse Sandals and Early Medieval Horse Shoes Dating from About 1000 to 1400 A. D.



Drawings of Early Horse Furniture. The Shoe at the Center is Probably the First Nailed on Shoe on Record.

Digitized by Google

identified as a horseshoe, it is the earliest known specimen of one intended to be nailed on. We reproduce an engraving of it from a drawing, but the drawing is more perfect than the object itself was, for this was so eaten by rust that when the rust was scraped away it broke. Nevertheless, if the drawing can be trusted at all, we have here the earliest known nailed-on shoe.

Our picture also shows several bits and other articles of horse furniture of the early French period.

The cavalry of Louis the Debonnaire in the ninth century, according to Daniel the historian, were shod in the time of frost.

In comparatively recent years a number of early shoes for draft animals, both of the Roman sandal variety and of the later nailed-on type have been unearthed.

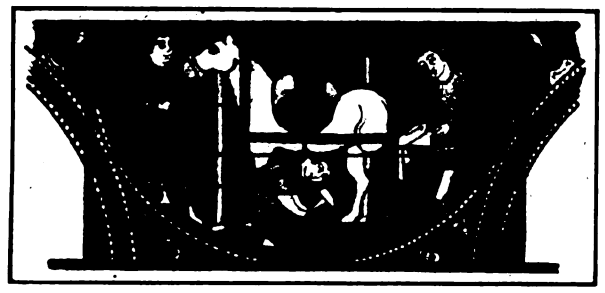
Our plate shows almost forty shoes of different periods. The first seven are Gallo-Roman sandals which were tied on to the foot. The twisted shoe at Fig. 8, and the simple circle at Fig. 9, probably date from the tenth century. The shoes with the straight bars and closed ends are presumably of the eleventh century. The rest of the row as well as the fourth and fifth rows are most likely from the fourteenth century, while the last row seems to be from the fifteenth century.

A poem of 1038 declares that Boniface, Marquis of Tuscany, when traveling to meet his bride Beatrix, had his train shod in silver, and that any silver nails that dropped out were presented to those that found them.

The practise of shoeing horses is stated to have been introduced into England by William the Conqueror, and Northampton was given as a fief to one of his followers in return for a sum to provide shoes for the horses.

Much of the early horseshoeing seems to have been done with the aid of a frame to prevent the horse from kicking. At least the earliest known pictures on the subject exhibit devices of this nature.

The earliest picture of horseshoeing which has yet come to light is probably that in the Cathedral at Chartres, France, in a stained glass window which dates from the thirteenth century. The horse is fast in a frame which holds the head and one hind foot up, and, curiously enough, one farrier is at work on the hind foot still on the ground.



NEW BOOKS RECEIVED

Abrasives and Abrasive Wheels, by Jacobs. With the arrival of high-speed steels, modern cutting tools and finishing methods the subject of abrasives and abrasive wheels has become one of great interest. The book "Abrasives and Abrasive Wheels," written by Fred B. Jacobs, is a complete treatise on the manufacture of abrasives and their manifold uses. The book takes into account different grinding methods and is fully illustrated. It is sold by The Norman W. Henley Publishing Co., of 2 West 45th Street, New York City.

Metal Worker's Handy-Book of Receipts and Processes, by Brannt. Metal working and metal treatment is one of the broadest subjects in science and the average mechanic finds it difficult to keep pace with the advance of this science. The "Metal Worker's Handy-Book," which is compiled by William T. Brannt and published by Henry Carey Baird & Co., Inc., of 116 Nassau Street, New York City, has been written with the idea of keeping the mechanic abreast of the times. It is a collection of chemical formulas and manipulations for the working of all metals and alloys and includes methods for the decoration and beautifying of articles manufactured therefrom.

Old Home Week in New England

Our Correspondent Visits a Shop Where He Worked Many Years Ago

BY JAMES F. HOBART

YES, I've been having "Old Home Week" the past month and it isn't over yet. Reminds one of Old Abner Metcalf, who used to say: "Worked down to the factory *nine* days last week, got home in the morning and worked *all day* hoeing beans and helped the blacksmith shoe horses *all afternoon* and got through at *three* o'clock—" Abner was brought up on the Town Farm, where he said that though he liked the "chow," he did not care for the sudden changes, "they have mush and milk for breakfast and milk and mush for dinner,—I don't like such sudden changes" complained the old man.

There used to be three or four cracking good smith shops in East Pepperell, to say nothing of one or two which *came* and *went* as the days passed. One shop was started by a young man, many years ago and grew to be one of the town's landmarks. He prospered and made money enough to retire on, several years ago. But, in a evil moment, he wanted a little more, as most of us do, and was led to invest in a coal business, down in Panama. Things looked mighty prosperous until suddenly the "bottom dropped out" of the scheme, and our smith was left without a dollar!

But he was "*game.*" He built a little shop close by Old Chub Hole, the once famous town "swimmin' hole," put in a lot of tools and got back many of his old customers and today the 64-year-old smith, together with a helper of about his own age, is holding up horses, tinkering ice-wagons and doing all sorts of blacksmith work, not the least of which is making and mending springs for automobiles and doing forge work in general for "gas" wagons. But, they won't go any further with that class of vehicle:—"no automobile overhauling for mine," said the smith as he started to fit a set of very light shoes for a small horse with delicate hoofs.

"Wish you would be a little careful" said the burly man who brought in the little horse, "she is mighty tender on her feet and I wish you would fix up her feet all you can. I can't see any lump on her, but she is mighty tender all the same!"

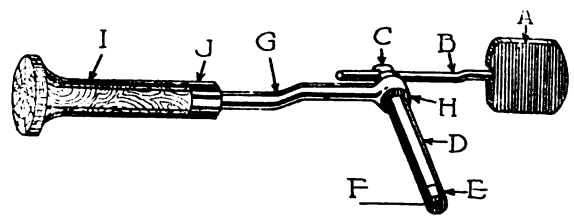
"It's a mean trick," said the old smith as he trimmed the little horse's thin hoofs a bit. "That big lummox has worked this little horse barefoot so long that her hoofs are worn down until there isn't anything to nail shoes to." "It's a shame," blustered the smith. "I'll put in the smallest nails I have in the shop and put a soft piece of leather between hoof and shoe under both forefeet; that will help her a good deal."

It is many years since I saw an old-fashioned "buttress" for trimming the hoofs of horses, but I saw some in that old smith's shop. They not only had buttresses, one for each shoer, but they had hoof-trimmers, too, and good, heavy ones at that, also the hoof knives used so much in the west; and they also had some of the double-ended driving knives for removing thick tough pieces of hoof, said knives being driven through the hoof by hammer blows.

Improved Buttress

I never could figure why the old "buttress" went out of use. It is a mighty handy tool for paring hoofs, especially when a good deal has to be removed. With a shoulder against the wooden handle of the tool and one hand grasping the hoof, the smith is surely in a position to pare a hoof with the least possible exertion, to pare it straighter and smoother than is possible with a hoof-knife (also to slice a chunk off of the ball of his thumb if he doesn't watch out!).

The Buttresses used in this shop were made by the aged smith, Mr. George Jinks, and one of the tools had many years' service to its credit. These tools are about as shown by Fig. 1, but one of the tools is smaller than the other, an attempt having been made evidently, to see how light a tool could be made and still stand up to the work. The tool which I liked best, had the handle *D*, about ¾-inch in diameter. The other tool, had a handle very little over ½-inch in diameter and it was noted that this light tool had been bent or "sprung" in a couple of



The Improved Buttress.

places, thus showing that the lighter tool was not quite strong enough. Therefore, I will give the dimensions of the heavier tool, as shown by Fig. 1.

The cutter *A* is about 1½ of an inch square and ¼ of an inch thick, the cutting edge well rounded, as shown, and by loosening the round nut *F*, the cutter can be readily removed for grinding or for new-laying when worn too short. The shank *B* is about 5/16 of an inch thick and held in the handle *D* by means of the clamp-bolt *C*, which, when nut *E* is tightened, draws down upon thread *F* and clamps *C* firmly upon *B* in exactly the same manner that a nib is clamped upon a scythe snath.

Handle *D* is about ¾ of an inch in diameter and nearly four inches long. The nut *E* is the same size as the handle *D*, and rounded like the handle. In fact, I had to look for some time to see how the device worked for the reason that nut *E* and handle *D* fitted each other so well that I could not tell handle from nut and wondered how clamp *C* was tightened.

Shank *G* is about 9/16 of an inch in diameter and "upset" so as to form a boss at H, which is drilled for a driving fit on handle *D*, after which it is brazed to it. Handle *I*, is made of wood, about eight inches long and 1½ inches in diameter. A ferule *J* is closely fitted to the handle and prevents the wood from splitting. Offsets are made, as shown at *G* and *B*, in the stems of both the tool and the cutter, thus bringing the cutting edge free from possible contact with a horse's gambrel or fetlock. Grinding is easy; the cutter *A*, being removable in two seconds by simply catching nut *F* in a vise and giving the handle *D* a slight turn.

The Old Bellows

I visited another shop in East Pepperell, where there were two fires and the old and the new were figuratively shaking hands in great shape. One fire was fitted with a first class pair of bellows of regulation type—old-timers but well taken care of and apparently as good as they were 50 years ago. The other fire in this shop is supplied with blast by an up-to-date electrically driven blower with a rheostat which gives five or six degrees of blast-force. The contrast between the old method and the new is made very striking indeed since they are brought together in the same shop.

A Second-Hand Tire Job

An ice wagon came to the Old-Timer's while I was there; it came on three wheels and a pole, a tire having broken short across. The old tire had worn too thin to be worth resetting and the thrifty Yankee brought an old, but thicker tire to be set in place of the

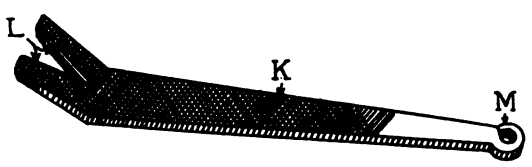
Digitized by Google

broken one. The old tire was a foot or more too large for the wheel, therefore it had to be traversed and a piece cut out.

The *new* old tire being originally 3 x ¾ inches, made a good mouthful for the tire roller and the old smith called into action all the loafers who chanced to be in the shop and set them to holding the frame of the rolls, lest the heavy work tip that machine completely over! Finally, the tire was rolled until its ends came together, when they were welded and traversed again after which the tire was very little too large.

Into the upsetter went the tire and the Smith had so much confidence in his work that he upset the tire right in the weld—and it held, too. The bit of tire under compression beginning to "hump up" in the machine, the Old smith seized a sledge and began hammering down the upset portion tight in the machine, when the clamps let go, the tire canted sidewise and caught the smith a nasty cut just at the top of his very high forehead.

But the old man would not stop for a little thing like that. With his helper he grabbed the tire, hustled it upon the anvil and flatted down the "hump" before he even thought of his cut head from which the blood streamed down over his face until he resembled an Indian with his war-paint on!



The Bolt Puller.

As soon as the tire was back into the fire again, I got hold of the old smith and washed off his "war-paint" and found a neat cut about one inch long, but one which had not drawn the edges of the skin apart. He washed out his cap, put on another and went to work again. His only remark was: "drat that tire!"

Some Grindstone!

While looking around the Old Smith's shop, I saw a grindstone which looked strangely familiar, and upon a closer look, found it to be one which I had hung in my father's shop, more than 35 years ago! Then it was a big stone, nearly five feet in diameter. And apparently the stone has not lost more than an inch of radius during all that time. I remember the "time" I had in wedging the shaft into the six-inch square hole in that big stone, and the driving and re-driving of wedges and the fitting of blocks before the big stone was made to run true sidewise and facewise.

The old shop in which the big stone was originally mounted, had a farm connected with it—or the shop *might* have belonged to the farm, I won't be too exact, and father used to grind a whole lot of mowing scythes and felt grieved whenever he had to hold the scythe sidewise to keep from hitting the hands of the victim who was doing the "circular work." To get rid of that sidewise business, father purchased the five-foot stone and I wedged it upon a square shaft so well that it is still tight after at least 35 years!

Pulling and Holding Bolts

Several handy home-made tools were noticed in Mr. Jenk's shop. One, as shown in Fig. 2, was a "Bolt-puller" and had been made from an old hoof rasp without even the hammering or grinding out of the tooth marks—something pretty hard to accomplish when the marks are as deep as they are in a rasp. The body of this tool, shown at *K*, Fig. 2, was, excepting wear, just as it came from the file maker. The end of the file, however, had been split and bevelled inside, as shown at *L*, so as to form nail-pulling jaws somewhat similar to those on some straight-clawed nail hammers. The writer asked the Smith why he did not curve the jaws *L* same as those of an ordinary claw hammer or the jaws of a wrecking bar, but the Smith has not answered yet. Possibly he is looking for some good reason for the straight jaws?

The tang end of the file in question, had been drawn down so the shoulder had disappeared and an easy taper formed, as shown by the picture. Then the tank had been bent around upon itself, as shown at *M*, thus forming an eye by means of which the tool could be hung up when not in use. Another handy little tool, shown by Fig. 3, goes with the bolt puller. This tool is a "bolt-holder" thus making a pair of very handy tools. It evidently was made of tool steel and the fingers *N* and *O* were about ⅜ of an inch in diameter at their junction with each other. The body of the tool was of the same thickness, but the lug *P* was thicker in order to give more thread for screw *Q* which was pointed at the end and evidently had been case-hardened to prevent wear. The screw terminated in the wing head *R*.

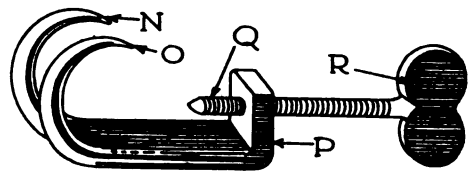
The use of this tool is obvious, but the convenience of the device can only be appreciated to its full extent by actual use when trying to put a bolt through two or more thicknesses of wood or metal, or when a nut is to be started upon and screwed home and the bolt turns around! Then, the little bolt holder is gripped around the work, say the rim of a wheel, and the point of screw *Q* is brought to bear against the head of the obstinate bolt. There is not another wriggle in that bolt, which holds right still until the nut has been screwed home, which usually so loosens the bolt holder that it comes off without having to loosen the thumb-head *P* in the least.

Another "Landmark" Shop

The shop in which the bellows and the electrically driven blower work side by side, has also just changed hands and is now operated by Mr. A. A. Charbonneau, who recently came from South Framingham, Mass., and who is a most enthusiastic reader of THE BLACKSMITH AND WHEELWRIGHT.

"I don't see," he said, "why all the Smiths around here are so afraid to charge decent prices for their work? Why, some of them are shoeing with No. 6 shoes for $2.00, and that will hardly pay for shoes and nails, shop rent and overhead. I don't believe half the smiths ever think of those items of expense and so, go on cheating themselves, month in and month out until they wonder where the profits of the business have gone to! I won't work as cheap as that for anybody. I can't charge what I should receive, but I never will give away work as some of them do, and I simply won't 'scamp' work in order to make a profit out of the cheap shoeing prices."

"Why, just look at that shoe," Mr. Charbonneau continued. "I took that shoe from a horse one of those cheap guys had shod. The shoe had been on only a week and it was ready to fall off. And just look at the way that shoe is made and finished? Some rough, isn't it? And the rest of the job was just as bad. The hoof had not been pared, the shoe didn't fit, and so all the way through. It was a wonder that the shoe stayed on for even a week!"



The Bolt Holder.

"Why don't you get all the smiths together and establish fair prices for shoeing and other smith work?" I asked of Mr. C— "Then you can have right prices all around."

"Right nothing," he replied. "Most of them are afraid to charge decent prices. Afraid if they do, that 'tother fellow will work a little cheaper and get all the work. You can't do a thing with them! And, say," continued Mr. C— "those fellows down in Maine sure ought to wake up. I have been reading in the THE BLACKSMITH AND WHEELWRIGHT the prices for work which they get down there and—why, those prices are worse than they are here and I don't see how smiths live down there even if they get steel and labor for nothing, carry no insurance and don't even pay taxes."

The welcome I got from the old fellows in East Pepperell, was a warm one to be sure, but it wasn't a bit more cordial than what Mr. Charbonneau handed out when he found that I was that particular Hobart who writes THE BLACKSMITH AND WHEELWRIGHT stories. Nothing was too good for me after that, and during our talk about his old shop and other things, he asked: "Say, Mr. Hobart, you have been around the West a good deal and I wish you would tell me if they do the things out there that I hear they do?"

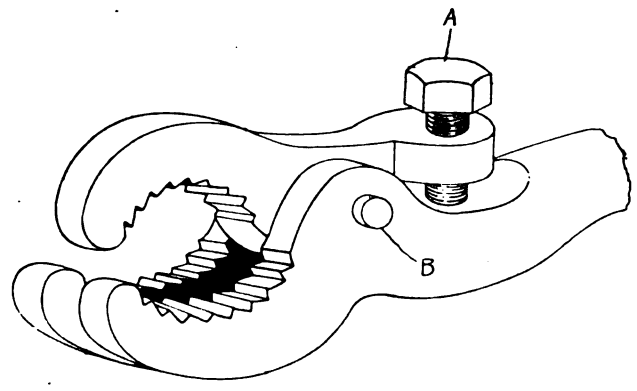
"There was a Government chap who used to come around once in a while. A sort of Inspector or something who looked after shipments and lost goods or something which took him all around everywhere. That chap used to tell some of the all-firedest yarns about how they did things in the West. He would tell of their shoeing horses out there by electricity alone, that doing all the work and in less than fifteen minutes per horse. And he also told how some smiths out there shod 300 horses a day each! I wondered if he was lying when he told the stories, and perhaps you can tell me how they did such things out there?"

But I was totally unable to tell Mr. C— of any "15-minute electrical shoeing" and left him to wonder more than ever, "how, when and where" they did it! I went up into New Hampshire from Pepperell and saw a chap riding a mowing machine along the highway from one job to another. He had mounted the machine upon a little two-wheel vehicle which a smith might make to advantage and sell to occasional mowing machine users. This chap put the machine upon the device in less than two minutes and rode home in comfort upon smooth wheels.

POSITIVE GRIP PIPE WRENCH

By Chas. H. Willey

THIS wrench was designed and made by the writer to meet the need of a positive grip pipe and round stock wrench. Almost all mechanics are familiar with the ordinary style of Stillson pipe wrench and know how it slips when the teeth are the least bit dull. When it slips it becomes useless and also damages the work.



The Pipe Wrench Described.

The wrench shown in the sketch is homely in appearance and odd in design, yet indispensable around the shop when one encounters a stubborn pipe, stud, or shaft that the ordinary wrench will not move. It consists essentially of two parts, a moving and a stationary jaw. The moving jaw is adjusted and set up tight by the set screw (A). When placing the wrench on, or taking it off the work, the pin (B) which is made an easy fit, is removed. The drawing gives one a clear idea of its construction and should enable the shop's blacksmith to forge up such a tool easily.

EASY ENOUGH

A CERTAIN newspaper that made a practice of answering queries from readers received this one:

"Please tell me what is the matter with my chickens. They go to roost apparently well. The next morning we find one or more on their backs on the floor, stiff, combs white and feet in the air."

It was the editor's busy day, and this was the answer his reader received:

"Dear sir:— your chickens are dead."—*Du Pont Magazine.*

Digitized by Google

THE BLACKSMITH & WHEELWRIGHT

The Pioneer Journal of Its Class in the World.

Member of the Audit Bureau of Circulations.

PUBLISHED MONTHLY BY

M. T. RICHARDSON COMPANY,

71-73 MURRAY STREET, NEW YORK.

POST OFFICE BOX, 654. TELEPHONE—7377-7378 Barclay.

CHICAGO OFFICE, Garland Building, 58 East Washington St.

Entered as second-class matter at the Post Office in New York City.

M. T. RICHARDSON, President and Treasurer
F. R. WHITTEN, Secretary
M. T. RICHARDSON, Editor
FRANK L. AVERY, Managing Editor

F. R. WHITTEN, Advertising Manager

H. F. LUDINGTON, Western Representative
HOWARD COBURN, Ohio, Western N. Y. and Western, Pa.
GEO. A. SMITH, Eastern Representative
FRANKLIN MYERS, Art and Copy Dept.

FOREIGN AGENTS:

NEW ZEALAND
MR. R. HILL, Matlock House, Davenport, Auckland, New Zealand.

GREAT BRITAIN
ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance.....$1.00
One Copy, six months, in advance.....60 cents
Single Number.....10 cents
Canadian subscriptions.....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English Money.

Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

ADVERTISING RATES SUPPLIED ON APPLICATION.

SPECIAL NOTICE

Subscribers failing to receive their magazine regularly will favor us by giving us notification to that effect.

CHANGE OF ADDRESS

Subscribers who desire the address of their paper changed should send us the old as well as the new address.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

Our Editor's Letter

A SHORT time ago I visited a shop where everything seemed to be old and time-worn. The smith must have been about 70 years old and certainly knew his trade for I'm pretty sure that no one else could have accomplished what he did with the tools he had.

After I had talked with the smith for nearly half an hour, he began to "Loosen up" with his ideas and from him I learned many things. Perhaps the reason why he finally began to talk was due to the fact that I was able to help him to a certain extent. I noticed that he didn't have a good pair of tongs in the shop, so I passed along a suggestion from this magazine regarding tongs. He thought that the idea was good and after that he was entirely willing to show me a number of the tools which he had made.

At first, the smith was rather bashful about his equipment. The tools were crude and made mostly from scrap iron and steel. He didn't seem to think that they would interest me in the least, but they did for it seemed to me that many of his tools might save considerable time.

That is one trouble with the blacksmith; he does not seem to think that he has anything of value to any one else. He seems to think that every other smith has the same ability. As a rule, however, the smith is willing to pass along his ideas if he can only be persuaded that they are of value to a brother.

If the smiths would only trade ideas they would all profit by the experiences of others. No idea is too poor to pass along and the man who wants to keep everything to himself is the man who loses in the end. If I find a new way to do some bit of work, a way that saves time and money, I take pleasure in suggesting it to others. In all probability there are many others who have found that way before me, but I usually find some one who is glad to get it.

The general all-around blacksmith who does everything from skate sharpening to horseshoeing may not have time to develop anything new, but among our subscribers we number many smiths who perform a certain task in a certain line every day in the year. These smiths are probably experts in their line and through constant practice have developed a certain method of work. They have, in many cases, invented new tools and time saving devices.

Such specialists should be able to help their brother smiths and for that reason should pass along their ideas. Nothing is gained by keeping things to themselves; just a short letter or a rough sketch to THE BLACKSMITH AND WHEELWRIGHT and your idea is published for thousands of your brothers to read and gain profit from.

Stop and think a minute; ask your yourself just why you read any book or magazine. You read because you can get suggestions from the article, don't you? And yet the average book or magazine contains ideas which the writer alone has learned from his own experience or gleaned from a few friends. One can see that such knowledge is limited and the information is not as valuable as that contained in a department such as our Correspondence Department.

Don't keep ideas to yourself! You owe your brothers something. Every month you profit by a hint from another reader, therefore it is up to you to do your part.

No matter how crude your sketch, no matter whether your letter is the work of a Professor or not, your idea is valuable. We will put your letter in shape for the department and have the sketch drawn by an artist, for we know that it will interest other readers.

Every day I receive many letters which contain suggestions of value, some of them I hold for months at a time simply because there is not room in the paper for them, but never yet have I received a suggestion which was not worth printing.

Keep the letters coming, for the Correspondence Department is yours and its success is in your hands.

Federal Ownership of Public Utilities

FOR the first time in history there is a concerted movement on the part of the public at large for Federal ownership of all public service utilities. The movement, as such, started with the demand of the labor unions for control of the railroads. It owes its birth to the Socialistic propaganda that is spreading over the country and the results are problematical.

On the face of the matter, from theory, it would seem to be a practical solution of the problem insofar as the workmen themselves are concerned. It would simplify the fight of labor against capital. If their demands for more money were not met, then they might strike against the public (their employers) and their demands would be satisfied.

At present we have a fair example of Government ownership in the postal department where Mr. Burleson rules. A letter posted today reaches its destination at some future date which never can be determined—it may never reach its destination. The post office department has never paid for itself, the deficit has always been made up through taxation. The department in the past has been run by the people through the Government, at times, in a very efficient manner, but with every change in politics there has been a change in postal management.

For many months we have had a sample of Government ownership, or management, which amounts to the same thing, in the railroads themselves. The service is consistently poor, the employees dissatisfied, and the rates much greater. Despite the fact that all tariffs were increased, the operating expenses as contrasted with those before the Government took control, have increased all out of proportion.

If this control continues, we may reasonably expect an entirely new management with the next election. We may expect to have a new set of heads with no experience in railroading, with every election and the public will pay for their education. We may expect to have a score of men in charge who are politicians, not business men and the roads will be used by the political bosses as pies from which to gather the plums for their supporters.

As a check against extortion, the people have established an Interstate Commerce Commission which has regulated tariffs and protected the public. Under Government control, this commission has been hampered and their findings thrown aside.

For the past two years practically every business has been under the control of the Government, and under this control prices upon every commodity and service have increased more than 100 per cent. We have maintained an expensive political machine and are now awaiting the acts of a procrastinating Congress to check some of the useless expenditures.

In view of these facts, do we as a public want the Government to continue its control? Are we willing to pay for its mistakes? Will we wait for special sessions of Congress in patience while they settle the grievances of their various employees?

The Transportation Problem

UNDOUBTEDLY one of the factors which was largely instrumental in breaking the Brooklyn car strike was the extensive use of motor vehicles. With the tie-up of practically all Brooklyn car lines, over one million people were put to inconvenience. Anticipating the strike many of the larger business houses arranged to have trucks and automobiles call for their employees in the morning and take them home at night.

A fair percentage of the rest were forced to walk, while taxicabs and good natured autoists carried capacity loads. After twenty-four hours of the strike, however, transportation was had for practically everyone. Motor buses, taxicabs, trucks and automobiles did a big business. As the strike continued, the inconvenience lessened until finally the public suffered but little from the lack of trolleys and subways.

As soon as the public's support was removed, the strikers were forced to temporize and so the strike ended as suddenly as it had begun.

It is true that train and trolley transportation is cheap, but all things considered it would seem that motor vehicles are a good substitute. If one were to figure the cost of automobile operation one would find that an average machine, filled to capacity, may be operated at a less cost per capita than trolleys or steam trains over short distances.

Steam train fares vary between two and three cents per mile over distances of ten miles, while the average five-passenger car costs from five to ten cents per mile for operating. In the latter case, then, the cost per capita is from one to two cents per mile and includes the depreciation of the machine as well as the cost of fuel.

As a means of transportation, the horse has long since been displaced; perhaps in the near future our trolleys, our subways and our short line railways will have been thrown into the discard.

The public always suffers during a transportation strike and such a strike can never be won without the public's support. As soon as the public wakes up to the fact that railroads and electrics are not essential, then again there will be peace. In the country towns where the transportation company's demands are too great, there will be community-owned automobiles or trucks. There is a limit to that which the long suffering public will stand, and the limit is nearly reached.

It is not our purpose in this editorial to take issue either with capital or labor, we merely offer a solution for the public at large.

Digitized by Google

Old Friends

ON January first of next year THE BLACKSMITH AND WHEELWRIGHT will be forty years old. It was the first magazine ever published which was devoted strictly to the field which it covered. There were other magazines of a general nature, but none of them were written in the interest of the Blacksmith and Wheelwright trade; it was the Blacksmith's first magazine friend.

The idea of the magazine to cover the field originated in the brain of Mr. M. T. Richardson and to him is all credit due. For more than thirty-nine years Mr. Richardson has been, and still is, the sole owner and proprietor of THE BLACKSMITH AND WHEELWRIGHT; by him have its editorial policies been directed and to-day as on January 1, 1880, Mr. Richardson is a firm backer of the ideas which led to the printing of the first issue.

Blacksmiths have come and gone, new names have appeared on our subscription list, old ones have dropped off, but still THE BLACKSMITH AND WHEELWRIGHT retains its old Editorial policy, a magazine for the Blacksmiths and Wheelwrights. It is written with a regard to the interests of this class of workmen only and at present is the only magazine devoted strictly to this field.

We have said that many of our old subscribers, those who remember the first issues of THE BLACKSMITH AND WHEELWRIGHT, have long since dropped from our list, but still there are a few who subscribed in 1880 and are still in the family circle. To these few, we send greetings and that our later friends may know them, we ask them to send us their photographs in order that we may show their pictures in our fortieth anniversary number, January, 1920.

Old friends, subscribers of 1880, join us in our Family Reunion, send us a letter, your photograph, and a brief sketch giving the history of your life and your business, so that we may renew old acquaintanceship and greet new friends among the subscribers of to-day.

To all of these friends Mr. Richardson will send a beautiful autographed portrait of himself, for old time's sake. This portrait was made from Mr. Richardson's best photograph, and is suitable for framing.

Our 1880 subscribers are few in number, but there are still more who have known us for at least 25 years, we want to hear from them also, so that we may publish their names in an Honor Roll.

By all means, then, don't fail to join our reunion by writing us a letter, telling how long you have read THE BLACKSMITH AND WHEELWRIGHT and sending us a photograph if possible.

Keep a Scrap Book

FEW people realize that man is merely an educated animal of the higher order and that he differs from the horse and the dog in that he has an ability to reason and plan. Everything he does is based upon experience, it is absolutely impossible for anyone to be original in the strictest sense of the word.

The brain cells or memory which guide man through life are developed from natural demands. Man learns to talk because speech is necessary. As time passes he obtains ideas and adapts them for himself and for his work as necessity calls.

All modern inventions, the airplane, the wireless and machine gun are evolutions from machines of lower types. In all probability had Marconi been born a hundred years ago, the wireless telegraph would not have been invented by him, but by another, for Marconi would not have had the necessary experience in his generation to have progressed to the extent to which he did.

Knowledge of to-day is the result of past experience, things which to-day are utterly unthought of and impossible an era from now will be actualities because we are slowly building up our science and gaining something new every day.

If man were to forget experiences or did not profit by what has been learned, he would be in a class with the scholar sof Socrates' time. Most of us forget things, facts that matter but little and we are none the worse for it, but often-times were our memory perfect we would gain considerable both in time and money.

Many of us make a practice of keeping memorandum books to help our memories, but such a book is limited in its usefulness. Every workman should keep a scrap book in which could be pasted clippings from books, papers and magazines. Such a book should be indexed so that each clipping could be referred to at a moment's notice.

After a time such a book would be very valuable. A smith, if he kept such a set of clippings, when he desired to make a certain tool or do a certain kind of work, could look under that heading and find just the information he wished. He would not need to rely on memory and would have for reference the best authorities in the country.

The correspondence department of THE BLACKSMITH AND WHEELWRIGHT contains suggestions every month that are of great value to many workmen. It will pay every reader to cut out the interesting items and compile a book for themselves of just the material that interests them most.

One of the wisest men in the country who is worth millions has said, "It is not the man who knows a lot, for he forgets, but it is the man who knows where to find his information who makes a success of life." And this man has hit the nail right on the head.

SALE OF ANVILS

THE War Department authorizes publication of the following statement from the office of the Director of Sales:

The Director of Sales announces that the Surplus Property Division of the Office of the Quartermaster General of the Army is offering for sale under sealed proposals 400 blacksmiths' anvils, located at New York, bids for which will be opened at 10 o'clock on the morning of September 18, 1919, by the Surplus Property Officer, Zone Supply Office, 461 Eighth Avenue, New York.

These anvils are made of steel and weigh from 70 to 75 pounds. The face measures about 12½ inches by 3¼ inches. The length of the blight is 1 3/16 inches and of the horn 6¼ inches. Bids for one or more of the anvils will be considered.

Inspection of the anvils may be made by applying to the Surplus Property Officer, Zone Supply Office, New York, at any time before bids are submitted. Particulars and special bid forms can be obtained from the Surplus Property Officer, Zone Supply Office, in any of the following cities: Boston, New York, Philadelphia, Baltimore, Newport News, Atlanta, New Orleans, St. Louis, Jeffersonville, Ind., Chicago, Omaha, San Antonio, El Paso and San Francisco.

THE TRAINING OF CRIPPLES

HOW many of us realize we are cripples? We have the usual quota of legs and arms, fingers and toes, but we're cripples just the same. Samuel Hopkins Adams made the discovery while studying reconstruction of maimed soldiers at Walter Reed General Hospital, Washington. Describing the incident in the "Red Cross Magazine," he writes:

" 'I suppose you regard yourself as a whole man,' demanded one of the vocational therapy experts.

"Looking myself hastily over to make sure that I had not lost anything in the surgical ward, I replied that I could count the usual number of arms, legs and other appurtenances.

" 'All right,' said the expert, 'but you're sort of a cripple at that. You're atrophied.'

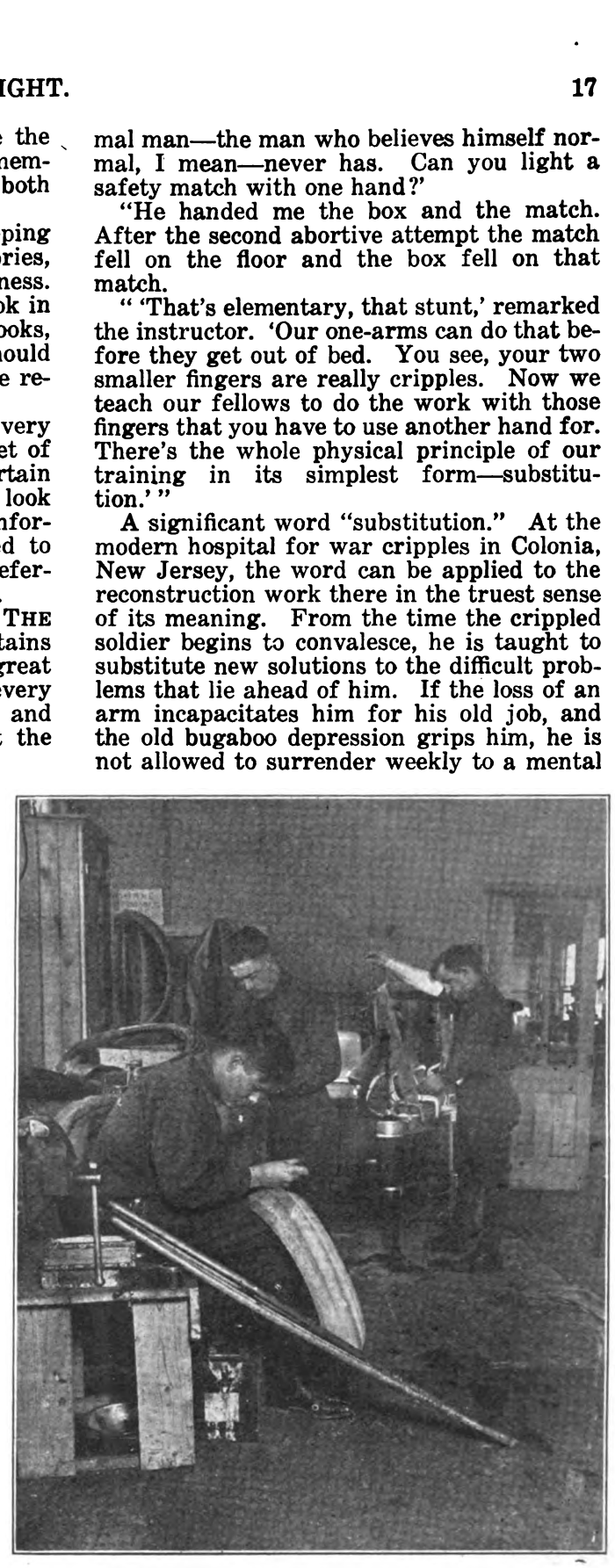
" 'If I am, I've never discovered it,' I assured him.

" 'Of course not. People never do until they're shown. You haven't got anything like the full use of more than four fingers and two thumbs out of a total of ten. The normal man—the man who believes himself normal, I mean—never has. Can you light a safety match with one hand?'

"He handed me the box and the match. After the second abortive attempt the match fell on the floor and the box fell on that match.

" 'That's elementary, that stunt,' remarked the instructor. 'Our one-arms can do that before they get out of bed. You see, your two smaller fingers are really cripples. Now we teach our fellows to do the work with those fingers that you have to use another hand for. There's the whole physical principle of our training in its simplest form—substitution.' "

A significant word "substitution." At the modern hospital for war cripples in Colonia, New Jersey, the word can be applied to the reconstruction work there in the truest sense of its meaning. From the time the crippled soldier begins to convalesce, he is taught to substitute new solutions to the difficult problems that lie ahead of him. If the loss of an arm incapacitates him for his old job, and the old bugaboo depression grips him, he is not allowed to surrender weekly to a mental



A Tire Repairing Class at the Reconstruction Hospital in Colonia, N. J. (Photo Copyright by Western Newspaper Union.)

state of "dependency." The Red Cross and Uncle Sam substitute a new vigorous sane outlook on life, by refusing to baby him, by teaching him a new and more remunerative trade. He has the incentive to make good when he leaves the hospital.

Very seldom does a war cripple "lay down on the job." He may have a shattered body, and worn out nerves, he may be thoroughly depressed and blue, but the will to go on fighting is nearly always there.

One soldier lost both hands at the wrists. For a while he refused to buck up. He talked continually of living on his pension—a life of glorious ease. His Red Cross nurse in charge noticed his dependent attitude with some anxiety, and suggested that he take a walk through the government shops attached to the hospital, where his buddies were learning how to repair automobiles, paint china, make telephones, draw art posters and a hundred other trades. He half-heartedly agreed.

The trip worked a miracle. He couldn't see his pals working busily and happily in the miniature industrial city of Colonia, and remain idle.

"Say," he said diffidently to the nurse, "don't you think I could tie a paint brush on my arm and do a little painting?" With encouragement from his nurse, the suggestion became a reality. For the work he turns out, he receives 50 per cent. profit and 100 per cent. happiness.

Colonia is like a vast clearing house where the debts of the government to these boys are paid in gifts of training and courage. Every

Digitized by Google

type of man is taught an occupation that will be congenial and profitable when he leaves. The work varies from repairing inner tubes, to learning higher mathematics, and through the encouragement of the Red Cross they go out to face life, renewed in mind, soul and body. They are "carrying on" at Colonia.

THE WAY TO WIN

"Strike" while the iron is heated,
"Pause" and the iron 's cold—
If you strike too late on a hardened plate
The weld will never hold.
"Seek" and success will follow;
"Wait" and it passes by;
Be quick to grasp, then hold it fast
And trust for a better try.
"Work" and the world works with you;
"Loaf" and you loaf alone;
This strenuous world 's a continuous whirl:
It offers no room for the drone.
"Life" is an undertaking;
"Death" is a silent thought.
So let life's light illume the night
With the deeds which you have wrought.
—P. Gordon Mills in Indianapolis *Sentinel*.

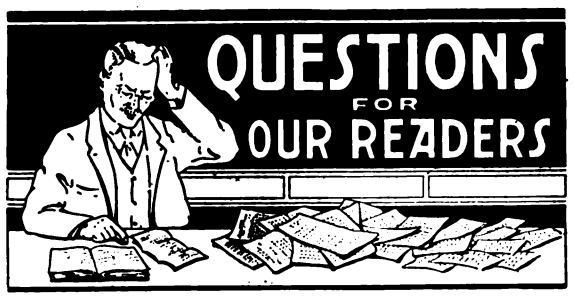
SH!—SH!

Mrs. Blank could find only two aisle seats one behind the other. Wishing to have her sister beside her, she turned and cautiously surveyed the man in the next seat. Finally she leaned over and timidly addressed him.

"I beg your pardon, sir, but are you alone?"

The man, without turning his head in the slightest, but twisting his mouth to an alarming degree, and shielding it with his hand, muttered:

"Cut it out kid—cut it out! My wife's with me."—*Public Service Chat.*



A Saw Table?

From Chas. Jenkins, Canada.—Will some brother be good enough to tell me through the columns of THE BLACKSMITH AND WHEELWRIGHT how to build or make a small saw table or stand for a circular rip saw with tilting table and give full measurements and also how fast the saw should run. How many R.P.M., say, on a ten or twelve-inch saw for use in a small country shop.

Hammer and Sharpener

From T. H. Christmus, Texas.—Will some brother blacksmith who has had experience with power hammers give me some idea as to the proper size and type for use in an ordinary blacksmith shop?

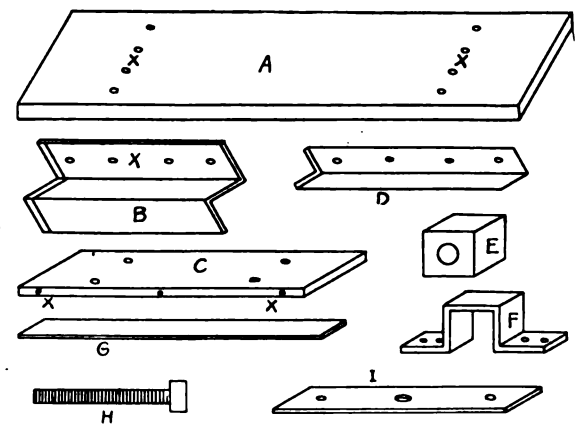
I would like to know also about some brother's experience with the Justrite plow blade sharpeners. What type and style are considered efficient and best for sharpening plows and cultivator sweeps? I would be glad to hear from someone at the earliest opportunity.

Grab has long fingers, but sometimes it cracks them, when it gets too much in its fist.



The Belt Tightener

From John Sefcik, Kansas.—I am sending you herewith a sketch of a device for tightening countershaft belts. This device is easily adjustable so that in Winter the belt can be loosened and in summer when the belt stretches, it can be tightened up again. It will save lots of time and prevent consider-



Details of the Belt Tightener.

able bad language. It will also save money, because there is no need for cutting out a piece of belt and putting in a lacing.

I first took a plank two inches thick, 12 inches wide and 36 inches long, and beside it I nailed a second one the same thickness but only six inches wide. The two planks, side by side will make one 18 inches wide and 36 inches long, as shown in the figure at *A*.

Take an old binder sickle guard bar which is bent to a double angle, as shown at *B*, punch the holes through it for three-eighth inch bolts and fasten *B* to *A*. The crosses on *B* and *A* show where the fastening is made. There should be two of these double angle pieces, one at each end of *A*.

Make up angle iron *D* which is one and and three-quarter inches wide inside, and fasten it to the edge of *C*. *C* is a plank measuring two inches by twelve inches by twenty-four inches in length. There should be two angles like *D*, one at each end of *C* and when they are in place the plank *C* will slide in the two angles *B* which are mounted on plank *A*.

Next fasten an old cultivator beam measuring one and three-quarter inches by one-half by twenty-four inches long to one edge of the plank *C*, as shown by the crosses. The fastening should be made with three-eighth inch lag screws.

On the side of the beam fasten the iron piece *I*. This metal piece should be the width of the beam, and at the center have a countersunk place about one-quarter of an inch deep, but there should be metal beneath it. This is to take the pressure from the tightening screw and so protect the beam. This completes the sliding portion of the device.

The portion *A* is mounted solidly to the ceiling while the countershaft hangers should be mounted upon the sliding plank *C*. When *C* is moved in its slides it will tighten the belt.

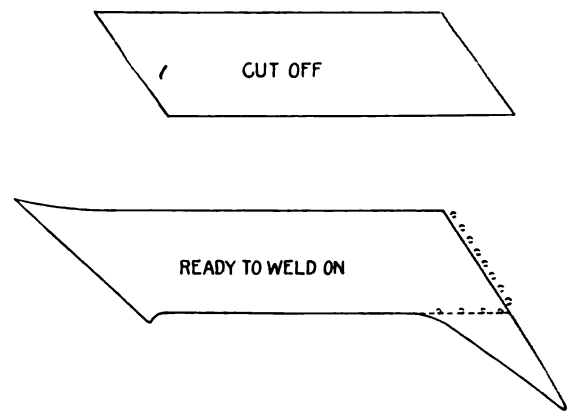
In order to make an adjustment screw, obtain a piece of iron two inches square, as shown at *A*, drill and tap it for a seven-eighth inch bolt. I use a disc bolt. I square up the head and thread it its full length. Then I file off about three threads at the end so that the end of it will fit into the seat on the iron *I*. The clamp shown at figure *F* should be made of heavy iron and its edges should be crimped around the nut *E*.

The set screw *H* should then be screwed into the nut *E* about half-way. The end of the set screw is then placed against the half hole in *I*, and *F* is then screwed to the ceiling. As soon as *H* is screwed up it presses against *C* and tightens the belt.

A Letter From Arkansas

From John O. Lane, Arkansas.—I have been a silent reader of THE BLACKSMITH AND WHEELWRIGHT for many years and have obtained lots of help from it. I think you hit the nail on the head when you said that if the blacksmiths would only do more thinking, they would get along better.

I talk auto and tractor to my customers every chance I get, although there are no tractors in this part of the country now. I obtained my automobile and tractor experience in Colorado. I purchased a car some



How Mr. Lane Shapes Plow-Points.

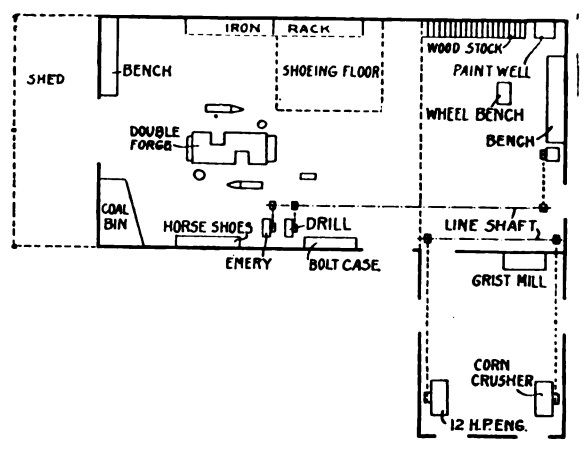
time ago, you know the rest of the story, or can guess it.

I like to read the letters from the other smiths and sometimes I can hardly keep from writing to them direct. Though Mr. Berry (in the February issue) does not say, I think he must have to apply the same kind of tires that I used to put on when I was in California. I used a No. 4 scientific cold tire setter in shrinking on these tires and as long as I did the work, I never had a single tire returned to be reset. I am a firm believer in cold tire setting. I was interested in Mr. Lachman's handy tongs, a description of which appeared in the February issue and am sorry that he did not say what size of stock he used for making them. I have worked in the smith shop about twelve years and I do not think that the smith is paid for what he does. Let me give some of the prices which I charge for work and what some materials cost:

Horseshoeing, all sizes.. $1.50
Resetting 1.00

Shoes cost me from $7.75 to $8.15 in this part of the country. Nails cost twenty-five cents a pound and coal sells for $6.50 a ton. This coal I purchased directly from the mines which are located here.

I am giving herewith a sketch which shows my method of cutting parts or bills



Plan of Mr. Lane's Shop.

to lay plowshares. I cut the steel 12 inches long, using one-quarter by one and one-quarter inch lay steel when I can get it.

For making welding compound, here is my receipt:

1 quart of common sand
1 quart of common table salt
1 pound of table soda
1 pound of borax
1 pound of Spanish brown

to color with. Mix all of these things together and you can weld most anything.

I often find in my travels that there are

Digitized by Google

many men shoeing horses who should be plowing or making rails. Then the horses would be better off. I have seen some of the smiths pull off the old shoes, then heat the new shoes red hot and burn the hoof until one couldn't stay in the shop. Then when the horse went lame, they would wonder where the trouble was.

I always pare the hoof level and fit the shoe as nearly as I can without putting it against the hoof. Then I heat it and finish shaping it cold, making it fit the hoof instead of making the hoof fit the shoe. My shop is 20 x 40 feet. I was brought up in this place, but spent considerable time in California. Since I returned, I have been here eighteen months. I get lots of work, despite the fact that I am five miles from town.

We have a mill and crusher near the shop. I have done considerable studying and have built a double forge which is shown in the center of the drawing. It is 32 inches wide and seven feet long, and a man can work on each side of the chimney which is located in the center of the forge so as to take both fires.

Moving Van and Passenger Body

A Practical Body Which Will Find Steady Sale in Almost Any Locality

NEVER in the history of the country has there been so much unrest among the laboring people. This unrest has led to strikes and the strikes have added to the cost of products and in fact all commodities. Many of the trolley lines in the smaller towns have been forced to suspend operation for days and sometimes weeks at a time. In some cases the trolley companies have gone bankrupt and the tracks are no longer in use.

This condition has greatly inconvenienced the people living along the lines, particularly in the morning and at night when they travel to and from their work in the various villages adjacent.

There has been a class of automobile drivers which has taken advantage of the conditions outlined and has operated what have been termed "jitney" lines. In the majority of cases in order to make these lines pay, the touring cars have been crowded to capacity on their runs and not all of the people have been served by such lines.

There is a general demand for a large capacity automobile truck, capable of carrying a large number of people during the rush hours, yet a machine which could be used for other purposes besides. In the country towns, such a bus could not be operated at a profit during the day, though it pays large dividends during the rush hours in the morning and in the late afternoon.

Doubtless within the near future many enterprising business men will take advantage of these conditions and establish regular bus lines in the various parts of the country. The blacksmith, if he is inclined to do so, may construct a body for a large chassis such as the Packard truck, which may be used for bus service and for general moving or hauling purposes during the rest of the day.

Such a body is illustrated in our drawing this month and shown mounted upon a Packard truck chasis. The body is designed primarily for hauling work, for carrying furniture or in fact any commodity which may be bulky. The body proper measures 13 feet six inches in length, six feet in width and six feet four inches in height. It is mounted upon seven cross bars which in turn are supported by two bar rails. The bar rails rest up on the frame of the truck.

The bottom of the body itself is a frame, all corners of which are mortised together and strengthened by means of angle irons. To add strength to the floor, two lengthwise sills are mortised into the frame at each end, across the center. A plan view of the frame and body members is shown at B.

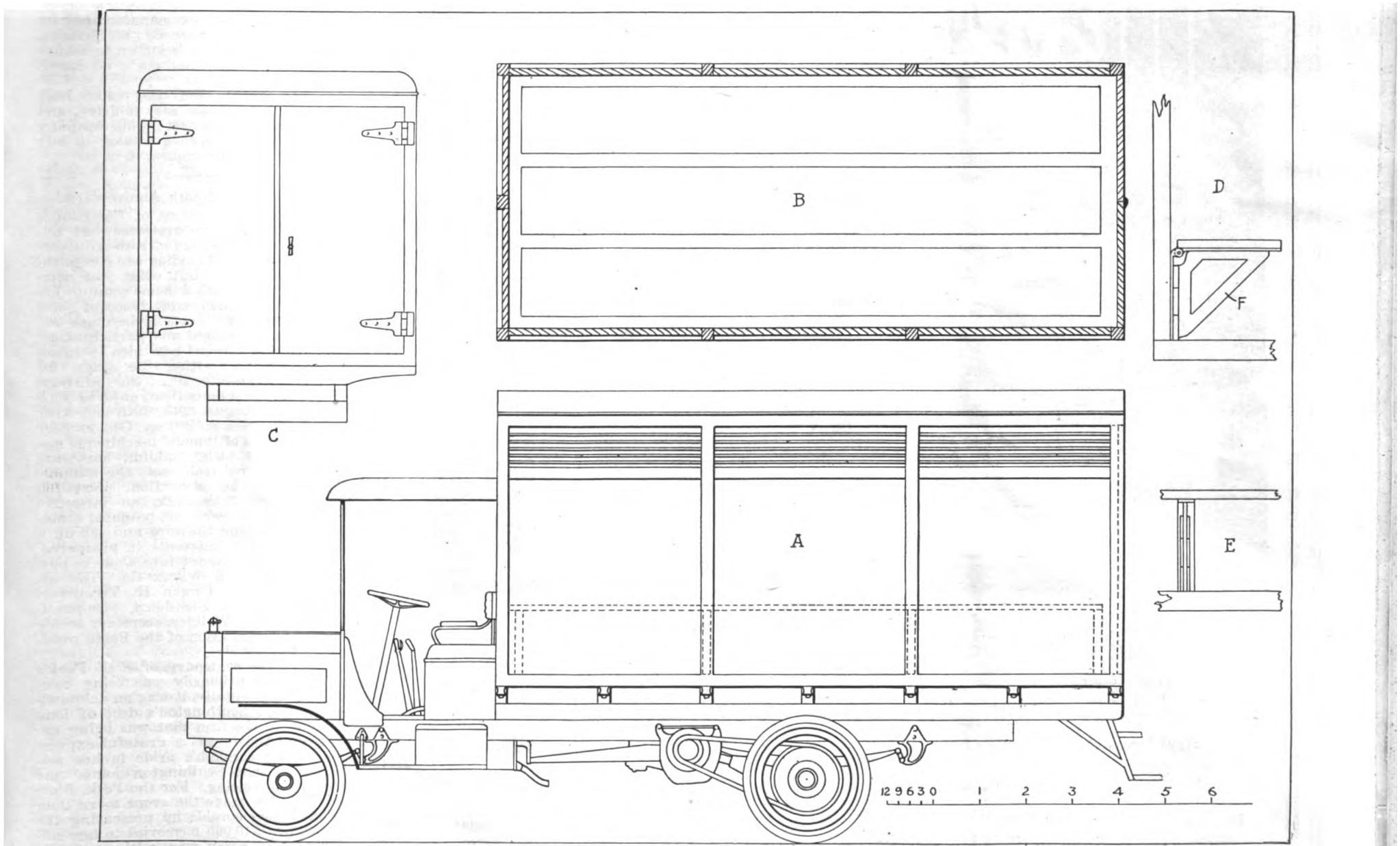
There are nine upright posts, measuring three by three inches which support the roof of the car and upon these posts rests the frame constructed of four top rails. These top rails carry the top or roof bows. The top is constructed from thin wood, canvas covered or heavy wood tongued and grooved and made water-tight.

In order to provide ventilation for the body, the sides are fitted with slat openings. The panels (eight in number), are cut at a distance four feet from the floor and are arranged so that the upper parts may be removed within a few minutes so as to leave the sides open.

At D, E, and F are shown the details of the seat construction. F is a swing bracket, one of which is hinged to each of the nine uprights. When not in use, it folds against the side of the body and permits the seat board which is also hinged, to drop down against the side or be raised, as is most convenient.

With this seat construction, all of the seats can be raised or dropped out of the way and the van used for carrying large boxes or merchandise of any kind. With the seats in place, and the side panels removed, the machine may be used for carrying passengers. The rear doors are mounted upon large double hinges and the hinges are so arranged that the doors may be swung open and forward so as to fold lengthwise along the body and leave the rear of the body entirely open.

The steps (two in number) are also hung on hinges and can be folded up beneath the car when the machine is used for carrying merchandise. The body, being very simple in construction, can be made by practically any smith within a very short time and should find a ready sale in practically any town in the country.



Details of the Body Described. The Chassis Used is a Packard.

Digitized by Google



Piston Ring Size Directory.

The Gill Mfg. Co., 351 W. 59th St., Chicago, Ill., has recently published a piston ring size directory. The purpose of this book is to enable the garageman, dealer or jobber to ascertain the correct size of piston rings desired for the particular "job" upon which he is working.

Frequently a car owner fixes a date for the garageman to overhaul his car, but the garageman may not know the size of rings to order. With the assistance of this size directory, however, he can order the rings in advance and obviate the delay.

The directory also contains general instructions for the fitting of Gill piston rings together with a telegraph code to facilitate quick ordering. Copies of this booklet are being distributed free to the trade and can be obtained by addressing a request on a letterhead to the Gill Mfg. Co. at the above address.

Neverslip Shoes and Calks.

It would be wise for our readers to investigate the very complete line of horse and mule shoes manufactured by the Neverslip Works of New Brunswick, N. J. We say "complete," for it is said to comprise a variety of patterns that covers the entire field. Their Red Tip Calks are well known to the trade and there are many types to select from.

The line embraces all styles of Screw Calks, Iron, Steel and Extra Light Steel Shoes, Drilled or Calked; Drive Calks, Sharp or Blunt, Driving, Draft and Mule Shoes and all the necessary tools. Blacksmiths should always have the Neverslip catalog handy, and if they've misplaced it, the manufacturers will gladly furnish a new one.

Automobile Electrician's Guide.

We call the attention of our repair men readers to the book which is being placed on the market by the Michigan State Auto School of Detroit, Mich., and known as "The Automobile Electrician's Guide."

This book is one of the most complete wiring diagram books on the market and contains more than 800 different diagrams, which include practically all of the wiring systems used on the cars since starting and lighting systems were first installed. Some of the diagrams date back as far as 1906. It is divided into two sections, diagrams for 1917, 1918 and 1919 cars in one section and diagrams for cars from 1906 to 1916 in the second section.

The diagrams, which are printed in black upon heavy white paper, are mounted in loose leaf form and arranged in alphabetical order. From time to time new diagrams may be added as required, so that the book can be kept up-to-date indefinitely.

Power Lighting System for Farms and Garages.

A modern electric lighting and power plant for farms, rural schools, and churches, suburban homes, yachts, etc., is to be manufactured by one of the John N. Willys companies, The Electric Auto-Lite Corporation of Toledo, Ohio.

The new system will be known as Willys Light. It will be marketed by the Willys Light Division of The Electric Auto-Light Corporation through distributors and dealers. The formation of the sales organization is now under way. It will extend throughout the United States and eventually, it is hoped, throughout the world.

The new system is said to be the most complete that has yet been placed on the market. It is operated by a Willys-Knight sleeve-valve motor, a motor known for its simplicity of operation and its silence. The engine has been developed to such an extent that it requires practically no attention and is so simple that a child can operate it, according to those who have observed it.

The complete plant consists of a Willys-Knight engine, a directly connected generator, a simple control box and a storage battery. The Knight engine burns kerosene at approximately one-half the cost of gasoline. It is air-cooled, self-cranking, self-running, and self-stopping. The control is semi-automatic.

The noisy poppet valves are eliminated in the Willys-Knight engine. In their place are two cylindrical sleeves, one within the other, which glide silently up and down between the piston and the cylinder wall. The long ports in these sleeves register with each other and with the ports in the cylinder wall at the proper intervals, forming large and direct passages for the intake and exhaust gases.

This engine, with its sleeve-valve construction, improves with use, it has been proven. Carbon instead of decreasing its efficiency, seems to increase it.

The Willys Light generator is shunt wound for 32 volts. It delivers 750 watts. The armature of the generator, the engine fly wheel and crank shaft are constructed in practically one piece, thus eliminating separate generator bearings and reducing friction.

The battery consists of 16 cells with nine plates to the cell. These are enclosed in sealed glass jars. They have a capacity of 160 ampere hours.

With the Electric Auto-Lite, a company long engaged in the manufacture of electric lighting and starting systems for automobiles, producing it, there is no doubt as to the high standards of manufacture which will enter into its construction.

The new lighting system is adapted to an increasing number of uses. In addition to its general utility on the farm, it is available for cotton gins, lumber and construction camps, oil and gas pumping stations, mines, storage, garages, dairies, telephone exchanges in smaller towns, warehouses and stations. It also may be utilized for hospitals, fishing and hunting clubs, country homes, street, store and home lighting in small towns, theatres, military camps, and in summer resorts and cottages.

THE SEPTEMBER ISSUE
OF THE
Automobile Dealer and Repairer
WILL BE OUR REGULAR



OUR TOOL AND MACHINERY NUMBER
HAS BECOME A POPULAR AND WELL RECOGNIZED ANNUAL INSTITUTION
LAST YEAR
EVEN IN THE STRESS OF THE GREAT WAR IT WAS EXCEEDINGLY SUCCESSFUL
THIS YEAR IT SHOULD BE MORE SO
Final forms close September 5th, 1919, but do not wait till last minute to engage space.
Write or Wire to Us NOW
"Famous for Producing Tangible Results"
Regular Rates
MOTOR VEHICLE PUBLISHING COMPANY
71-73 MURRAY STREET, NEW YORK CITY
Regular Rates

Well Made Horse Shoes.

The fact that Phœnix Horse Shoes and Bull Dog Calks are in constant demand would seem to prove that the shoes and calks are worthy of the investigation of our readers. They are manufactured by the Phœnix Horse Shoe Co., of Chicago, Ill., and this company is known to manufacture practical shoes made of excellent material.

It is said that Bull Dog calks hold firmly to the shoe. are easy to drive, and never jump out when set. This company will cheerfully furnish a catalog to any of our readers who request it.

The Two Hundredth Anniversary.

Centennial celebrations of the founding of one's business are somewhat unusual as yet. Two hundredth anniversaries of a town's founding are comparatively infrequent. But when you combine them both with a home-coming jollification and a welcoming home of your soldier boys, with a whole borough enthusiastically aroused and participating, and throw in a brand new idea in memorials, you are setting the stage for something decidedly out of the ordinary.

Southington, Connecticut, enjoyed such an event on August 29th, 30th and 31st. The Peck, Stow & Wilcox Co., pioneer manufacturers of tinners' machinery, mechanics' hand tools, building hardware and blacksmiths' tools, was the animating spirit in the celebration. Just 100 years before, Seth Peck, an inventive mechanic of pioneer days, patented a machine for making tin-ware and set up a business in Southington. It prospered. Gradually it expanded into what is now the Peck. Stow & Wilcox Co. The officers today are Lyman H. Treadway, president; L. E. Fichthorn, vice-president, and E. N. Walkley, secretary-treasurer. The reputation of the Pexto products is world-wide.

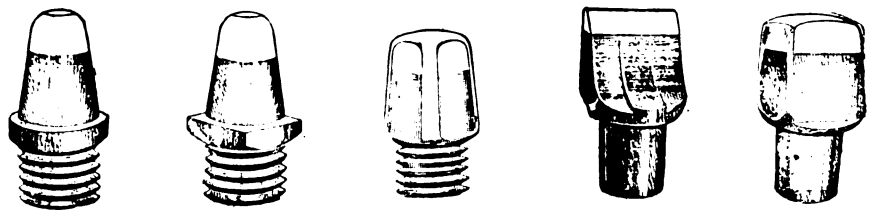
It was the centenary of Seth Peck's venture that primarily was being celebrated. Incidentally, it was an acknowledgement of Southington's debt of long standing to the firm that was being expressed. And it was a grateful expression of the borough's pride in her soldier boys that Southington joined the company in voicing. For the Peck, Stow & Wilcox Co. made the event more than ordinarily memorable by presenting the city with a $10,000 memorial to her soldier sons of every war, without exception, from the Revolution down to the recent locking of horns with Germany.

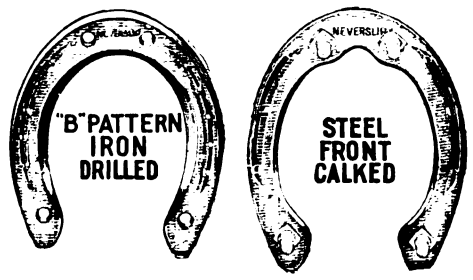
This memorial is unique in being per-

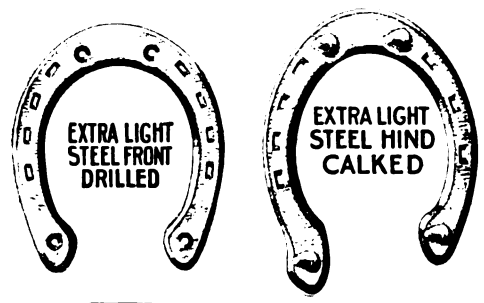
Digitized by Google

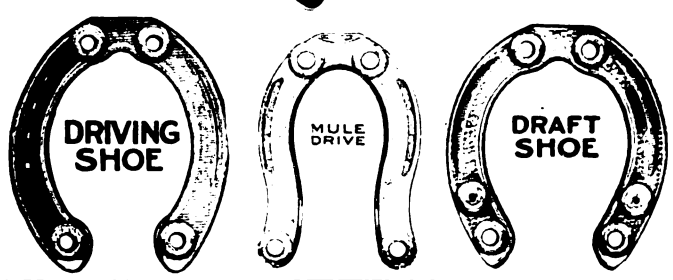
ALWAYS LOOK FOR THE RED TIP!

SCREW AND DRIVE CALKS—ALL PATTERNS









Re Tip calks will stay in and wear sharp clear down to the shoulder. We base these claims upon the indisputable tests of actual time and service. When you buy these calks that have a reputation for rendering high class service, you are not going to tolerate a compromise.

Nowhere in the history of horseshoe making is there registered a success so complete as ours—we bridged the gap between theory and practice.

RED TIP DRIVING AND MULE SHOES

are renowned for their perfect shape—which makes less work for the shoer. They are made with clips turned up, ready for use. All the clever arguments in the world cannot make you forget that the past performance of Red Tip Horse and Mule Shoes is the proof of their value. Your customers know them and like them—no substitute will do.

The line embraces all styles of Screw Calks, Iron, Steel and Extra Light Steel Shoes, Drilled or Calked; Drive Calks, Sharp or Blunt, Driving, Draft and Mule Shoes, and all necessary tools.

Get your order in today.
Another catalog?
Certainly!—Write.

The Neverslip Works
New Brunswick, N. J.



haps without duplication in all America, in that feature of carrying the name of every man any given community has sent to the front in the name of Liberty. A magnificent column of granite, 5 feet square by 10 high, and surmounted by a flag pole 87 feet in height, the memorial carries 971 names upon the bronze tablets that ornament its four sides. Not a war in which the United States has participated is missing from these rosters. The memorial sits at the northern end of the village green, and the formal presentation to the city was made by Governor M. H. Holcomb, of Connecticut, on behalf of the company, of which he is a director.

Pexto further gave expression of its appreciation of Southington's loyalty by presenting to each of its employees that had been upon the firm payroll more than 4 years with service medals appropriately engraved with the individual names and records of service. Five of these employees have been for more than 50 years in the company's employ; 18 have seen more than 40 years' continuous service. To all of these gold medals were given. Sterling silver medals were awarded to 53 others who have seen more than 25 years' service, while bronze medals went to all the rest. These service badges were presented personally by President Treadway.

The celebration began Friday, August 29th, with an old-fashioned community basket picnic at Lake Compounce, a pleasure resort a few miles north of Southington. In addition to the usual resort entertainments there was speechmaking and the presentation of the service medals.

Saturday there was a parade of returned soldiers and sailors, fraternal and civic units, and an elaborate pageant descriptive of Connecticut early history and industrial development; the presentation of the memorial, a reception to the public by the officers and directors of the company at the Pexto plant, and dancing at night in the new 5-story addition thereto. An interesting feature was an extensive exhibition of curios, heirlooms, historical objects and early hand-made furniture, together with a display of Pexto products from the earliest hand-made tools to those of latest design and most elaborate finish. Sunday was given over entirely to a union peace and thanksgiving service participated in by the clergymen and congregations of all the religious sects represented in the village.

By reason of the unusual nature of the event it was made a gala occasion for all that adjacent territory and the hardware belt was generously represented.

The Peck, Stow & Wilcox Co. is distributing to the trade a handsome illustrated brochure entitled "One Hundred Years of Progress," which sets down briefly and entertainingly the history of the company since 1819.

The concern is the fruit of the consolidation in 1870, under the present name, of the Peck-Smith Mfg. Co., of Southington, which traced its lineage back to Seth Peck; of the S. Stow Mfg. Co., which had its beginning in Plantsville, Conn., in 1834, through the enterprise of Solomon Stow; and of the Roys & Wilcox Co., which dates back to East Berlin, Conn., in 1840. Samuel C. Wilcox was president of the Roys & Wilcox Co. at the time of the consolidation.

Kerrihard Power Hammer.

No up-to-date blacksmith shop is complete without a power hammer, and it is well to install one that has a reputation of being thoroughly efficient. The Kerrihard Co., Kerrihard Station, Red Oak, Iowa, is the manufacturer of the well-known Kerrihard power hammer. This hammer is claimed to be the last word in efficiency and our readers should thoroughly investigate it. The company will be glad to furnish full particulars of the hammer upon receipt of a request.

Motor Topping.

Blacksmiths will find it easy to make a little money on the side by re-topping automobile or wagon bodies, but naturally they will want to use a reliable make of topping, one which will not fall to pieces in the first storm, and which will remain attractive looking. L. C. Chase & Co., of Boston, Mass., is marketing a top material which we would advise our readers to investigate, for it would seem to entirely fill the above requirements.

Northwestern Horse Nails.

Old-time blacksmiths know full well that a nail which bends, when being driven, is dangerous. They know that many horses have gone lame because the nails that were used were not good.

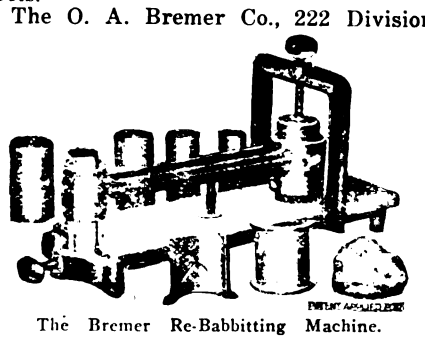
A nail which is claimed to resist bending to remarkable degree is manufactured by the Union Horse Nail Co., of Chicago, Ill., and this company draws attention to the fact that the re-inforced point makes this nail easy to drive and safe to use. Our readers should investigate this line of horse nails, and write for a catalog.

Re-Babbitting Machine.

One of the most common of automobile engine troubles is the wearing or breaking of connecting rod babbitts and as a general rule the repairman purchases replacement babbits direct from the manufacturer or from the service station. It follows, therefore, that the profit in the replacement goes to the manufacturer.

Oftentimes there is a double profit and the second profit goes to the service station. The repairman or blacksmith who repairs automobiles can save money as well as a great deal of time for his customers by re-babbitting connecting rods himself. As every blacksmith knows, babbitt replacement in bearings for line shafts or, in fact, for any kind of shafts, is an easy matter providing the shop is equipped with the proper tools.

The O. A. Bremer Co., 222 Division

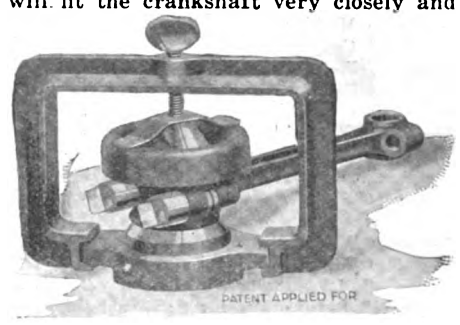


The Bremer Re-Babbitting Machine.

St., Burlington, Iowa, is manufacturing connecting rod re-babbitting jigs which are designed so as to fit practically any size auto engine connecting rod. The babbitting jig is provided with a number of mandrels for casting various size bearings. As shown in the illustration, the connecting rod is lined up by means of an adjustment screw at the bottom. It is kept in an upright position by means of a dummy wrist pin held in a "V" block at the end of the machine.

The mandrels at the large end of the connecting rod are clamped into place by means of a set screw, while the casting which carries the set screw is adjustable for different length rods. Where a shop specializes in Ford repairs a special Ford connecting rod babbitter can be obtained.

In this particular case the mandrel is carefully machined so that the bearing will fit the crankshaft very closely and



The Ford Babbitter.

require but little fitting. Smiths who are looking for a side line should investigate either or both of the above tools. The manufacturers are willing to send descriptive literature and prices upon request.

Bryden Horse Shoes.

In order to manufacture horse shoes which will give universal satisfaction, it is necessary that a firm study the subject from every angle and that it consider the gradual development of horse shoes, going back to the earliest historical times. This would result in many modifications in shoe structure which ordinarily would not be made.

The Bryden Horse Shoe Co., of Catasauqua, Pa., has done just this. The company dates back to the year 1882, and has been actively in the trade ever since. Every shoe is thoroughly inspected before leaving the factory and any article which is not up to the mark is cast out.

The company has found that this policy pays because this maintains the reputation of the company. They manufacture several special types of shoes, a few of which are "Sideweights," "Bryden 'C' Horse and Mule Ideal Calked," "Toeweight," "Clipped Goodenough." The trade names of the shoes and racing plates are "Boss," "Banner," and "C and K."

Digitized by Google

Index to Advertisers

Adjustable Wagon Tire Mfg. Co., tires, Front cover
Aetna Nut Co., horseshoe calks.....Front cover
Akron-Selle Co., gears .....4th cover
American Calk Co., calks.....Front cover
American Carriage Co., supplies..... 4
American Horse Shoe Co., horseshoes..... 2
American Technical Society, books..... 1
Anti-Borax Compound Co., welding compounds 24
Armstrong Mfg. Co., bolt dies 8
Armstrong-Blum Mfg. Co., punches and shears .....Front cover
Barcus Mfg. Co., horse stocks..... 25
Barnett, G. H., files and rasps.....Front cover
Bertschy-Bermo Co., welding plants..... 23
Bradley, C. C. & Son, shaft coupler.....3d cover
Bremer Co., O. A., babbitters 6
Bryden Horse Shoe Works, horseshoes..Front cover
Buffalo Forge Co., blacksmiths' tools..... 7
Burden Iron Works, horseshoes.....3d cover
Bush Motor Co., automobiles.....4th cover
Butterfield & Co., taps, dies and screw plates 8
Campbell Iron Co., supplies 23
Canedy-Otto Mfg. Co., blacksmiths' tools..2d cover
Capewell Horse Nail Co., horse nails..Front cover
Champion Blower & Forge Co., blowers..... 3
Champion Tool Co., blacksmiths' tools..... 6
Columbus Anvil & Forging Co., anvils..4th cover
Columbus Forge & Iron Co., anvils..... 26
Cortland Welding Compound Co., welding compounds .....4th cover
Cray Bros., blacksmiths' tools 27
Crescent Machine Co., woodworking machinery 6
Diamond Calk Horseshoe Co., horseshoes..... 28
Doxey, N. D., welding compounds 4
Edwards Mfg. Co., C. D., shears 4
Electric Blower Co., blowers 26
Electric Wheel Co., wheels 4
Empire Mfg. Co., wheels 23
Felton, Sibley & Co., paints 1
Firestone Tire & Rubber Co., tires 25
Fisher & Norris, anvils and vises 8
Franklin Steel Works, toe calks 1
Giant Grip Horseshoe Co., horseshoes 27
Gogel Mfg. Co., tire heaters 23
Government Sale of (new) Steel Anvils, anvils 23
Greb Co., grip pullers 4
Greenfield Tap & Die Corporation, screw plates and blacksmiths' machinery 4
Gwilliam Co., ball bearings .....4th cover
H. B. Tempering Process Co., tempering process 28
Hart Mfg. Co., stocks and dies .....4th cover
Harvey Spring & Forging Co., auto springs... 27
Hay-Budden Mfg. Co., anvils .....4th cover
Heller Bros., horse rasps, tools, etc..... 8
House Cold Tire Setter Co., tire setters, hollow and spoke augers .....4th cover
Jenner, H. W. T., patents 23
K. & W. Rubber Co., tire reliners 27
Kaukauna Machine Works, hammers 1
Kerrihard Co., hammers 27
Kitowski, F. J., blacksmiths' tools 28
Lancaster Foundry Co., fifth wheels 24
Little Giant Co., hammers .....4th cover
Linde Air Products Co., oxygen 8
L. S. P. Calking Machine Co., calking machines .....3d cover
Macgowan & Finigan Cordage Co., hammers.. 26
Ness, Geo. M., Jr., steel stamps.....Front cover
Neverslip Works, horseshoe calks 21
Nicholson File Co., files and rasps 24
Parker, C. L., attorney 23
Parks Ball Bearing Machine Co., woodworking machinery 22
Paro Co., H. G., grease guns.....4th cover
Peck, Stow & Wilcox Co., pincers 28
Phillips-Laffite Co., welding plates 26
Phœnix Horseshoe Co., horseshoes and toe calks 5
Porter, H. K., bolt clipper .....4th cover
Prentiss Vise Co., vises .....4th cover
Plymouth Foundry & Machine Co., punches and shears 28
Prest-O-Lite Co., Inc., gas 8
Rosewater Electric Co., blowers 28
Rowe Calk & Chain Company, horseshoe calks .....Front cover
Sheldon Axle & Spring Co., axles.....2d cover
Sherwood, W. L., woodworking machinery.... 23
Standard Horse Nail Company, horseshoe nails .....4th cover
Star Mfg. Co., agricultural implements 6
Sterling Tire Corp., hoof pads 24
Stokes Bros. Mfg. Co., rasps.....Front cover
Strite Governor Pulley Co., plow blade sharpeners .....3d cover
Thompson Tuyere Iron Company, tuyere iron .....4th cover
Union Horse Nail Co., horse nails 1
Universal Wheel Compressor Co., wheel compressors 25
West Tire Setter Co., tire setters, hammers.. 25
Wheel B. Top and Hardware Co., supplies.... 4
Whisler Manufacturing Company, nut splitters, jointer heads .....Front cover
Witte Engine Works, engines 23
Young, W. F., veterinary remedies 4

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co. 6

Anvils
Columbus Anvil & Forging Co.....4th cover
Columbus Forge & Iron Co..... 26
Fisher & Norris 8
Government Sale of (new) Steel Anvils..... 23
Hay-Budden Mfg. Co.....4th cover

Attorneys
Parker, C. L..... 23

Automobiles
Bush Motor Co., automobile .....4th cover

Automobile Springs
Harvey Spring & Forging Co..... 27

Axles
Sheldon Axle & Spring Co.....2d cover

Babbitters
Bremer Co., O. A..... 6

Ball Bearings
Gwilliam Co.....4th cover

Blacksmiths' Machinery
Greenfield Tap & Die Corp..... 4

Blacksmiths' Tools
Buffalo Forge Co..... 7
Butterfield & Co..... 8
Canedy-Otto Mfg. Co.....2d cover
Champion Blower & Forge Co..... 3
Champion Tool Co..... 6
Cray Bros..... 27
Heller Bros. Co..... 8
Kitowski, F. J..... 28
Nicholson File Co..... 24
Peck, Stow & Wilcox Co..... 28

Blowers
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3
Champion Tool Co..... 6
Electric Blower Co..... 26
Rosewater Electric Co..... 28

Bolt Dies
Armstrong Mfg. Co..... 8

Bolt and Rivet Clippers
Porter, H. K.....4th cover

Books
American Technical Society 1

Calking Machines
L. S. P. Calking Machine Co.....3d cover

Calks, Horseshoe
Aetna Nut Co.....Front cover
American Calk Co.....Front cover
Neverslip Works 21
Rowe Calk & Chain Co.....Front cover

Calks, Toe
Franklin Steel Works 1

Chisels
Champion Tool Co..... 6
Peck, Stow & Wilcox Co..... 28

Chucks
Buffalo Forge Co..... 7

Disc Sharpeners
Little Giant Co.....4th cover

Engines
Witte Engine Works 23

Farriers' Tools
Barnett Co., G. & H.....Front cover
Champion Tool Co..... 6
Heller Bros. Co..... 8
Peck, Stow & Wilcox Co..... 28

Files and Rasps
Barnett Co., G. & H.....Front cover
Nicholson File Co..... 24
Stokes Bros. Mfg. Co.....Front cover

Forges
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3

Gas
Prest-O-Lite Co., Inc..... 8

Gasoline Engines
Witte Engine Works 23

Gears
Akron-Selle Co.....4th cover

Grease Guns
Paro Co., H. G.....4th cover

Grip Pullers
Greb Co..... 4

Hammers
Champion Tool Co..... 6
Kaukauna Machine Works 1
Kerrihard Co..... 27
Macgowan & Finigan Cordage Co..... 26
Little Giant Co.....4th cover
Peck, Stow & Wilcox Co..... 28
West Tire Setter Co..... 25

Hollow Augers
House Cold Tire Setter Co.....4th cover

Hoof Nippers
Champion Tool Co..... 6

Hoof Pads
Sterling Tire Corp..... 24

Hoof Parers
Champion Tool Co..... 6

Hoof Shears
Champion Tool Co..... 6

Horseshoes
American Horseshoe Co..... 2
Bryden Horse Shoe Works.....Front cover
Burden Iron Works .....3d cover
Giant Grip Horseshoe Co..... 27
Phœnix Horseshoe Co..... 5
Rowe Calk & Chain Co.....Front cover

Horseshoe Calks
Diamond Calk Horseshoe Co..... 28
Neverslip Works 21
Rowe Calk & Chain Co.....Front cover

Horseshoe Nails
Capewell Horse Nail Co.....Front cover
Standard Horse Nail Co.....4th cover
Union Horse Nail Co.....

Horse Stocks
Barcus Mfg. Co..... 25

Jack Mfrs.
Rowe Calk & Chain Co.....Front cover

Kerosene Engines
Witte Engine Works 23

Nut Splitters
Whisler Mfg. Co.....Front cover

Oxygen
Linde Air Products Co..... 8

Paints and Varnishes
Felton, Sibley & Co..... 1

Patents
Jenner, H. W. T..... 23
Parker, C. L..... 23

Pincers
Peck, Stow & Wilcox Co..... 28

Plow Blade Sharpeners
Strite Governor Pulley Co.....3d cover

Punches
Champion Blower & Forge Co..... 3

Punches and Shears
Peck, Stow & Wilcox Co..... 28
Plymouth Foundry & Machine Co..... 28

Screw Plates
Butterfield & Co..... 8
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3
Greenfield Tap & Die Corp..... 4

Shaft Coupling
Bradley & Son, C. C.....3d cover

Shears
Edwards Mfg. Co., C. D..... 4

Spoke Augers
House Cold Tire Setter Co.....4th cover

Steel Stamps
Ness, George M., Jr.....Front cover

Stocks and Dies
Butterfield & Co..... 8
Champion Blower & Forge Co..... 3
Hart Mfg. Co.....4th cover

Supplies
American Carriage Co..... 4
Campbell Iron Co..... 23
Wheel B, Top & Hardware Co..... 4

Swages
Champion Blower & Forge Co..... 3

Tempering Process
H. B. Tempering Process Co..... 28

Tires
Adjustable Wagon Tire Mfg. Co....Front cover
Firestone Tire & Rubber Co..... 25

Tire Bending Machines
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3

Tire Heaters
Gogel Mfg. Co..... 23

Tire Reliners
K. & W. Rubber Co..... 27

Tire Setters
Buffalo Forge Co..... 7
House Cold Tire Setter Co.....4th cover
West Tire Setter Co..... 25

Tire Shrinkers
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3

Tongs
Champion Tool Co..... 6

Tool Grinders
Phœnix Horseshoe Co..... 5

Trucks
Akron-Selle Co.....4th cover

Tuyere Irons
Buffalo Forge Co..... 7
Champion Blower & Forge Co..... 3
Thompson Tuyere Iron Co.....4th cover

Veterinary Remedies
Young, W. F..... 4

Vises
Butterfield & Co..... 8
Fisher & Norris 8
Prentiss Vise Co.....4th cover

Wagons
Akron-Selle Co.....4th cover

Welding Compounds
Anti-Borax Compound Co..... 24
Cortland Welding Compound Co.....4th cover
Doxey, N. D..... 4

Welding Plants
Bertschy-Bermo Co..... 23

Welding Plates
Phillips-Laffitte Co..... 26

Welding Supplies
Linde Air Products Co..... 8

Wheel Compressors
Universal Wheel Compressor Co..... 25

Wheel Dishers
Crescent Machine Co..... 6

Wheels
Electric Wheel Co..... 4
Empire Mfg. Co..... 23

Wheels, Fifth
Lancaster Foundry Co..... 24

Woodworking Machinery
Buffalo Forge Co. 7
Crescent Machine Co..... 6
Parks Ball Bearing Machine Co..... 22
Sherwood, W. L..... 23

Wrenches
Champion Tool Co..... 6
Peck, Stow & Wilcox Co..... 28

Perfectfix Products.

The Henry J. Dewitz Co., of Milwaukee, Wis., have recently put upon the market a self-vulcanizing product for repairing tubes and casings. They claim that this repair product can be used by the amateur with excellent results under practically any conditions. To use Perfectfix, one does not need heat or vulcanizers, neither are there any special tools required.

Attachable Auto Curtain Glass.

The Auto Curtain Glass Co., 10 Pratt Court, Worcester, Mass., are marketing an attachable auto curtain glass which can be applied to any kind of automobile top or side curtain.

The device consists of a heavy glass rigidly mounted at the factory in a specially designed nickel plated frame. It is so arranged that it may be put into place on the top in a very few minutes. The device can be obtained in practically any size shape for any model, make or year of car

More Tenons by 45 to 1

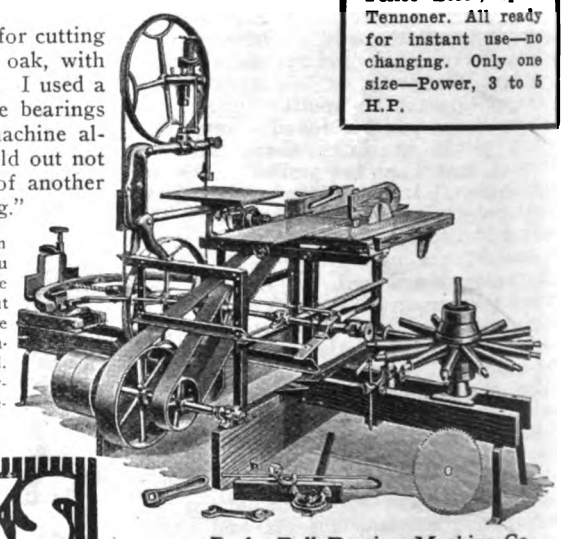
"YOUR spoke auger machine cuts tenons smooth and straight," says W. J. Vanstory, of Rienzi, Miss. "I have timed myself and cut as many in one minute as I could cut in 45 minutes by hand. One great advantage the Parks has, the tables are made of angle steel, well braced, and don't require concrete beds or heavy sills for foundation.

"I have used this Band Saw for cutting 4 in. wagon rims, seasoned oak, with it just standing on dirt floor. I used a Parks about 3 years and the bearings were good as new. This machine always gave satisfaction. I sold out not long since and am in need of another machine. Please send catalog."

If every user of the Parks Wagon Shop Special told his story you wouldn't hesitate another minute about getting one. It all but eliminates hard labor; saves time and makes money. Price, complete, $203. Ten days' free trial. Write for catalog telling everything about machine, its arrangement and operation.

Wagon Shop Special

A combination of Circular, Rip and Cross Cut Saws, 22" Band Saw, 12" Jointer, Rim Rounder, Felloe Borer, Spoke Tennoner. All ready for instant use—no changing. Only one size—Power, 3 to 5 H.P.



PARKS Wood Working Machines

Parks Ball Bearing Machine Co.
North Side Station Cincinnati, Ohio

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

will be inserted under this head at 3 cents a word, including the address, for each insertion, payable in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York
PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT

Patents

PATENTS FOR INVENTIONS.

H. W. T. JENNER, patent attorney and mechanical expert, 622 F Street, Washington, D. C. Established 1883. I make an examination and report if a patent can be had and the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trademarks registered.

For Sale

FOR SALE

A live blacksmith shop in the Yakima Valley, Washington. Business of 1918 exceeded $6,000. Doing the work myself with the exception of one helper 2½ months. Shop is equipped with up-to-date power machinery, electric power. Large and complete stock. Price $3,200 for stock and tools. Shop can be leased for $12 a month and bought very reasonable. Nearly all cash is required. This is an exceptional opportunity to get in the business and make money. If interested call or write, H. R. Fox, Prosser, Washington.

FOR SALE

14 x 6 Shepard Lathe, $275; 18 x 6 New Haven, $275; 24 x 8, $575; 22 x 12, $575; 28 x 12, $600; Milling Machines, $125, $200, $250; 22 x 20 Iron Planer, $590; 12" Prentiss Tool Co. Shaper, $350; Special Type Shaper, $200; Double End Heavy Emery Grinders, $20; Heavy Buffing Stand, $30; Buffing Head only, $15; 4" Centrifugal Pump, $50; Power Hack Saw, $12; 24" Wood Planer, $175; 8" Sticker, $225; Broom Handle Lathe, $35; Automatic Knife Grinder, $65. Bicknell Mfg. & Supply Co., Janesville, Wis.

FOR SALE

Good blacksmith shop, 50 x 26 feet, with neat six room dwelling. Large lot of land, shade trees, lawn, 168 foot front. Centrally located. Live Kansas town. Shop fully equipped with up-to-date tools and machinery. Fairbanks engine, Skow disc roller, House tire setter, Little Giant hammer, two blowers, anvils, hand and power drills, etc. Doing good business. Only sold on account of old age. Fine bargain if taken quickly. Write now to J. F. Horn, Box 16, Natoma, Kans.

FOR SALE

Hydraulic tire setter, No. 3 extra heavy tire bender, Edwards No. 5 shear, 9 kegs horseshoes, lawn mower grinder, "Wonder" disc sharpener, No. 400 Champ. blower, 5½" blacksmith vise, 4¼" wood vise, oxy-acetylene welding outfit; slightly used; other iron stock. Reece Metzger, R. 8, Olney, Ill.

FOR SALE

An old-established horseshoeing and wagon shop with stock and tools with nine room house and garage, also 1¼ acres land. Will sell at a bargain. Reason for selling, am in poor health. For particulars write owner, J. Alexander, North Main St., Winsted, Conn.

FOR SALE

If you can't get the nuts off from old bolts that turn when taking machinery apart, try one of our Nut Splitters. Splits all nuts three-quarter inch and smaller. Get circulars. Whisler Mfg. Co., Gibson, Iowa.

FOR SALE

Well established blacksmith, horse shoeing, auto and wagon shop. Equipped with machinery and power. On one of Denver, Colorado's principal streets. Owner wishes to retire. L. A. Pfeiffer, 1447 So. Broadway, Denver, Colo.

FOR SALE, GOVERNORS FOR AUTO ENGINES

We make governors for auto and cycle engines when used as stationary. Write today for circulars. C. L. H., Box 582, Dept. C, Taft, California.

FOR SALE

Blacksmith shop and garage combined in good community. Work for two or three men. Building 40 x 60. Electric lights, well equipped. Price $2,500. Address Graham's Garage, Alleman, Ia.

FOR SALE

Horseshoeing and blacksmith shop. Doing all kinds of work. Also six room bungalow. Address Elmer Reed, Wyoming, Ill.

FOR SALE

Garage and blacksmith shop combined. Equipped with machinery, electrical power. Oil and gas station. One half acre land and residence. All kinds of fruit. On main highway San Francisco to Los Angeles. Good business established. Lyon & Sedge, Coyote, Calif.

WANTED

A machine blacksmith for contractor's repair work. Apply by letter to M. E. Grey, Milmay, N. J.

PERSONAL

Brother.—Accidentally discoveed pleasant Florida root that quickly, easily and inexpensively overcomes any tobacco habit. Fine for indigestion. Send address if interested. G. S. Stokes, Florida.

The man who does not advertise simply because his grandfather did not, should wear knee breeches, silk stockings, and a wig.

Tires

Telephone Circle 2460

B. LIBEN & CO.
DEALERS AND JOBBERS
in all Makes of Auto Tires and Tubes
261 WEST 54th STREET, NEW YORK

Biggest Drop in History in

Double Tread Tires

Greatest selection in factory seconds and blemished tires.

Write for information.

Tire Dealers Attention!

REDUCED PRICES ON DOUBLE TREAD TIRES

30 x 3 Plain - $5.00
30 x 3½ NonSkid $6.75

All other sizes on request. 20% deposit on C. O. D. orders required. Write for list to

M. LIBEN & CO.
793k 7th AVE. NEW YORK CITY

PRICE WRECKERS
Double Tread Tires with Double Lock Stitch

30x3	N. S.	$5.50	34x4½	N. S.	$11.00
30x3½	"	6.50	35x4	"	10.00
32x3½	"	7.25	36x4	"	10.25
31x4	"	7.50	36x4½	"	11.00
32x4	"	8.00	36x5	"	12.00
33x4	"	9.50	37x4½	"	12.25
34x4	"	10.00	37x5	"	13.00

We carry a full line of Firsts and Factory Blemished Tires and Tubes at moderate prices.

ROYAL TIRE EXCHANGE
282 Halsey St. Newark, N. J.

DOUBLE TREAD TIRES

We carry a full line of new and used tires and tubes. H. GINSBERG & SONS, 236 W. 48th Street, New York City.

AUTO ACCESSORY

Don't discard your old tires. Use self cured blowout patches. They weld permanently. Extra long and strong. Easily applied. Double mileage assured. The outcome of years of practice. Ben's Big Tire Shop, Dept. H., 378-382 Queen's Blvd., Winfield, L. I., N. Y.

The Mayer Trip Hammer.

The Kaukauna Machine Works of Kaukauna, Wis., are now manufacturing the celebrated Mayer trip hammer which is being manufactured in a number of different sizes to conform with the requirements of either small or large shops. This device is operated in connection with a taper friction cone pulley so that the operator at all times has perfect control of the speed and weight of the blow.

The ram connection is so designed and constructed that a perfect cushion is formed for the recoil at the upper extremity of the stroke and by the same means a downward impetus is imparted to the blow of the ram on its power stroke. The guides for the hammer are "V" shaped and adjustable. They are extra long and have wide bearing surfaces.

The dies are made from high grade crucible tool steel, properly hardened, and may be furnished in either standard flat or rounded faces for plow work. Readers who intend to install any sort of power hammer should investigate this line and write the manufacturers for price lists and specifications.

Adjustable Wagon Tire.

The Adjustable Wagon Tire Mfg. Co., of Oklahoma City, Okla., is manufacturing a patented replacement tire which they claim is so constructed that it will reinforce old wheels that are being repaired and make a repaired wheel better than the original.

We understand that this new device is easily applied and that its cost is extremely low. The company is looking for agents in various parts of the country and every blacksmith or wheelwright who does any wagon repairing should familiarize himself with the device.

Ekern Portable Grease Gun.

The H. G. Paro Co., Dept. B, 1412-14 South Michigan Boulevard, Chicago, Ill., is marketing the Ekern portable grease gun which is claimed to work the heaviest grease and oil. It is said that this is the only hand-operated gun on the market that will do this.

Every blacksmith should write for the catalog issued by this company, as they manufacture a very full line of grease and oil guns, motor stands, valve tools and jacks, as well as emergency axles, running board, luggage carriers, etc. What the blacksmith will probably regard as very interesting, is the fact that these articles are very cheap, and are backed by prominent manufacturers.

WITTE



2 H-P. Pulls 2¾

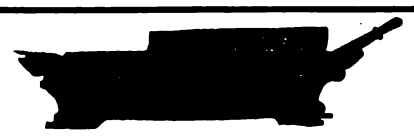
Big Value—Big Surplus power. Immediate Shipment. Offer includes engine on skids—ready to use. Life guarantee against defects.
LOW PRICES—DIRECT
Any size—2 to 30 H-P.—Stationary, Portable or Saw-Rig. New book, latest list FREE.—Ed. H. Witte, Pres.

$39.95 Now

WITTE ENGINE WORKS
2447 Oakland Avenue KANSAS CITY, MO.
2447 Empire Building PITTSBURGH, PA.

PATENTS
C. L. PARKER
Ex-Member Examining Corps, U. S. Patent Office
Attorney-at-Law and Solicitor of Patents
American and foreign Patents secured. Trade marks registered. Searches made to determine patentability, validity and infringement. Patent suits conducted. Pamphlet of instructions sent upon request.
McGill Building WASHINGTON, D. C.

Campbell Iron Company
WHOLESALE SUPPLIES
Still carry a stock of Wagon, Blacksmith Materials, Farrier Supplies, as well as Tools, Hardware Specialties and Duplicate Parts for Fords.
Write for General Catalogue.
817 Cass Avenue St. Louis, Mo.



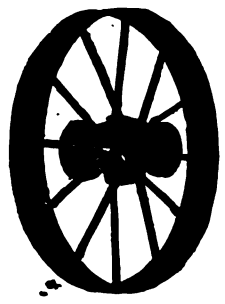
5" Hand Planer or Bench Jointer for $36.00

Same quick easy adjustable features used on our larger sizes of machines. Cast iron and steel construction.

Catalogue No. 15 gives further information on the above and other sizes.

W. L. SHERWOOD, Kirksville, Mo.

EMPIRE STEEL WHEELS



Plain or Grooved Tire
To Fit Any Wagon.

FARM TRUCKS
All Standard Types

Write today for Proposition to Blacksmiths

EMPIRE MFG. CO.
P. O. B. 209
QUINCY, ILL.

Government Sale of (New) Steel Anvils

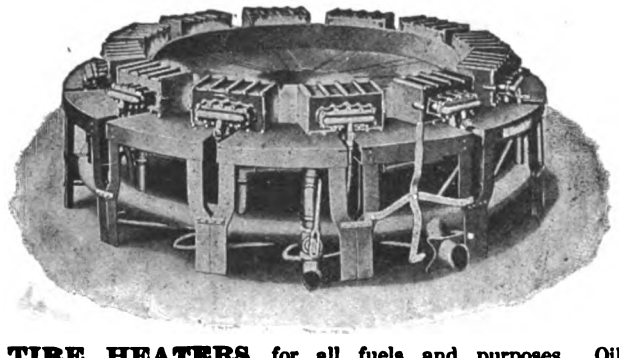
400 f. o. b. New York City

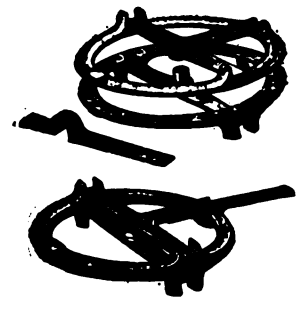
Sealed bids will be opened at Zone Supply Office, 461 Eighth Ave,. New York City. Particulars, special bid forms may be obtained at above office or Zone Supply Office, attention Surplus Property Officer in the following cities:

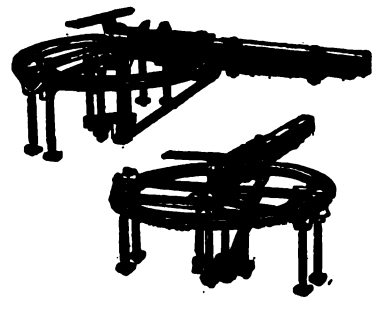
Boston, Philadelphia, Baltimore, Newport News, Atlanta, Jeffersonville, Ind., Chicago, St. Louis, New Orleans, San Antonio, Omaha, El Passo, San Francisco. Refer to S. P. D. No. 688 GS.

10 A. M. SEPTEMBER 18, 1919

WELDING PLANTS, $25.00 to $300.00
Designed for all purposes. Small cash payment; balance, three to six months.
Every mechanic and shop should have one.
BERTSCHY-BERMO CO. OMAHA, U. S. A.







TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas, Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.

OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.

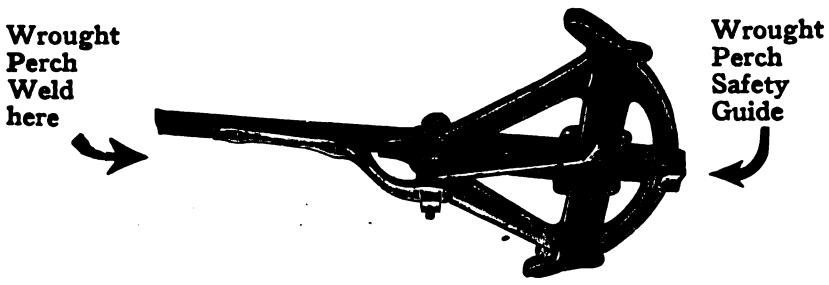
Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE GOGEL MFG. CO., TOLEDO, OHIO.

Digitized by Google

"NATIONAL" Safety Short Turn

FIFTH WHEELS



UNDER VIEW STYLE "J"

Seven Styles **Nineteen Sizes**

ONLY WHEEL WITH WROUGHT PERCH. This forms a ONE-PIECE PERCH THE ENTIRE LENGTH of the running gear including the SAFETY GUIDE.
Your customers will recognize that this construction is unequalled for SAFETY, STRENGTH and DURABILITY. Please them by using NATIONAL wheels.

Send for catalogue and prices. We have a complete stock from which your orders will be shipped promptly.

WE ALSO MANUFACTURE

Refined Malleable Iron Castings.
Bolster Plates (All Sizes).
Link Belt and Combination Conveyor and Transmission Chain.
Malleable Elevator Buckets (standard sizes).
Complete Elevators and Conveyors.

LANCASTER FOUNDRY COMPANY

LANCASTER, PA., U. S. A.

STERLING

PADS and PROTECTORS

Sterling pads are one solid, inseparable piece. The tough, pliable, waterproof back, made of our patented rubber and fibre compound, is vulcanized (not cemented or stitched) to the resilient rubber heel. They will never pull apart. STERLING Pads and Protectors are waterproof—do not swell, shrink or get soggy in stable moisture.

They are best for the horse's hoofs, and best for the shoer's business.

We sell exclusively through the regular jobbing trade. Please ask us for samples.

STERLING TIRE CORPORATION

RUTHERFORD, N. J.



"E-Z" and "Crescent" Welding Compounds

It Pays to Use Only the Best

For welding axles, tires, springs and lap welding of all kinds, no other compounds give you such uniformly perfect results at low heats as "E-Z" and Crescent Compounds. In all around blacksmith work they have no equals.

"E-Z" works equally well on all kinds of steel. Welds at lower heat. Sticks to the metal. Does not boil away and waste. Leaves no scale.

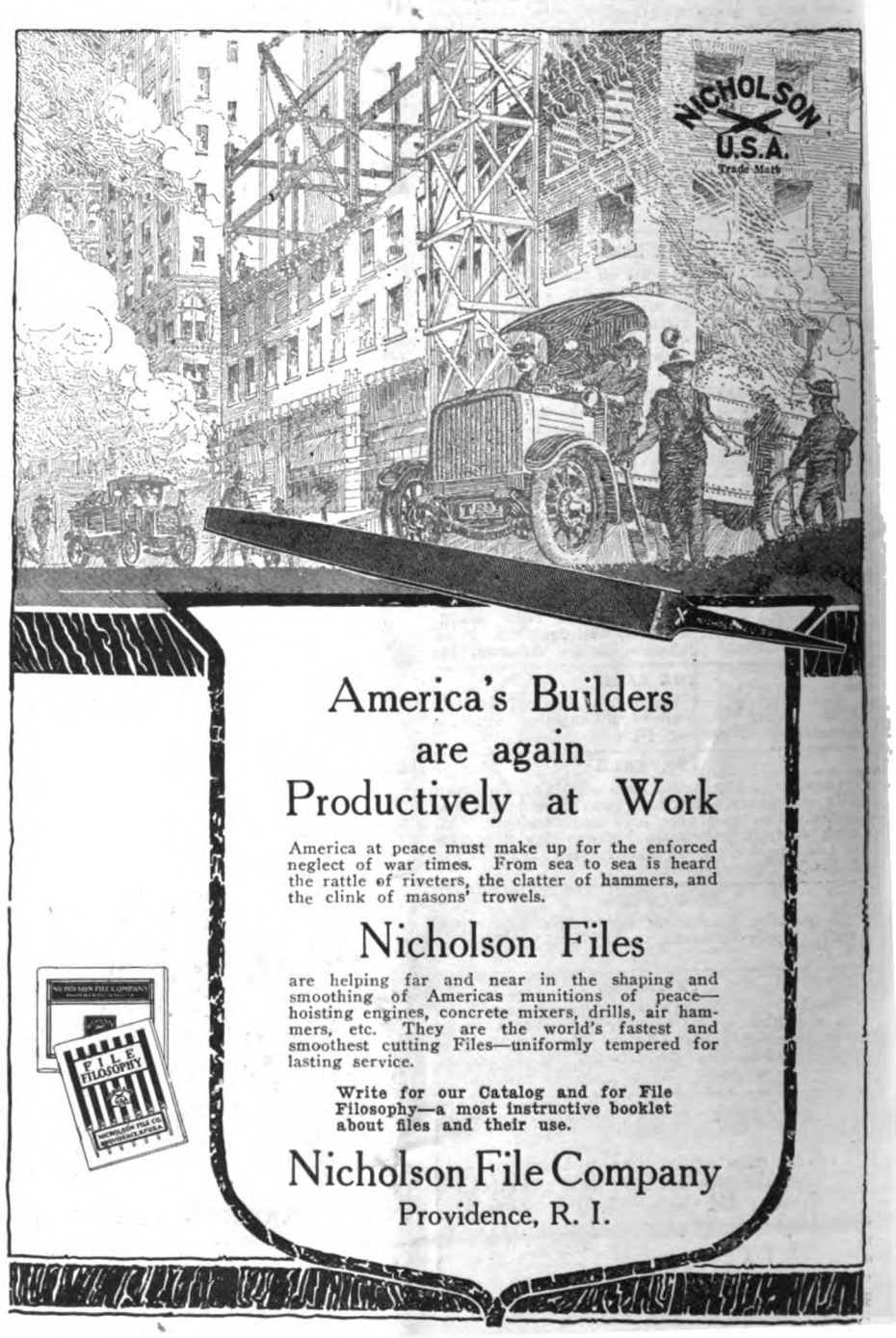
Crescent is especially good for plow work. Makes perfect welds on toe-calks. Insures smooth finish on split welds, finishing heats, welding under dies, etc.

Carried in stock by leading jobbers and dealers in United States and Canada. Your money back if not satisfied.

Write for large free sample.

Anti-Borax Compound Company

FT. WAYNE, INDIANA



America's Builders are again Productively at Work

America at peace must make up for the enforced neglect of war times. From sea to sea is heard the rattle of riveters, the clatter of hammers, and the clink of masons' trowels.

Nicholson Files

are helping far and near in the shaping and smoothing of Americas munitions of peace—hoisting engines, concrete mixers, drills, air hammers, etc. They are the world's fastest and smoothest cutting Files—uniformly tempered for lasting service.

Write for our Catalog and for File Filosophy—a most instructive booklet about files and their use.

Nicholson File Company

Providence, R. I.

Digitized by Google

EVERY owner whose vehicle you equip with Firestone Tires has friends who are your prospects and, eventually, your customers.

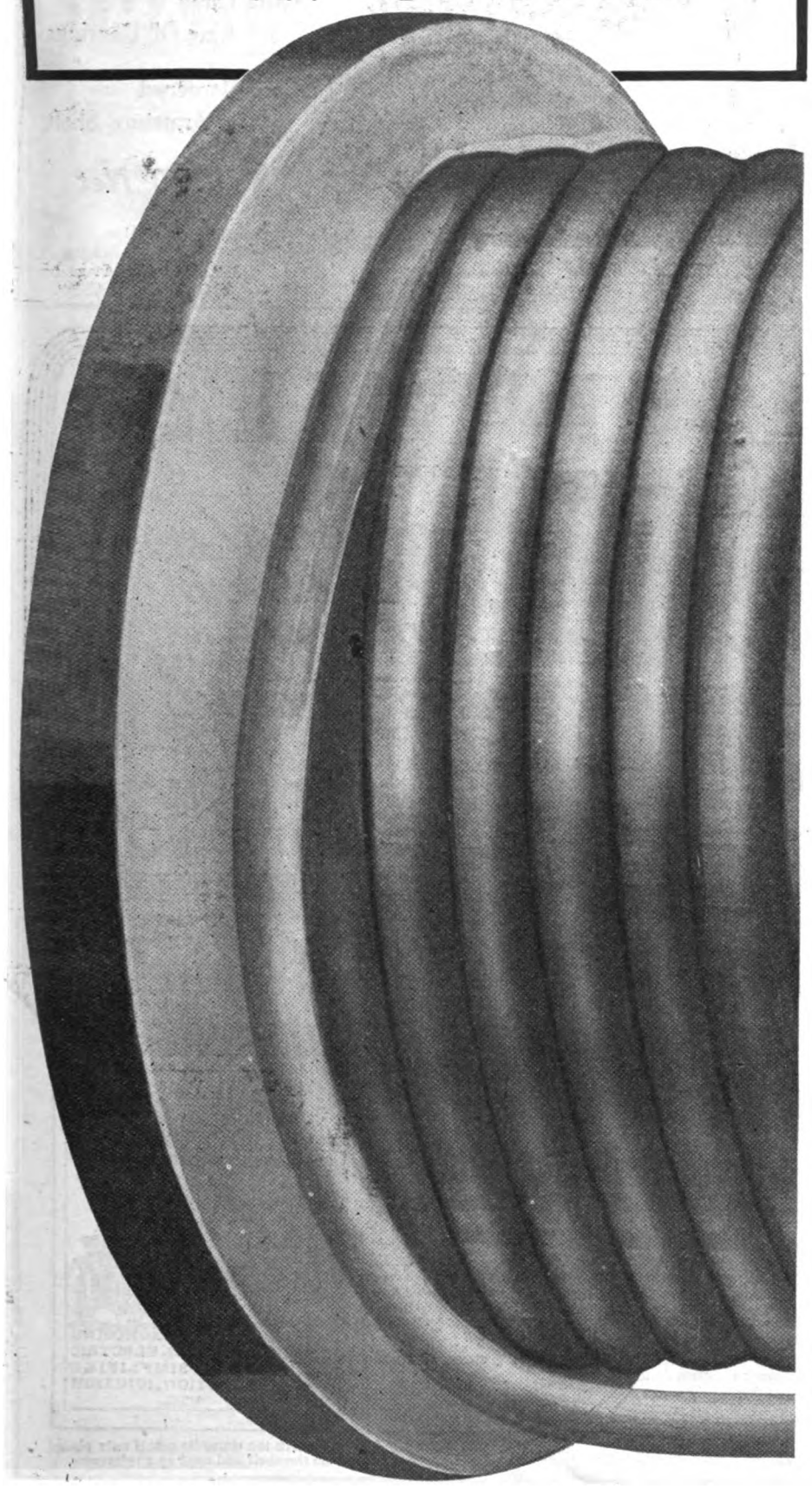
Firestone invented and perfected all the worth-while improvements in this type of tire. Their strong, resilient service built up leadership, and now the name, Firestone, sells them to the wise, experienced buyers.

Write for information and statistics

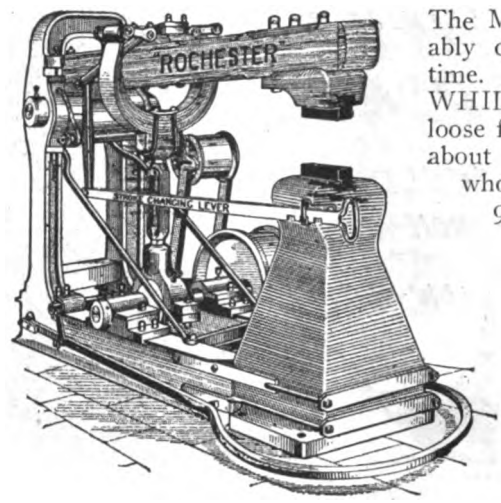
FIRESTONE TIRE & RUBBER COMPANY
FIRESTONE PARK AKRON, OHIO

Firestone

Carriage Tires



We'll Help You to Blaze a Trail to Efficiency



THE ROCHESTER HELVE HAMMER

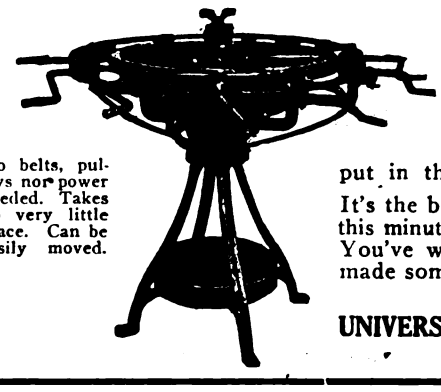
The Mechanic who works comfortably does the best work in quick time. He gives you WORTHWHILE results. You can't pry him loose from a superior tool. He brags about it. Give the chap a chance who uses the Helve Hammer. In 9 cases out of 10 he'll say "The Rochester Helve" for Mine. He is the man who knows the 100% Satisfaction Helve. We can't tell you all its distinctive features in this brief Advt., so we ask you to write for our Helve Hammer Book.

THE WEST TIRE SETTER CO.
ROCHESTER, N. Y., U. S. A.

BUY THIS

UNIVERSAL WHEEL COMPRESSOR

You can make so good an arrangement with us that this machine will be at work in your shop within three days' time. Why should you wait when others are having them put in?



No belts, pulleys nor power needed. Takes up very little space. Can be easily moved.

Your profits come quickly because the machine itself masters the work with no delay.

Adjustable for all types of Auto and truck wheels. Wire wheels can be trued up and new spokes put in them as in wooden wheels.

It's the busiest machine in many a shop right this minute—are you going to be left behind?—You've worked hard enough—it's time you made some easy profits.

WRITE US.
UNIVERSAL WHEEL COMPRESSOR CO.
CEDAR RAPIDS, IOWA

Would You Sell Your Life For $65?

You wouldn't part with even an arm or a leg for that figure, would you?

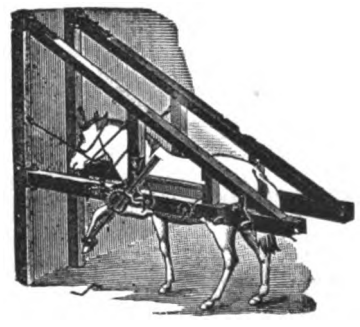
Yet every vicious horse you shoe is likely to do more damage in the twinkling of an eye than can be repaired at several times the cost of **Barcus Stocks.**

When you place a horse in a Barcus Stock, he is harmless—he cannot hurt either you or himself. Costing only $65 it is cheap insurance, indeed.

BARCUS STOCKS not only furnish the logical way to observe "Safety First," but they are also a positive aid to good shoeing. The BARCUS is a modern Stock—automatic working parts instead of the bothersome ropes, straps and blocks that made the old style stock almost more of a nuisance than a help.

If you don't know about **Barcus Stocks** you owe it to yourself and your family to write **at once** for the complete details.

The Barcus Mfg. Co.,
Wabash, Ind.

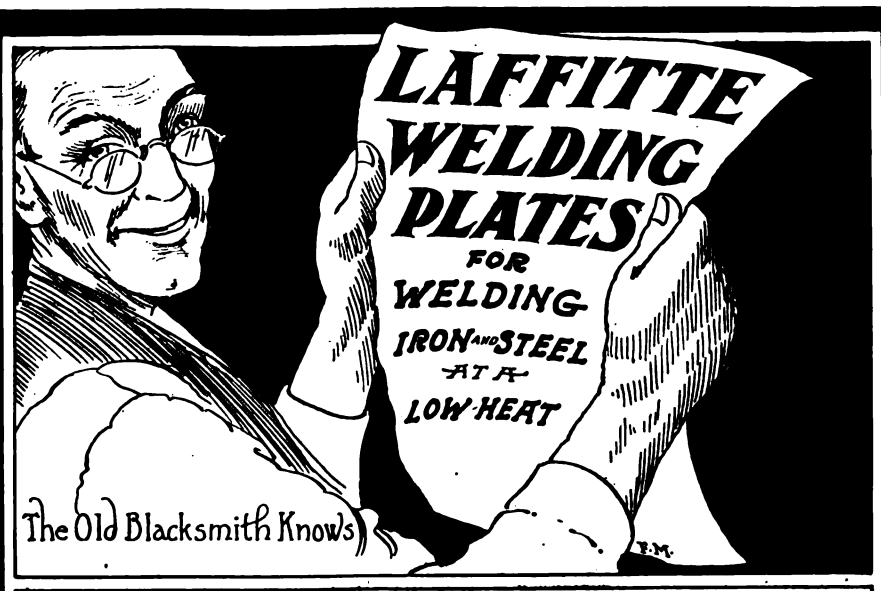


Please send me full particulars regarding your Horse Stocks without any obligation on my part.

Name.....

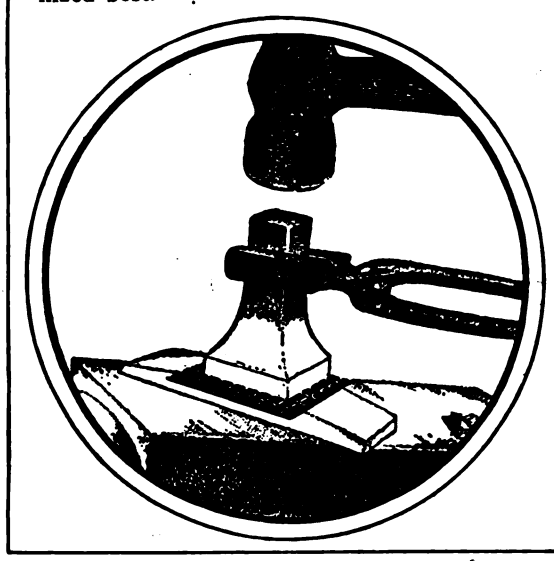
Town..... *State*.....

Digitized by Google



"THEY DO THE WORK"

Yes, it's a noteworthy example of American progress. If the success of your business hinges upon the quality and service of the welding material employed, you can make no mistake in adopting the recognized best.



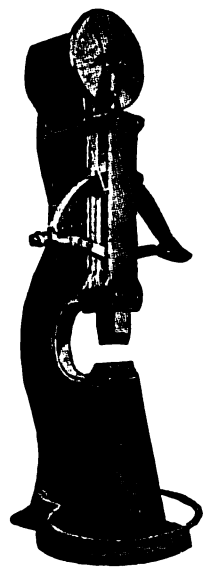
Laffitte Welding Plates receive first consideration from prominent blacksmiths, machinists and welders in every part of the civilized world.

Let us send you samples, and try them out, there are endless economies you can effect, the cost is insignificant compared with the results.

Dealers throughout the country carry LAFFITTE in stock, if yours does not, let us know, he soon will.

The Phillips-Laffitte Co.
Pennsylvania Building
Philadelphia, Pa.

The Perfect Power Hammer



Note the difference in construction over other makes:

Extra Long Guides, insuring a direct movement of the ram without any side motion, which causes guides and springs to break on other Hammers.

The only Hammer made with a disk attachment with special anvil for sharpening harrow and plow disks.

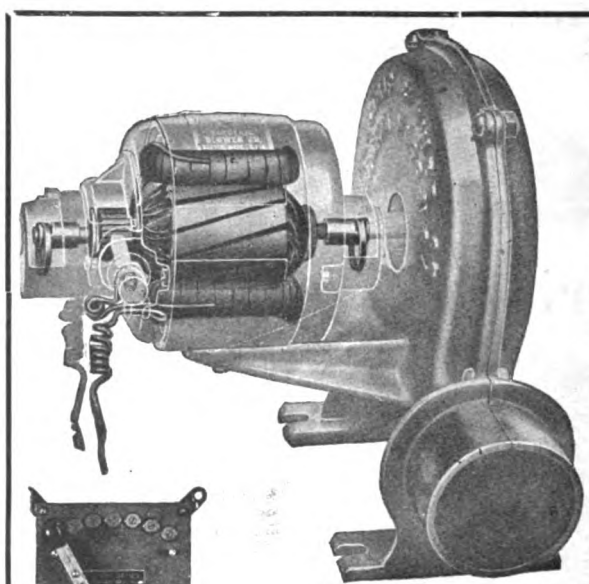
A recently invented **Friction Clutch** fitted with **Ball Bearings,** absolutely controls the operation of the Hammer by foot pressure from the lightest tap to the heaviest blow. This ease of operation makes the Hammer particularly well adapted for plow work, as you can get as light a stroke as you desire.

Will ship to any responsible party on approval. If not as represented, no sale.

Made in two sizes:
3-inch square, 40-lb. ram; shipping weight, 1,150 lbs.
4-inch square, 80-lb. ram; shipping weight, 1,800 lbs.

Write any jobber for prices, or

Macgowan & Finigan Cordage Co.,
204 North Third St., ST. LOUIS, MO.



"ONE FIRE" MARVEL

A. C. or D. C.
or
UNIVERSAL MOTORS

Extra Large
Ring Oil Bearings

Case Hardened
Armature Shaft

$38.00 Net

Order a **Marvel** on 30 days' trial through your Dealer, or your Electric Light Company

Electric Blower Co., 352 Atlantic Avenue BOSTON, MASS.

TRENTON ANVILS



Solid Wrought from New Steel; not cast.
Recessed Base; stand firmly on the block
Made in all sizes with all desirable Clips.
Ring like a Bell and Perfect in Shape.

BOKER CUTLERY & HARDWARE CO., Inc., Sole Sales Agents,
101-103 Duane Street, New York City

THE COLUMBUS FORGE & IRON CO. COLUMBUS, O.

940 Pages instead of 824 — 3362 Illustrations instead of 2000

NINTH EDITION

$4.46 prepaid DYKE'S AUTO ENCYCLOPEDIA $4.46 prepaid

Entirely re-written, hundreds of illustrations and many new subjects added. Practically a new book. A non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 50 Instructions—Simplified and Practical.

3362 Illustrations—the kind you understand at a glance.

2 Supplements, part printed in two colors, treating on the construction, operation, repairing and adjusting of the FORD and PACKARD—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.

776 illustrations and 279 pages on Electric Ignition, Electric Starters and Generators, etc.

81 pages and 79 illustrations on the Delco system alone.

60 pages and 254 illustrations on Adjustments, Tests, etc., of leading Electric Systems.

184 pages and 1189 illustrations on Repairing.

Oxy-Acetylene welding. Axle, Differential and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.

27 pages and 180 illustrations on Tires and Tire Repairing.

44 pages and 119 illustrations on Carburetion.

89 pages and 291 illustrations on Engines and Parts.

16 pages on Digest of Troubles.

6000 lines to the Index. This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. Index begins on colored paper, easy to refer to.

Dictionary is also included, which gives the meaning of motoring terms

Inserts: There are five—printed in colors. New features you never before saw or heard of in one of the inserts.

Additions to the Ninth Edition:

TRUCKS, TRACTORS, MOTORCYCLES, AIRPLANES and LIBERTY ENGINE

HOW TO BECOME AN EXPERT AUTOMOBILE MECHANICIAN

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion subject so thoroughly, you can adjust any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

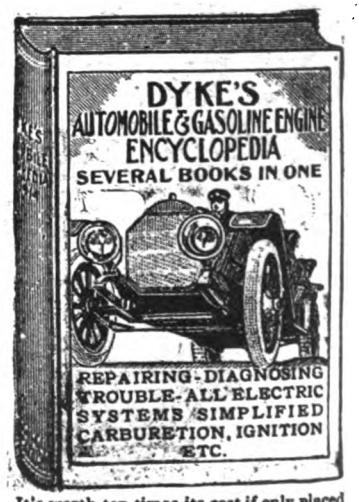
Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical Automobile book in America. Price $4.46, prepaid.

Price will advance to $5.00 September 1st.

Address all orders to

THE BLACKSMITH & WHEELWRIGHT
73 MURRAY STREET NEW YORK



It's worth ten times its cost if only placed on the shelf and used as a reference.

Digitized by Google

You Don't Save →but pay heavily IN TIRE-BILLS IN TIRE-TROUBLE BY USING WEAK TIRES without MAXOTIRES

Don't
Don't
Don't--

Throw Away Your-Weak-Tires

MAKE THEM
FINISH-THIS-YEAR

USE MAXOTIRES

MR. BLACKSMITH
Why not sell Maxotires too? Why not increase your income? Write today for "free" Maxotire Catalog and Wholesale Price.
K & W RUBBER CO., 50-60 Channing St., Delaware, Ohio
Reliable—Established 1908



Free 448 PAGES OF BARGAINS
POST PAID

WE WANT TO SEND YOU THIS 448 PAGE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

Tells how you can work up a profitable auto supply and repair business.

Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories
1117 W. 11th Street, Cleveland, Ohio, U. S. A.

THE ECONOMY
of effort—that's what counts!

Modern efficiency has evolved time-saving methods.

Kerrihard Power Hammer

does the work of four men — scattering all old time methods and records to the four winds. How do you manage without it?



Write for full particulars.

THE KERRIHARD CO., Kerrihard Sta., Red Oak, Ia., U.S.A.

Shaped Right —Made Right



Giant Grip Shoes have been scientifically perfected in design through years of experience and study. The calk holes are strongly reinforced and absolutely accurate. The best of horseshoe steel gives them the strength to meet the hardest usage.

Giant Grip Calks of tool steel are tempered to the maximum hardness. The fit is so exact that they cannot twist or fall out. They insure a reliable grip under any conditions.

A shape for every need

Giant Grip
Shoes—Calks—Tools

The Giant Grip Horseshoe Co., Oshkosh, Wis., Dept. 21.

There's a Harvey Jobber near you who can supply you, on a moment's notice, with a Harvey Spring for any make or model of automobile.



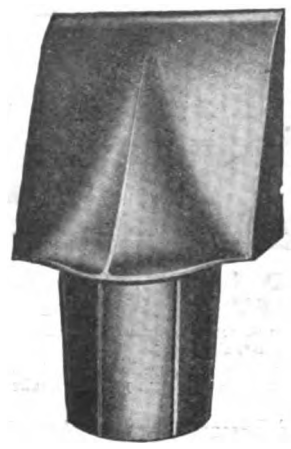
Car-owners naturally place more confidence in dealers who handle the Harvey Spring.
They have learned to look for and insist upon this trademark that guarantees quality—

Send to your jobber for the Harvey Spring Book or write

Harvey Spring & Forging Co.
1089 17th Street Racine, Wis.

Harvey RACINE Boltless Automobile Springs
Easy Riding - Guaranteed

Digitized by Google



Quality and Service

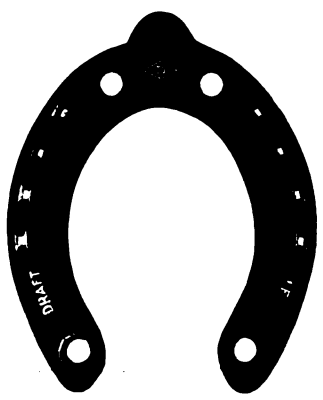
in *design, wear, fit, finish* and all-around efficiency have been, are and always will be, the first consideration in the manufacture of

DIAMOND
CALKS and SHOES

We aim to make our product of such superior excellence in everything that makes for satisfied dealers and satisfied users that they will not only ask for, but insist on the DIAMOND line because they cannot buy a better one.

Your good will and your customers' good will are what we want above all else.

Diamond Calk Horseshoe Co.
Duluth, Minn.



H-B Tempering Process

BLACKSMITHS,—are you making a business of TEMPERING? It is a general fact that Tempering of Steel is a side issue with the Blacksmiths. Why not make it a business that will bring more MONEY and GREATER RESULTS.

WRITE FOR PARTICULARS.

A ready mixed sample will be sent on the receipt of $1.00 with directions how to use.

ORDER AT ONCE ***IT WILL CONVINCE***

Manufactured by the

H-B TEMPERING PROCESS CO.
CLEARBROOK, MINN.

PLYMOUTH COMBINED HAND POWER PUNCH AND SHEAR

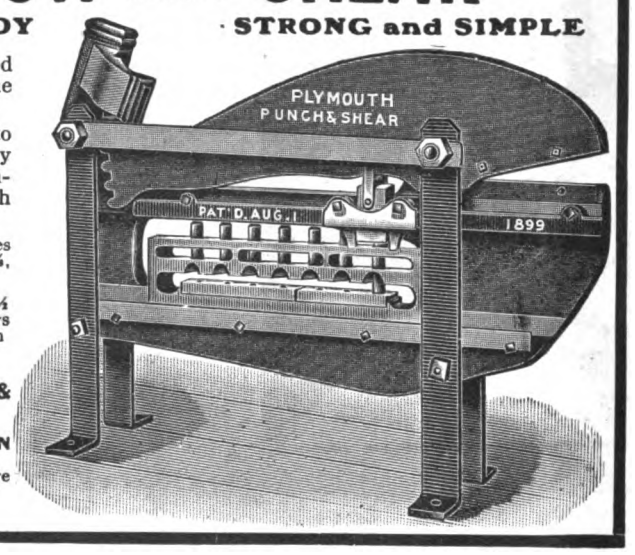
ALWAYS READY **STRONG and SIMPLE**

No lost or misplaced Punches — always in the machine.

Punch Rack shifted to position for use of any punch in a moment without the need of a wrench or any other tool.

Seven different size punches with every machine, ¼, 5/16, ⅜, ½, ⅝, ¾, and ⅞.

Will punch ½ in. hole in ½ in. iron or its equivalent. Shears 4x½ or 3x⅝ or 1 in. Round Iron



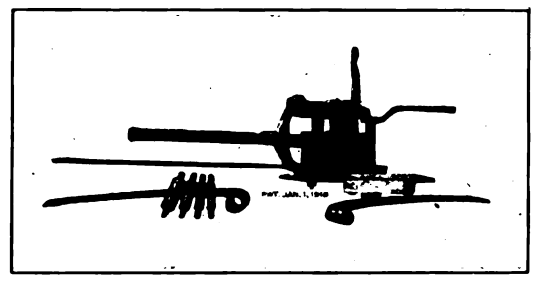
Manufactured By
PLYMOUTH FOUNDRY & MACHINE CO.
PLYMOUTH, WISCONSIN

For sale by all Heavy Hardware Jobbers and Blacksmiths' Supply Houses.

THE KITOWSKI EYE TURNING DEVICE

Especially adapted for auto spring work

The one and only machine that will make a complete and perfect eye of any desired size with one turn of the lever. Price is very reasonable. For particulars write



F. J. KITOWSKI
St. Cloud, Minnesota

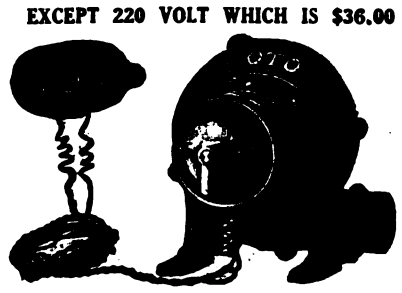
ROBERGE'S GREAT BOOK

"THE FOOT OF THE HORSE"
By DAVID ROBERGE

The author of this book for many years enjoyed the entire confidence of Robert Bonner, who, in his day, owned many of the fastest trotters the world has ever seen. Bonner and Roberge worked together in shoeing the former's horses. Many believe that David Roberge was the ablest horseshoer this country has ever seen. His book is filled with plates and illustrations showing proper methods of shoeing horses for every kind of lameness. We have sold large numbers of these books and they have always given entire satisfaction. The work represents the life experience of its author. Sent to any address, postage prepaid, on receipt of price, **$5.00.** Address
M. T. RICHARDSON CO., Publishers, 71-73 Murray Street, New York.

The ROTO ELECTRIC BLOWER ONLY $35.00

EXCEPT 220 VOLT WHICH IS $36.00



One Dollar Cash Discount allowed if payment is received with Order.

SAVE TIME! SAVE MONEY!

Are you still blowing your forge by hand? Do you know this time is WASTED? Install a ROTO Electric Blower and SAVE this time. It is the greatest *time and labor saver* you can put in your shop. It will let you do *twice* the work, do it *better—quicker—cheaper.* You will then say, like hundreds of our customers,

I wouldn't sell my ROTO for $100.00 if I couldn't get another.

Buy direct and *save the middleman's profits* of $10 to $20. The ROTO is used in several departments of the U. S. Government. You can rely on it. Write for more information or, better yet, mail the coupon today and try this blower in your own shop. If not satisfied, send it back at our expense. That's fair isn't it?

Send the Coupon—Do it Now

THE ROSEWATER ELECTRIC CO.
5516 KINSMAN ROAD, CLEVELAND, OHIO

Send me by.....An AIR COOLED ROTO BLOWER with one year's guarantee, complete with cord, plug and Speed Regulator. I will return it to you at the end of 30 days, if it does not give me entire satisfaction, and if I keep it, I will pay you $35.00 for the 110 Volt, or $36.00 for the 220 Volt Blower at the end of 30 days.

Name.....Address.....

Current.....Voltage.....Cycles.....

Your Electric Light or Power Company Will Give You This Information.

PEXTO TOOLS

True as Steel Can be Forged

In every way Pexto Hoof Parers are "true as steel." Perfectly fitted, accurate and precise to a point near perfection, forged from finest quality steel.

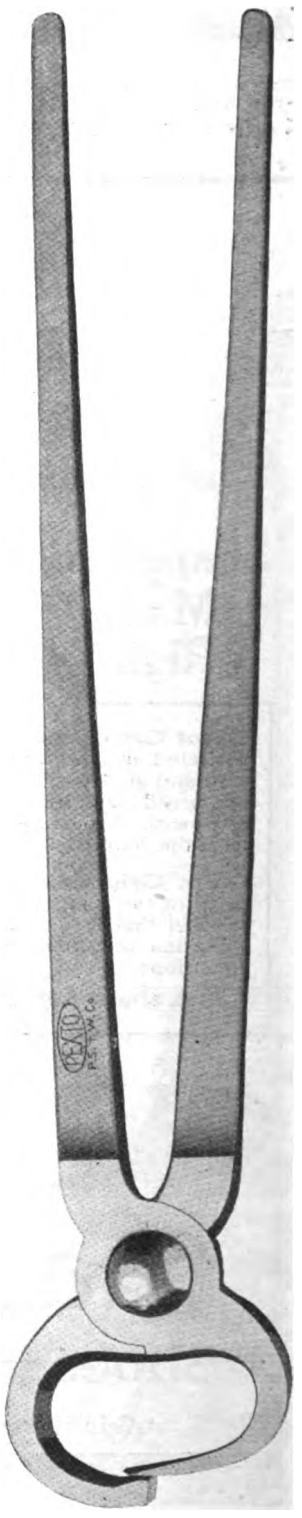
With extra heavy rivet at the joint, oil tempered and polished jaws, they are not only good looking and well designed, but are made to "stand the gaff."

The experience and reputation back of Pexto Blacksmiths' Tools is 100 years old. Ask for Pexto. If your dealer can't supply you write us.

THE PECK, STOW & WILCOX COMPANY
The Peck, Stow & Wilcox Company, Mfrs. Mechanics' Hand Tools, Tinsmiths' and Sheet Metal Workers' Tools and Machines, Builders' and General Hardware.

Southington, Conn. **Cleveland, Ohio**

Address correspondence to 209 W. Center Street, Southington, Conn.



PEXTO
BLACKSMITHS' TOOLS

Digitized by Google

V
No 5119

Established 1880 The Pioneer Journal of its Class

The BLACKSMITH AND WHEELWRIGHT

Registered in U.S. Patent Office

Vol. LXXX No. 4 Published Monthly

NEW YORK, OCTOBER, 1919

WHY WE PUBLISH IN THIS FORM

For nearly forty years the good old Blacksmith and Wheelwright has appeared, the first of every month, dressed in its well known orange colored cover. It has been of a standard, large size and contained an average number of reading pages. We have spared no expense to make this magazine the best Blacksmith's paper on the market and we feel that we have satisfied all of our subscribers.

Circumstances, over which we have noncontrol, prevent us from publishing the October number in its usual form, but as soon as we can arrange it, it will appear in its usual dress, well illustrated and printed upon the press.

On October first, the pressmen and feeders belonging to the local unions went on a strike. Contrary to all International Union laws, these striking union men refused to arbitrate; they demand an increase in pay which amounts to $14 per week; and in addition to this, a reduction of hours to 44 per week.

The International union is not in sympathy with these radical demands made by the pressmen and feeders for they realize that if the demands are granted, the printing industry will be ruined. The employing printers have agreed to an increase in wages amounting to $6 per week and are willing to reduce the hours of work to 44 after May 1, 1921.

At present, the pressmen and feeders local unions are at odds with the Internationals, in fact they have seceded, so that they are no longer in good standing. Until such a time as they can

Digitized by Google

THE MAYER

POWER HAMMER

'lects in full measure today's
ıpreme accomplishment in the
velopment of power hammers.
, details by mail - w r i t e.

KAUKAUNA MACHINE WORKS

.UKAUNA WISCONSIN

BUSH AUTOMOBILE

Shipped on approval.
5 passenger 35 H.P.car,116 in-
wheel base. Goodrich 32x3½
Delco ign. Dyneto Stg. and ltg.

WRITE AT ONCE.
for particulars of shipment and our
48 page catalog.
BUSH MOTOR COMPANY
Bush Temple Chicago,Ill.

J U S T R I T E

PLOW BLADE SHARPENER

dles plow blades,road scrapers,
g teeth,drill shoes,cultivator
vels, corn knives, etc. Gives a
ne clean edge.

STRITE GOVERNOR PULLEY CO.

7 South 3rd St. Minneapolis,Minn.

PORTER'S BOLT CLIPPERS

"Easy" Nos.1 and 2. "New Easy"
Nos. 0,1,2 and 3.

The Best!

H. K. PORTER

6 Ashland St.

Everett Mass.

THE KITOWSKI

EYE TURNING DEVICE

cially adapted for auto
ing work. A complete and
fect eye,any size with one
n of the lever. Write for
details.

F. J. KITOWSKI
Cloud. Minnesota.

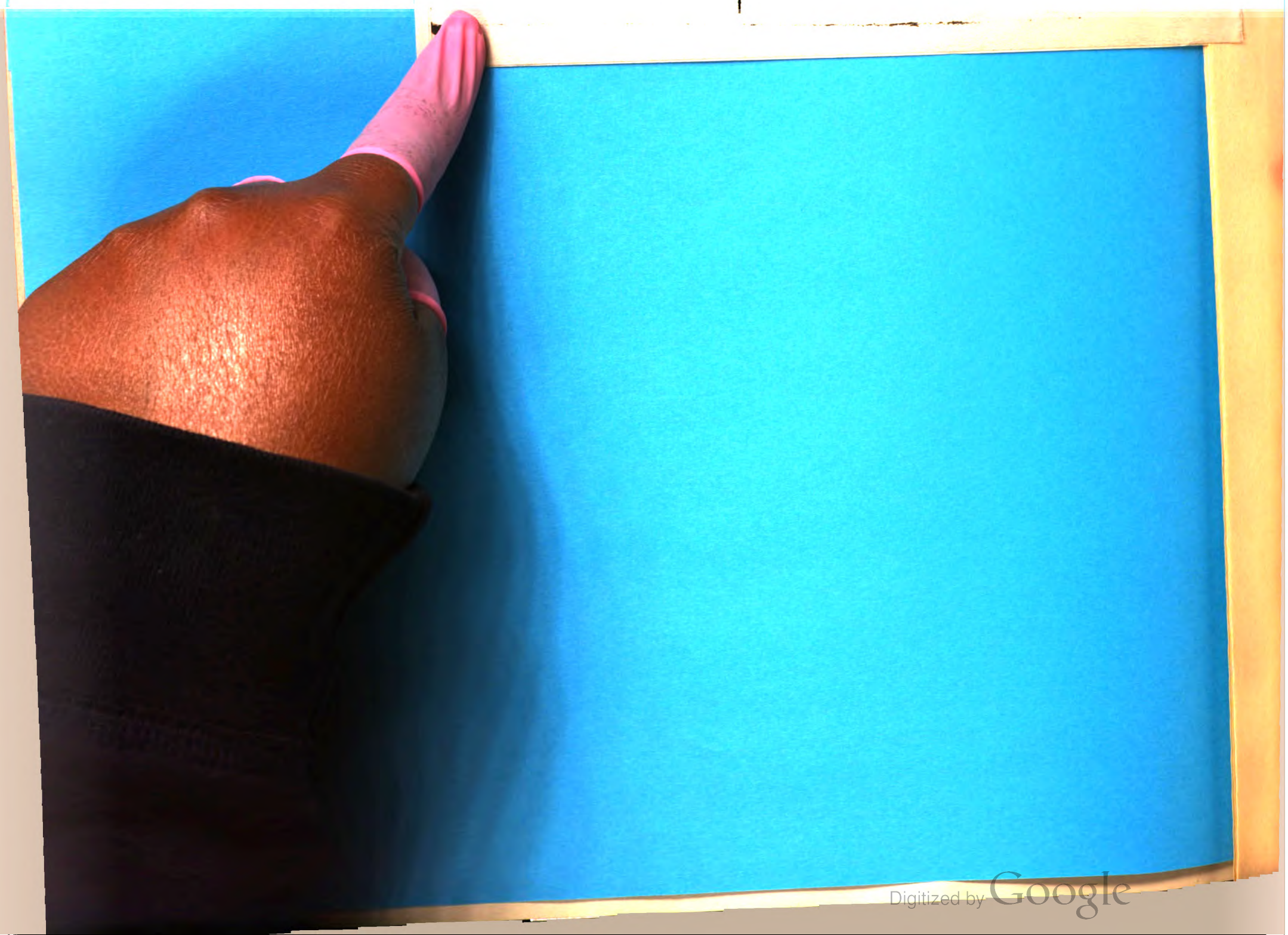
S H E L D O N

AXLES AND SPRINGS

Have long been Internationally
Famous for their superiority
in design,material and
workmanship.

SHELDON AXLE & SPRING CO.

WILKES-BARRE. PA.



Digitized by Google

THE NEW YORK PUBLIC LIBRARY
ASTOR, LENOX AND TILDEN FOUNDATIONS

ESTABLISHED 1880 — The Pioneer Journal of its Class

THE BLACKSMITH & WHEELWRIGHT

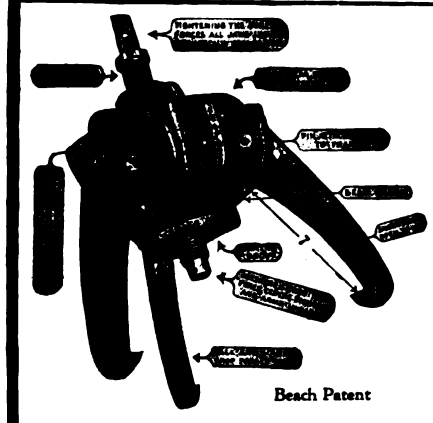
Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U. S. Patent Office.

Entered as Second-class Matter March 4, 1880, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Published Monthly.

Vol. LXXX. No. 5 — NEW YORK, NOVEMBER, 1919 — TERMS: One Dollar a Year. Foreign, $1.50. (6s. 3d.)

GREB AUTOMATIC GRIP PULLER



Beach Patent

Make Your Gear and Wheel Pulling Show a Profit.

A Powerful automatic one-man Puller, which adjusts to work instantly. Combination of two or three arms. Two complete sets of three arms.

Senior Size for heavy work, Capacity 1 to 18 in.
Junior Size for small work, Capacity 1 to 7 in.

Ten Days' Trial

If your jobber does not have them, we will send you one. Try it ten days. If not satisfactory, return it to us and we will refund your money. We also make the Greb Rim Tool and Grebford Extension.

10 DAYS TRIAL

THE GREB COMPANY, 219 State St., Boston, Mass.

There is One Particular Nail



which will drive easily where you want it to go—which will not crimp or split—which will prove itself the most economical nail you can possibly buy. . . . . .

IT'S "THE CAPEWELL" HORSE NAIL

Why accept something inferior when you can get the very best nail at a fair price? The Capewell having no equal in quality is by all odds the cheapest in the long run. Capewell customers are satisfied customers. . . . . .

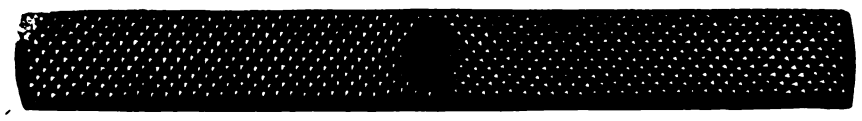
The Capewell Horse Nail Company

HARTFORD, CONN., U. S. A.

The World's Leading Horse Nail Manufacturers

Stokes Bros.' Improved Horse Rasps

Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A.

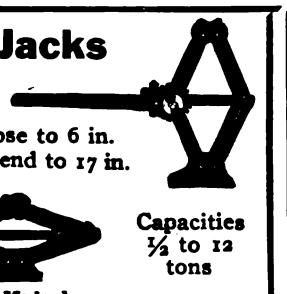
WELDING PLANTS, $25.00 to $300.00

Designed for all purposes. Small cash payment; balance, three to six months. Every mechanic and shop should have one.

BERTSCHY-BERMO CO. OMAHA, U. S. A.

Hi-Lo-Jacks

Six Sizes

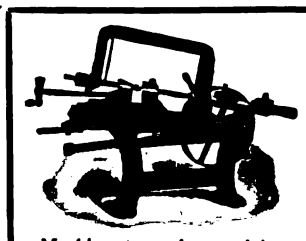


Close to 6 in.
Extend to 17 in.



Capacities ½ to 12 tons

Made by
The RoweCalk & Chain Co.
Plantsville, Conn.



Saw Those HeavyBars ON A MARVEL Power Hack Saw

Machine stops when work is cut off. Requires very little power.

Price is Low. Write Us.

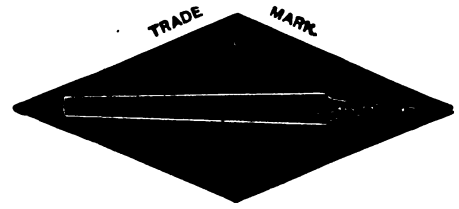
Ask for reply by return mail.

ARMSTRONG-BLUM MFG. CO.
340 N. Francisco Ave., Chicago, Ill., U. S. A.

THE TEETH IN
BLACK DIAMOND RASPS
ARE MINGLED

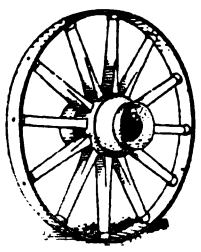
So as to Cut Clean and Free and Leave no Furrows in the Work

Twelve Medals of Award by Jurors



At International Expositions

G. & H. BARNETT COMPANY
Black Diamond File Works, PHILADELPHIA, PA.
Owned and Operated by NICHOLSON FILE CO.
Copy of Catalog sent Free to any interested file users upon application.



WONDERFUL INVENTION

Makes the repaired WOOD Wheel better than new. Guarantee every wagon against loose tires or dished wheels.

PLEASE EVERY CUSTOMER

Saves Time, Costs Less, A Business Builder, A Money Maker.

Want the AGENCY? Then WRITE TODAY.

ADJUSTABLE WAGON TIRE MFG. CO.
Shipping Point Near You. OKLAHOMA CITY, OKLA.



SUREGRIP CALKS

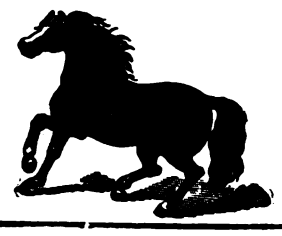
American Calk Co.
DETROIT, - - - MICH.

AETNA STEEL TOE CALKS

Made by THE AETNA NUT CO., Southington, Conn.

BLACK HORSE BRAND

BEST SHAPE
BEST SPUR
TO DRIVE
BEST STEEL



TOE AND HEEL CALKS

SOLD BY ALL DEALERS

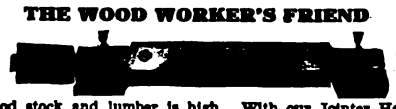
ROBERGE'S GREAT BOOK

"THE FOOT OF THE HORSE"

By DAVID ROBERGE

The author of this book for many years enjoyed the entire confidence of Robert Bonner, who, in his day, owned many of the fastest trotters the world has ever seen. Bonner and Roberge worked together in shoeing the former's horses. Many believe that David Roberge was the ablest horseshoer this country has ever seen. His book is filled with plates and illustrations showing proper methods of shoeing horses for every kind of lameness. We have sold large numbers of these books and they have always given entire satisfaction. The work represents the life experience of its author. Sent to any address, postage prepaid, on receipt of price, $5.00. Address
M. T. RICHARDSON CO., Publishers, 71-73 Murray Street, New York.

THE WOOD WORKER'S FRIEND



Wood stock and lumber is high. With our Jointer He you can buy rough lumber of any kind and dress it suit your job. Saves time, money and lumber. W this be any object to you? If so, get circulars prices. Sold on 30 days' trial. Manufactured by
Whisler Mfg. Co. Gibson, Io

The Telegraph Printing Co. 4 Harrisburg, Pennsylvania

Digitized by Google

UNIFORMITY

SHELDON AXLES AND SPRINGS

HAVE LONG BEEN

INTERNATIONALLY FAMOUS

For Their Superiority In

DESIGN, MATERIALS and WORKMANSHIP

REASON:

Sheldon Took Guesswork Out of Axle and Spring Manufacturing

which means

UNIFORMITY OF PRODUCT

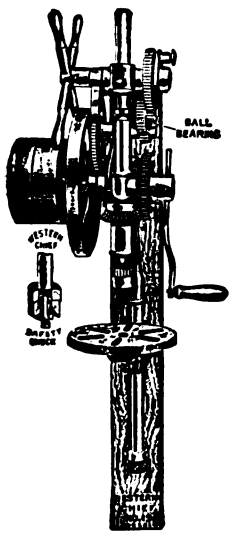
Sheldon Axle & Spring Co., Wilkes-Barre, Pa.

The Better Your Equipment The Bigger Your Profits

Buy CANEDY-OTTO

AND INCREASE YOUR INCOME

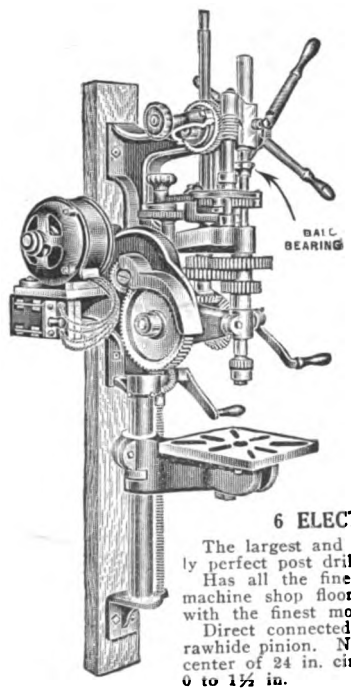
Once Tried, Always Used : There's a Reason—Quality



No. 19 DRILL

A low-priced combined hand and power self-feed drill.

Drills to center of 16½ in. circle.



6 ELECTRIC DRILL

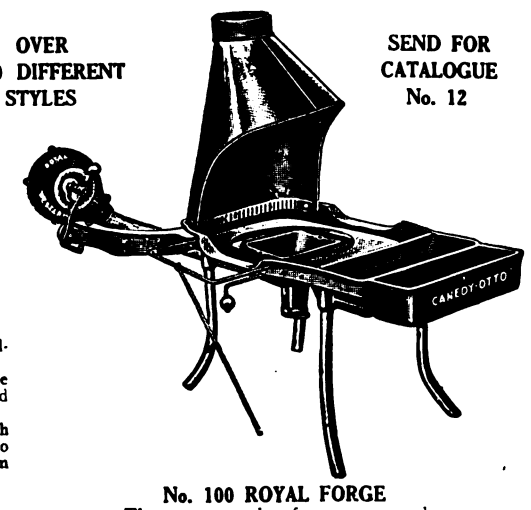
The largest and most mechanically perfect post drill manufactured.

Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.

Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1½ in.

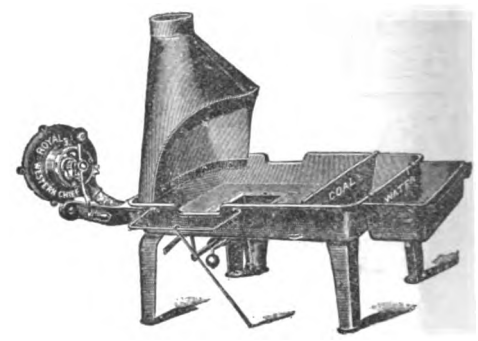
OVER 200 DIFFERENT STYLES

SEND FOR CATALOGUE No. 12



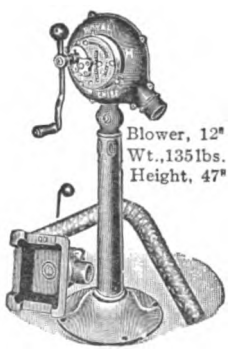
No. 100 ROYAL FORGE

The most popular forge ever made.
Fan, 12 in. Hearth, 31½x45½ in.



No. 9 ROYAL FORGE

Capacity for the heaviest work. Hearth, 38x50 in. Blower, 12 in.



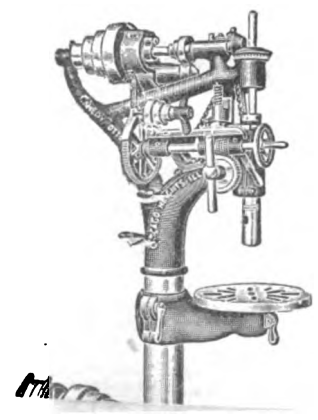
Blower, 12"
Wt.,135lbs.
Height, 47"

ROYAL BLOWER

(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.

Fire pot is 8x9 in. inside.



No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.

All machines are tested before leaving the factory, and guaranteed in every respect.

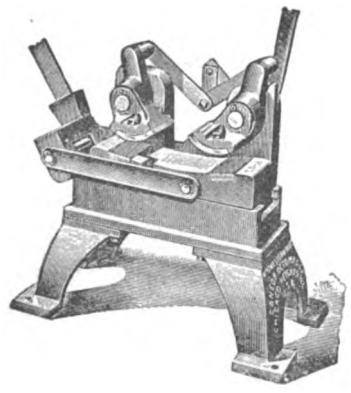
Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.

CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"

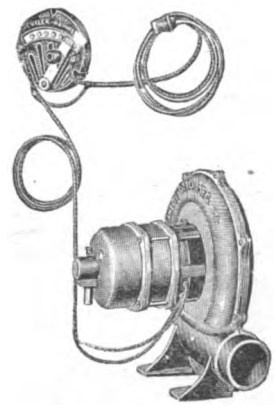
Forges, Blowers, Drills, Punches, Shears, Shrinkers

CHICAGO HEIGHTS, ILLINOIS



No. 1½ SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



No. 8 ELECTRIC BLOWER

The best outfit money can buy.

Digitized by Google



the Guarantee of
Strength
Fit
Workmanship

The name "Giant Grip" has long stood for shoe and calk satisfaction both to the horseshoer and horse owner.

Produced in an up-to-date, thoroughly equipped factory and perfected through years of experience, the "Giant Grip" line holds a well-deserved leadership.

The Shoes are forged of the toughest steel made, which insures them against breakage of any kind. The best shaped horseshoes on the market and the easiest to fit. Toe clip extra strong, calk holes accurate in size and reinforced, nail holes punched clean and exactly placed.

The Calks have perfect shanks and blades. They are correctly tempered to give the greatest hardness and wear. A size and shape of blade for every need.

Write for full particulars of the "Giant Grip" line.

The Giant Grip Horseshoe Company
Oshkosh, Wisconsin

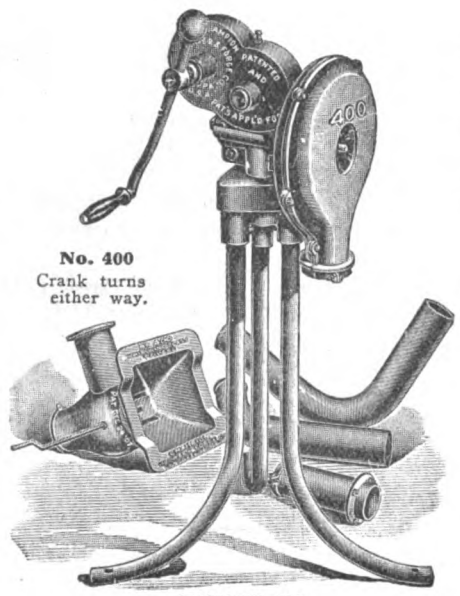
Giant Grip

Shoes--Calks--Tools

Digitized by Google

WORK WITH THE FAMOUS CHAMPION BLACKSMITH TOOLS



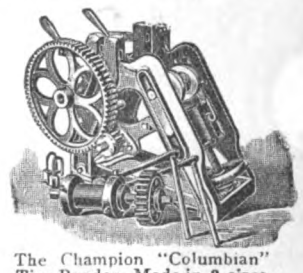


No. 400 Crank turns either way.

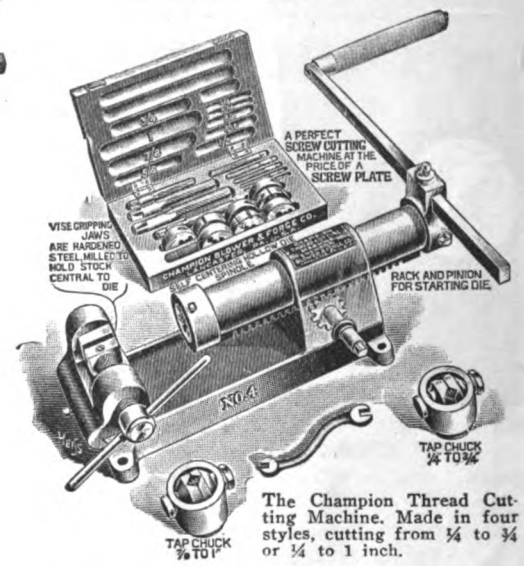
FAMOUS 400

Don't Fail to Get Our 1918 Catalog

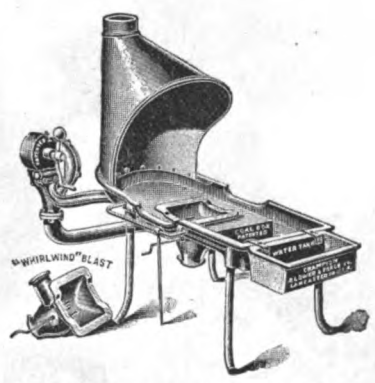
Before purchasing a Hand Blower Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



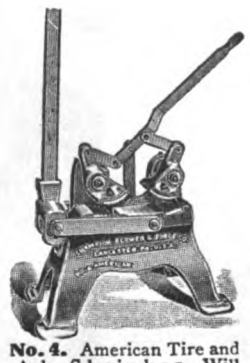
The Champion "Columbian" Tire Bender. Made in 8 sizes.



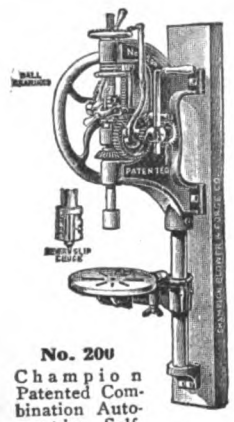
The Champion Thread Cutting Machine. Made in four styles, cutting from ¼ to ¾ or ¼ to 1 inch.



No. 433. Cast Iron Blacksmith's Forge.



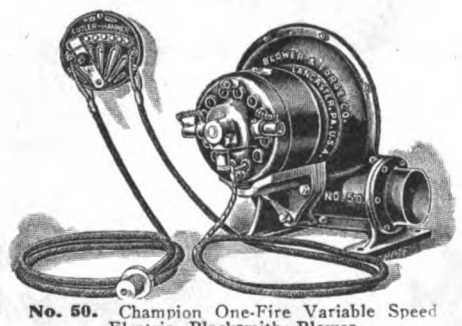
No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



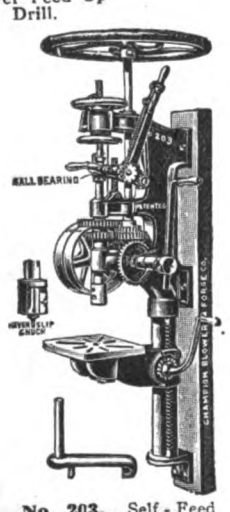
No. 200 Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



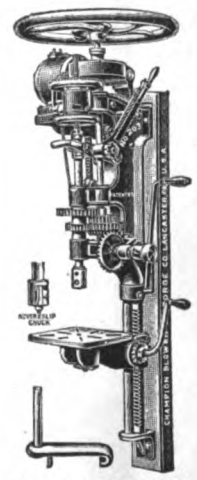
No. 408. Steel Blacksmith's Forge.



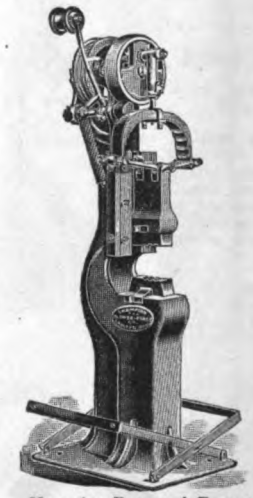
No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower.



No. 203. Self-Feed and Double Compound Lever Feed Drill.



No. 203. Self-Feed and Double Compound Lever Feed. Electrically Driven Post Drill.



Hercules Patented Power Hammer. Weight of ram, 65 pounds.

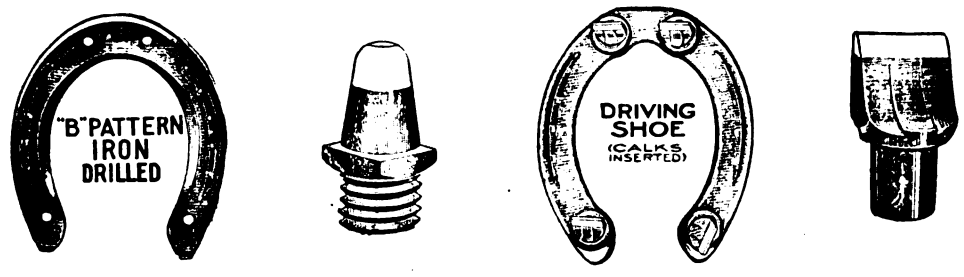
CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

Digitized by Google

RED TIP CALKS

CERTAINLY GET THE COIN!



There's a quiet undercurrent of supreme satisfaction here—these men have just "delivered the goods."

They did not stop and watch the hands go round on the face of the clock of progress—it would have put them in the class with "the man who stood still."



THEY DELIVERED THE GOODS—BECAUSE THEY *HAD* THE GOODS!—
that's the whole story in a nutshell.

MEET THE DEMAND FOR RED TIP CALKS—HORSE AND MULE SHOES

The Neverslip line embraces all styles of Screw Calks, Iron, Steel and Extra Light Steel Shoes, Drilled or Calked; Drive Calks, Sharp or Blunt, Driving, Draft and Mule Shoes and all necessary tools.

The only complete line. Write to us for catalog.

THE NEVERSLIP WORKS :: :: :: New Brunswick, N. J.

LINDE OXYGEN

From Coast to Coast 65 Producing Plants and Distributing Stations provide an unlimited supply of Linde Oxygen for users everywhere.

LINDE SERVICE means no investment except for oxygen actually received—no expensive overhead or upkeep charges.

Linde Oxygen may be obtained from any of the following Linde Plants and Distributing Stations where a large suppply of charged 100 to 200 cu. ft. cylinders is kept on hand constantly to insure immediate shipments.

Mail or telephone your order to THE LINDE AIR PRODUCTS CO., at the nearest point. Shipments will be made on day order is received.

PRODUCING PLANTS AND WAREHOUSES

Alabama
*Birmingham
10th Ave. & 28th St.
California
*Emeryville, Oakland
*Los Angeles
1405 Mission Road
Colorado
*Denver
S. B'way & Exposition Ave.
Connecticut
Hartford
1095 Main Street
District of Columbia
Washington
9th & Maryland Ave., S. W.
Georgia
*Alanta
Plyant St. & Southern R. R.
Savannah
OgeecheeCanal,So.of BaySt.
Illinois
*Chicago
3633 Wall Street
East St. Louis
6th & Walnut Ave.
Peoria
721-731 So. Washington St.
Indiana
*East Chicago
S.E.Cor Kennedy & 145th St.
Fort Wayne
414 E. Columbia Street
*Indianapolis
2819 Roosevelt Ave.
Iowa
Davenport
118 Harrison Street
Des Moines
117 W. 5th Street
Kansas
Wichita
Rock Island Ave. & 2nd St.
Kentucky
Louisville
126 East Main St.
Louisiana
New Orleans
831 Fulton Street
Maryland
*Baltimore
25th & Montebello Ave.
Massachusetts
Cambridge
25 Waverly Street
Springfield
Napier Street
*Worcester
961 Southbridge St.
Michigan
*Detroit
St. Aubin Ave. & Newton St.
Grand Rapids
Pearl Street by the Bridge
Minnesota
Duluth
Seventh Ave., West
*Minneapolis
1809 Hennepin Ave.
Missouri
*North Kansas City
14th & Charlotte St.
*St. Louis
4218 Forest Park Blvd.
Nebraska
Omaha
1007 Jones Street
New Jersey
*Elizabeth
Linden Ave.
Newark
354 Plane Street
New York
Albany
Montgomery & Colonie Sts.
*Brooklyn
475 Driggs Ave.
*Buffalo
Broadway and Ideal Sts.
*Utica
Walnut & Schuyler Sts.
Ohio
*Cleveland
802 East 72nd Street
*Cincinnati
Stanton & Mellish Aves.
Columbus
310 Dublin Ave.
Dayton
521 E. First Street
Lima
338 East High Street
Ohio
Toledo
441 South Erie Street
*Youngstown
601-621 Jones Street
Oklahoma
Oklahoma City
27 E. Grand Ave.
Tulsa
1 North Boulder St
Oregon
Portland
15th & Hoyt Streets
Pennsylvania
Allentown
211 Gordon Street
Erie
1502 Sassafras Street
*Norristown
*No. Philadelphia
11th & Cambria Streets
Pittsburgh
16th & Pike Streets
*Trafford
Tennessee
Chattanooga
212-238 King Street
Memphis
203 Washington St.
Texas
*Dallas
Harwood and Coombs St.
Houston
Cedar and Baker Sts.
San Antonio
512 Dolorosa St.
Utah
Salt Lake City
112 West Second St., South
Virginia
*Norfolk
22nd St. and Colonial Ave.
Richmond
1709 E. Carey Street
Washington
*Seattle
Henrietta St. & 8th Ave., So.
Spokane
121-123 S. Madison St.
Wisconsin
Manitowoc
810 Quay Street
*Milwaukee
36th St. & National Ave.

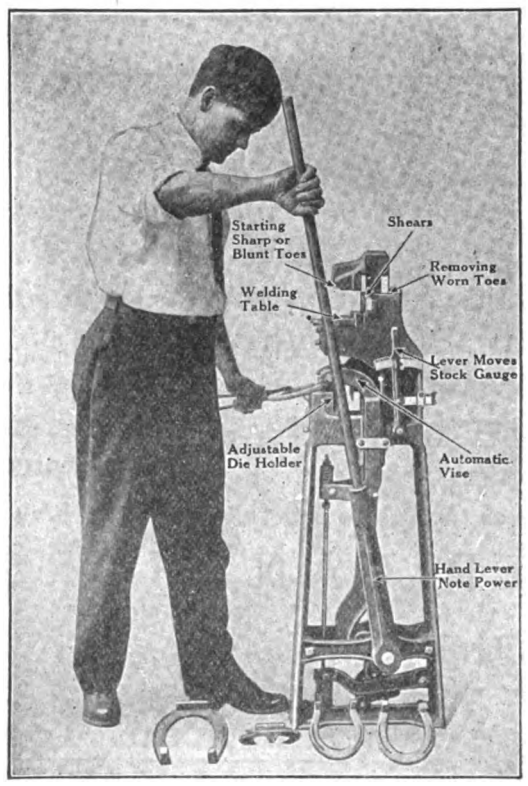
(Star) * Designates Plants.

Other Plants and Distributing Stations are planned for other industrial centers throughout the country and will be established as fast as and wherever the local demand for oxygen warrants.

THE LINDE AIR PRODUCTS COMPANY
Largest Producers of Pure Oxygen in America
Forty-Second St. Building NEW YORK

1920 MODEL
THE L. S. P. CALKING MACHINE

The Greatest Time and Labor Saving Machine On Earth



1920 MODEL—Fully covered with Patents

OUR 1920 Model is the same as our 1918 and 1919, we agree with the users and so would you that it cannot be improved.

Do not mistake this for a machine which makes toe calks or a foot vise. This machine is for turning heel calks, both Blunt and Sharp, sticking and welding toe calks, clipping and trimming ends of shoes. IT CALKS SHOES, doing the work just the same as you do by hand with the hammer, only it is done much better and easier, and in a fraction of the time.

In turning heels, you can turn up just as much stock as you wish, upset or stoveup to make as heavy as you like and square up the calks without use of hammer. There is no losing of toes when you weld on the L. S. P.

It is a strong, handsome, well made machine and will last, as you might say, a life time, fully warranted for one year. It is in use in the best shops in the United States, users claiming more for it than we do.

Write at once for full information and prices.

L. S. P. CALKING MACHINE CO.
P. O. Box 225 WYALUSING, PA., U. S. A.
NATIONAL MACHINE CO., Brighton, Ontario, Canada

Digitized by Google

OUT OF THE (A) COMES BETTER PAY THAT'S BECAUSE THE SHOE'S O. K.



American Horse and Mule Shoes

Quality is infinitely more important than price—the worth-while customer will always pay the price for the right quality. Our (A) mark on horse shoes is an insurance policy for the purchaser, denoting the unvarying quality that has made American Horse and Mule Shoes a pleasurable possession. When you make an all-time patron out of a one time purchaser, Mr. Blacksmith, you have accomplished your greatest business desire—because you see growth—it means a steady income. That's what contact with that (A) means to you—for out of the (A) comes better pay—that's because the shoe's O. K.



Perhaps the man you was talking to put the catalog in his pocket-all right-send for another.

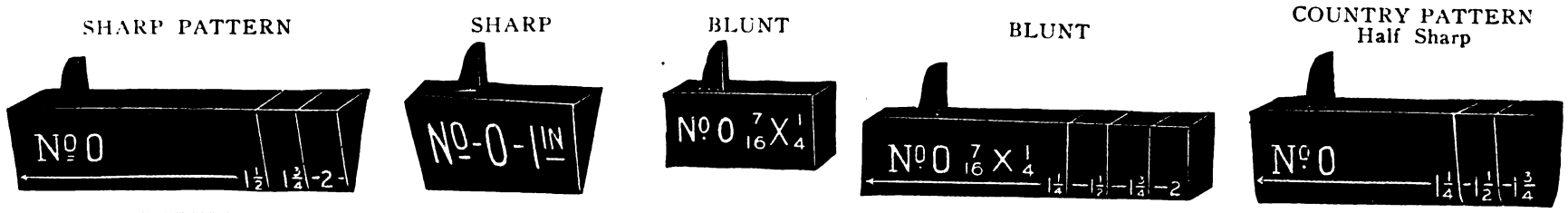
AMERICAN HORSE SHOE COMPANY

ROLLING MILLS WORKS AND OFFICES

PHILLIPSBURG - - - NEW JERSEY

American Toe and Heel Calks

The assertion that American Toe and Heel Calks are better calks is no mere claim. It is a well substantiated fact, which can be demonstrated thoroughly to your own satisfaction at any time. Get your order in today.



Digitized by Google

Come Close up We're Talking About



According to the testimony of thousands of horseshoers in the UNITED STATES and CANADA

SWEETS TOE CALKS are cold cut from specially rolled steel. We use Open Hearth Steel .30-.40 Carbon. It is uniform in quality, tough and wears well. It is not too high in Carbon to weld easily or too low to harden. The rib is set in the end of the calk and shaped to drive easily. It holds the calk to the shoe. Sweet's calks do not drop off in the fire.

Made in Blunt, Country Patterns and Sharp toe and heel calks.

This Is Not All By Any Means

Write us to send you information on how to add Dollars to your profits, how at the same time to make permanent your customers.

As well as "horsesense" gratitude from the horse.

FRANKLIN STEEL WORKS

JOLIET, ILL. CAMBRIDGE, MASS. HAMILTON, ONT.

IF YOUR FOREMAN

started out to do the bulk of the power hammering business in your territory, he would buy

The Mayer Power Hammer

for your men because that is the one he would buy for himself.

Look at it from the customers' standpoint. They know that the Mayer Power Hammer delivers the goods. They know that the service is superior to that of any other power hammer. They know that it is backed by the most comprehensve guarantee ever given any power hammer.

These figures, Mr. Boss, are more potent in swinging the bulk of the hammering business to you than any other consideration.

IT'S A SCIENTIFIC FACT
That "The Mayer" is built on the correct principle.

IT'S A DEMONSTRATED FACT
That in every shop where "The Mayer" has been placed, it is there to stay and no amount of persuasion has ever been successful in displacing it.

IT'S AN INDISPUTABLE FACT
That with "The Mayer" you can place your business on a permanent profit-paying basis.

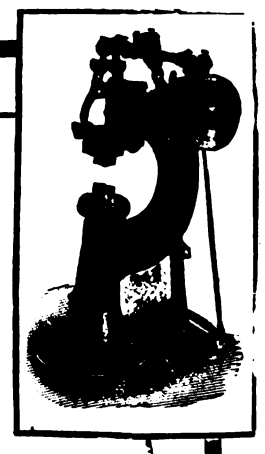
Made in 5 Sizes.
All details of capacity, advantages and price given by return mail—upon receipt of your letter—WRITE.



MOTOR EQUIPPED

Kaukauna Machine Works, Kaukauna, Wis.

HAVE YOU INCLUDED
The Kerrihard Power Hammer
in your plans?

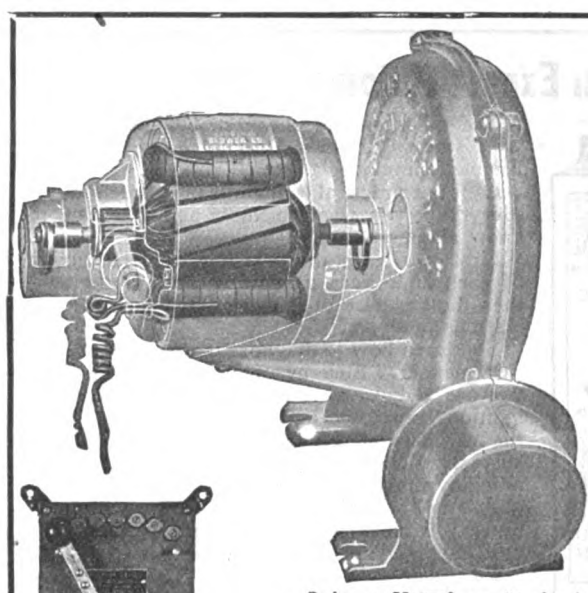


Things are moving so swiftly these days that the successful man must plan for the day after tomorrow to keep pace with today.

The Kerrihard does the work of four men. Could you ask for a bigger advantage?

Write for full particulars.

THE KERRIHARD CO., Kerrihard Sta., Red Oak, Ia., U.S.A.



"ONE FIRE" MARVEL

A. C. or D. C.
or
UNIVERSAL MOTORS

Extra Large
Ring Oil Bearings

Case Hardened
Armature Shaft

$40.00 Net

Order a Marvel on 30 days' trial through your Dealer, or your Electric Light Company

Electric Blower Co., 352 Atlantic Avenue BOSTON, MASS.

TRENTON ANVILS



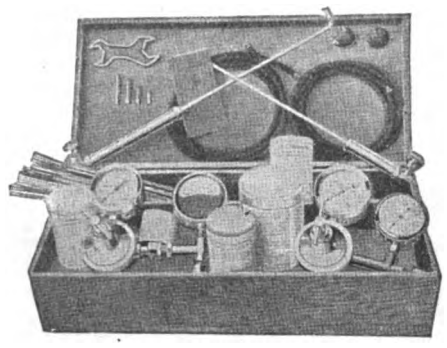
Solid Wrought from New Steel; not cast.
Recessed Base; stand firmly on the block
Made in all sizes with all desirable Clips.
'Ring like a Bell' and Perfect in Shape.

BOKER CUTLERY & HARDWARE CO., Inc., Sole Sales Agents
101-103 Duane Street, New York City

THE COLUMBUS FORGE & IRON CO. COLUMBUS, O.

Digitized by Google

ADMIRAL WELDING EQUIPMENT



COMBINES { EFFICIENCY
ECONOMICAL OPERATION
PORTABILITY
ABSOLUTE SAFETY
A REASONABLE PRICE

It has been thoroughly developed under actual working conditions. It has been on the market over nine years. Over 10,000 Admiral Welding Equipments in the hands of satisfied users doing all kinds of work.

It will give you the best of satisfaction, and make you more money than any shop equipment you can buy at anywhere near its price.

We sell the highest quality of welding supplies at reasonable prices.

Ask for Catalog.

ADMIRAL WELDING MACHINE COMPANY

1603 Locust Street, Kansas City, Missouri

From 2½ Days to 2½ Hours

James F. Reeves, a wagon shop builder of Philadelphia, gets out the frame work for an ordinary delivery body in 2½ hours with Parks Machines. This is a good 2½ days' work by the old methods of wagon building.

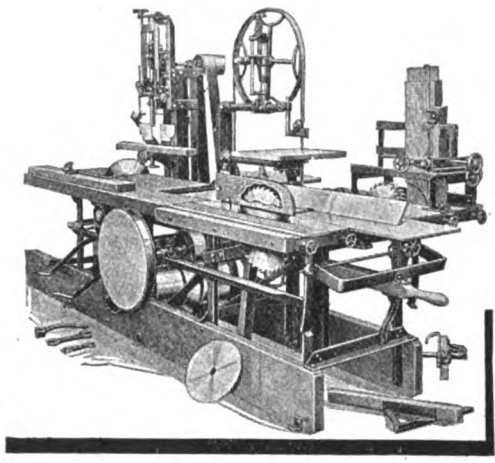
Mr. Reeves says he uses Parks machines for body work and that as time savers they can't be beat. In his opinion a Parks machine is much preferable to more expensive equipment because it takes half as much power to run them.

The price complete of the Parks Wagon Shop Special illustrated below is but $203. Don't buy a higher priced machine; it isn't necessary. This Parks will increase your production enough to quickly earn back its purchase price.

Try a Parks for 10 days free. See what it does and how well it works. Write for catalog giving full facts.

THE PARKS BALLBEARING MACHINE COMPANY

Northside Station, Cincinnati, Ohio



WAGON SHOP SPECIAL

A combination of Circular, Rip and Cross-Cut Saws; 22" Band Saw, 12" Jointer; Rim Rounder; Felloe Borer; Spoke Tenoner. All ready for instant use—no changing. One size—power 3-5 h.p.

PARKS Wood Working Machines

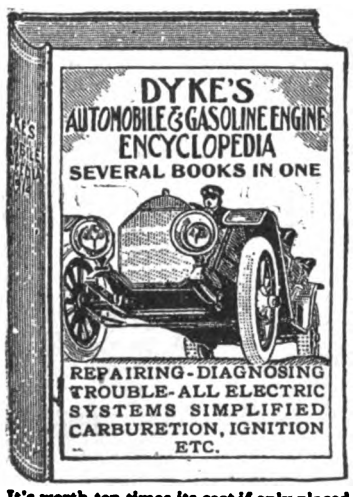
STAR STEEL SHAPES

PLOWSHARES LANDSIDE PLATES PLOW POINTS
LISTERSHARES LANDSIDE POINTS SEEDER POINTS
MOLDBOARDS SHOVEL POINTS SUBSOILERS
CULTIVATOR SHOVELS DRILL POINTS

Soft Center Solid Cast Crucible Steel

STAR MANUFACTURING CO., Carpentersville, Ill.

How to Become An Expert Automobile Mechanician



It's worth ten times its cost if only placed on the shelf and used as a reference.

Price, Cloth Bound

$5.46 prepaid

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion, ignition, and *storage battery* subject so thoroughly, you can adjust and repair any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical book on automobiles, originated the first auto supply business and manufactured and marketed the first blast feed carburetor in America.

DYKE'S AUTOMOBILE ENCYCLOPEDIA—TENTH EDITION

Is a non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 50 **Instructions**—Simplified and Practical.
3362 **Illustrations**—the kind you understand at a glance.
2 **Supplements**, part printed in two colors, treating on the construction, operation, repairing and adjusting of the **FORD** and **PACKARD**—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.
775 illustrations and 279 pages on **Electric Ignition, Electric Starters** and **Generators**, etc.
51 pages and 79 illustrations on the **Delco** system alone.
60 pages and 254 illustrations on **Adjustments, Tests**, etc., of leading **Electric Systems.**
154 pages and 1189 illustrations on **Repairing.**
Oxy-Acetylene welding. **Axle, Differential** and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.
27 pages and 180 illustrations on **Tires** and **Tire Repairing.**
44 pages and 119 illustrations on **Carburetion.**
89 pages and 291 illustrations on **Engines** and **Parts.**
16 pages on **Digest of Troubles.**
6000 lines to the **Index.** This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. **Index** begins on **colored** paper, easy to refer to.
Dictionary is also included, which gives the meaning of motoring terms.
Inserts: There are five—printed in colors. **New** features you never before saw or heard of in one of the inserts.

In addition to instructions on every detail of the automobile, from Repairing to Equipping a Shop and Starting into the Business. There are also instructions, fully illustrated, on TRUCKS, TRACTORS, MOTORCYCLES, AIRPLANES and LIBERTY ENGINE.

Address all orders to THE BLACKSMITH & WHEELWRIGHT, 73 Murray St., New York

$5.46 Prepaid **DYKE'S AUTO ENCYCLOPEDIA** $5.46 Prepaid

is a book of 956 pages — several books in one. It contains 3362 illustrations and 6200 lines of index.

It was used by our Government and sanctioned for use in Schools of Military Aeronautics in England, during the war.

It Will Teach You How to Become:

(1) An Automobile Repairman.
(2) Engine Expert; Testing and Overhauling.
(3) Electric Starter, Generator and Electric Wiring "Trouble Shooter."
(4) Ignition Expert.
(5) Tire Repair Expert.
(6) Storage Battery Expert.
(7) Carburetor Expert.
(8) Tractor Expert.
(9) Truck Expert.
(10) Automobile, Tractor and Truck Operator.

Some of the Subjects Added to This Edition:

(1) **Voltmeter and ammeter tests;** how to make all electric tests and how the meters are constructed and how used, including Ford tests.
(2) **How to test magnetos** and repair same, assembly and disassembly.
(3) **How to construct an electric testing outfit,** for starters, generators, magnetos, coils, horns, etc., and how to repair same.
(4) **How to make "cadmium tests" for storage batteries** and how to disassemble and repair batteries.
(5) **How to repair tires, how to vulcanize,** and proper equipment for starting into the tire repair business. All about "fabric" and "cord" tire construction and vulcanizing; difference between "sectional" and "wrapped tread" repairs, etc.
(6) **How to measure clearance of pistons, rings, etc.,** and how to disassemble and assemble engines and make repairs.
(7) **Specifications and prices** of 1919 cars.
(8) **Ford electric starting, generating** and lighting systems and a lot more, too numerous to mention.

Remember, all this new matter is in addition to the great mass of information as previously contained in this book, and everyone who purchased former editions of this book said it could not be improved.

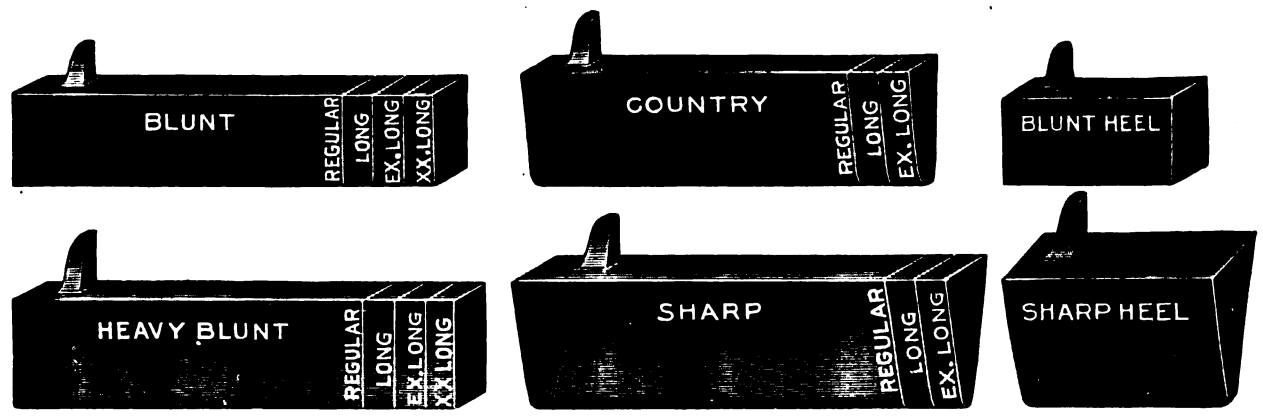
Digitized by Google

Announcement!

IN response to many requests which we have received for a toe and heel calk of the same high standard that we have maintained in the production of horse and mule shoes, we have recently added to our line

BANNER TOE and HEEL CALKS

Do us a favor by dropping us a postal for a calk sheet showing the full line of Banner Calks and the details of sizes in which they are made



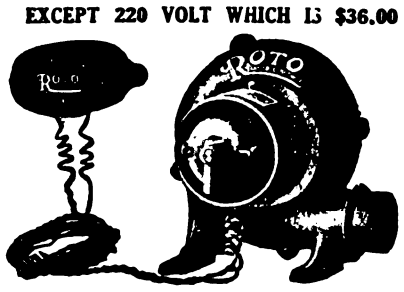
BRYDEN HORSE SHOE WORKS

Catasauqua, Pennsylvania

BRANDS { BOSS and BANNER HORSE and MULE SHOES
BANNER TOE and HEEL CALKS

The ROTO ELECTRIC BLOWER ONLY $35.00

EXCEPT 220 VOLT WHICH IS $36.00



One Dollar Cash Discount allowed if payment is received with Order.

SAVE TIME! SAVE MONEY!

Are you still blowing your forge by hand? Do you know this time is WASTED? Install a ROTO Electric Blower and SAVE this time. It is the greatest *time and labor saver* you can put in your shop. It will let you do *twice* the work, do it *better—quicker—cheaper*. You will then say, like hundreds of our customers,

I wouldn't sell my ROTO for $100.00 if I couldn't get another.

Buy direct and *save the middleman's profits* of $10 to $20. The ROTO is used in several departments of the U. S. Government. You can rely on it. Write for more information or, better yet, mail the coupon today and try this blower in your own shop. If not satisfied, send it back at our expense. That's fair isn't it?

Send the Coupon—Do it Now

THE ROSEWATER ELECTRIC CO.
5516 KINSMAN ROAD, CLEVELAND, OHIO

Send me by.....An AIR COOLED ROTO BLOWER with one year's guarantee, complete with cord, plug and Speed Regulator. I will return it to you at the end of 30 days, if it does not give me entire satisfaction, and if I keep it, I will pay you $35.00 for the 110 Volt, or $36.00 for the 220 Volt Blower at the end of 30 days.

Name.....Address.....

Current.....Voltage.....Cycles.....

Your Electric Light or Power Company Will Give You This Information.

H-B Tempering Process

BLACKSMITHS,—are you making a business of TEMPERING? It is a general fact that Tempering of Steel is a side issue with the Blacksmiths. Why not make it a business that will bring more MONEY and GREATER RESULTS.

WRITE FOR PARTICULARS.

A ready mixed sample will be sent on the receipt of $1.00 with directions how to use.

ORDER AT ONCE ***IT WILL CONVINCE***

Manufactured by the

H-B TEMPERING PROCESS CO.

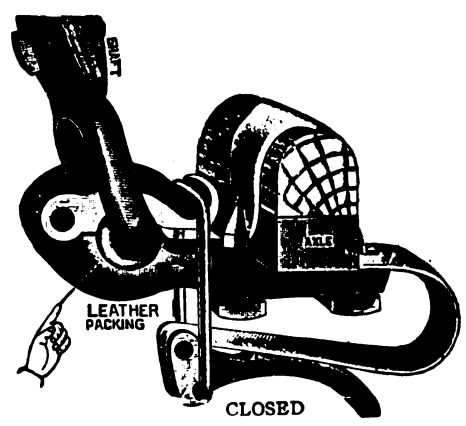
CLEARBROOK, MINN.

BRADLEY
Carriage Couplers

PERFECTLY SAFE

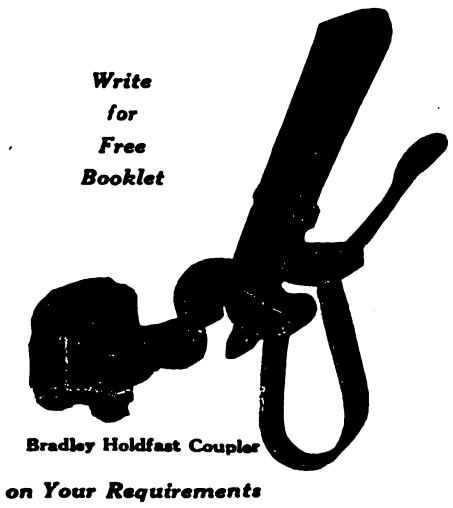
ALL STEEL

A Positive Anti-Rattler and Rapid Shifter



Bradley Ball Bearing Coupler

Write for Free Booklet



Bradley Holdfast Coupler

Used on a majority of the better known vehicles

Let Us Quote You on Your Requirements

C. C. BRADLEY & SON, Inc.

SYRACUSE, N. Y.

Digitized by Google



BOLTLESS AUTOMOBILE SPRINGS

Easy Riding - Guaranteed

Springs You Can Trust

Harvey Springs are specially designed for easy riding and great strength. They're boltless—no weak spot in them. And they're tempered exactly right, each leaf exactly the same by the patented Harvey process. Tested under such great force that no ordinary spring could endure it.

Harvey Springs mean protection to the dealer—and more sales. Many sales helps supplied. Harvey Spring Book lists over a thousand springs—for every make and model of passenger car or truck. A Harvey jobber, near you, can supply you promptly. Write for the Harvey Book.

Harvey Spring & Forging Co.
108 A-17th St. Racine, Wis.



Buffalo, N. Y.—A new Prest-O-Lite charging plant.

Convenient Producing Plants

The Backbone of Prest-O-Lite Service

NATION-WIDE Prest-O-Lite Service brings straight to the user's hands a single cylinder of highest-temperature gas — or hundreds of cylinders —

Such a Service must have a backbone strong enough to carry the tremendous load of national demand, flexible enough to meet the ever-changing needs of any one of an army of users.

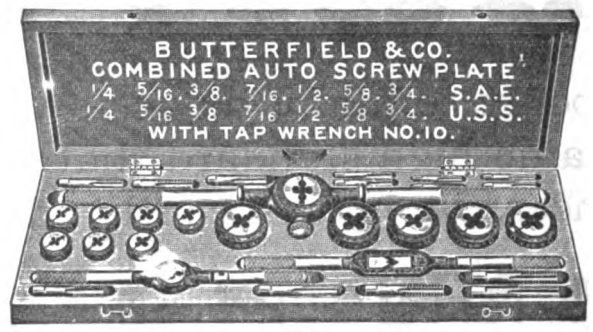
40 Plants and Warehouses Supply
PREST-O-LITE DISSOLVED ACETYLENE

Wherever you may be located, however large or small your requirements, there is an efficient Prest-O-Lite *producing* plant near — ready to serve you quickly and well.

The Prest-O-Lite Co., Inc., General Offices 30 East 42nd St., New York
Kohl Building, San Francisco
In Canada—Prest-O-Lite Co. of Canada, Limited, Toronto

131

Why Buy Two Sets When One Will Do?



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.
New York Store: 126 Chambers Street

THE HORSE RASP OF QUALITY



Ask Your Dealer for the *Improved*

HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, **"Slim," "Light," "Slim Light"** and **"Fine Cut."** Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial.

New catalogue mailed free on application.

HELLER BROTHERS CO., *Established in 1836,* Newark, N. J.

THE ARMSTRONG MFG. COMPANY

BRIDGEPORT CONN., U.S.A. **NEW YORK OFFICE 248 CANAL STREET**

like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



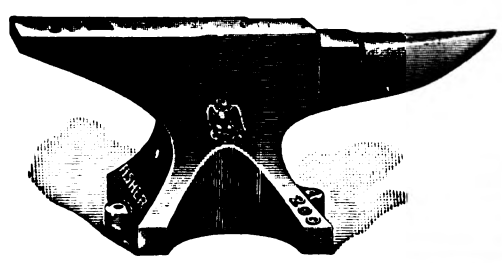
"Makers of the Genuine ARMSTRONG Stocks and Dies."

1843 EAGLE ANVILS 1919
AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE

Blacksmith and Wheelwright

Vol. ~~LXXIX. No. 11~~ 80[5] NEW YORK, NOVEMBER, 1919 TERMS: One Dollar Per Year

The Car Ambulance and the Patients

The Second of the "Sick Car" Series, Dealing With the Service Truck and Other Important Equipment

IN the last issue of this magazine, I likened the automobile to a person, and compared the garage with a hospital. The idea is not entirely new, for I know of a garage where a sign was posted, "Office hours from 9 A. M. to 9 A. M.," and another where the slogan is "If your car is sick, call us; our phone never goes to sleep."

In the "wee sma' hours" a phone call comes on the line "car disabled, three miles south of Wineville on the Beeville pike." Perhaps if the phone doesn't go to sleep— it gets drowsy and the garageman loses the rest of the message. Like a doctor or a surgeon he doesn't have time to ask for details— he drops the phone and "hustles" for his ambulance and to the rescue.

Away out in the country there is a patient for him; a patient who may be suffering from a broken steering knuckle or a dislocated wheel. A sick car that has been starved nearly to death by lack of oil, or burned by lack of water.

It would never do for the repairman to visit the "patient" prepared only to change a tire or scrape in a bearing; if the sick car were suffering from another "complaint." Like a doctor, the repairman must be prepared to meet every contingency; he hust be prepared to feed the car with gasoline or to take it to his hospital in the ambulance. If the "patient" is able to walk or limp home the garageman must be prepared to give it the necessary assistance in the nature of a tow.

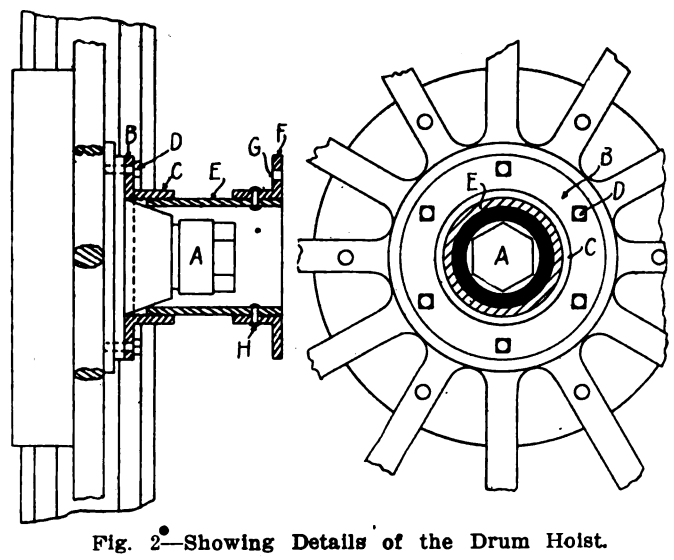


Fig. 2—Showing Details of the Drum Hoist.

The Car Ambulance

The service truck must be an ambulance in every sense of the word. In the "car ambulance" must be carried every possible repair tool, and room must be provided for certain supplies. The ambulance must be so arranged that it is a veritable "traveling garage," else it is almost worthless.

A garageman may build up a reputation upon his service and once his patrons feel that he can be depended upon for every emergency his mechanics may be pretty sure that they hold permanent jobs. I once lived in a small country town where there was one garage. The man in charge of this garage was an excellant mechanic—a man who had "lived with" the automobile since 1901 and who knew these machines from engine to differential.

This garageman did a thriving business and depended mainly upon transients and tourists for his trade. There was one big trouble with this man, however, he was very independent. He had work enough in his shop and seldom obliged autoists by road or service trips. If an unfortunate traveler was forced to leave his machine on the road—no prayers would influence the garageman to tow it in and "wished to be" customer had to "fall back" upon the lowly equus domesticus for motive power.

This sort of treatment began to work adversely for the garageman, and when a rival opened a garage in the same town, our first hero met his Waterloo and shortly thereafter closed his doors.

The rival repairman was dependable and tried to be just as obliging at two o'clock A. M. as at two o'clock P. M. At first, he too had to call upon the horse for towing, but unlike the first garageman, he furnished the horse. He did not expect the autoist to bring all of the work to his doors, but went out after it if necessary. This sort of treatment brought its reward and soon he gained a state-wide reputation for obligingness and ingenuity. He it was who hit upon the slogan of "Call my by phone at night or day— if you can't come here, I'll come your way," and it was this garageman that built the first "car ambulance" that I ever saw.

This ambulance was, and is, a marvel of ingenuity. With it about every sort of road work can be done. I have seen a car lifted from beneath a 40-foot embankment and I have seen the ambulance carry a 90 per cent. wrecked Packard car to the "hospital."

The ambulance was large enough to accommodate a fully assembled car, and whether the machine stood on its "four feet" or was a total wreck it could be taken care of by the ambulance. I well remember the time when an "Elizabeth car" often disrespectfully spoken of as a "tin lizzie") disputed the right of way with a freight engine at a grade crossing.

A Badly Injured Patient

Elizabeth was badly injured, was, in fact, entirely broken up. She lay at the side of the road a total wreck, except for one wheel and the steering gear. An ordinary "Car Surgeon" would have thrown up his hands in despair at the suggestion of getting her to the hospital; yet our friend with his "Ambulance" loaded her into the machine in just 15 minutes after his arrival upon the scene.

This quick work was only made possible by the fact that the garageman had a suitable car ambulance. I will wager to say, that had Elizabeth fallen over a cliff, or anything short of a mountain, her remains could have been picked up and loaded into the ambulance in very short order, as this ambulance or service truck was such an excellent device. In this relation I will endeavor to give a complete description to cover the essential features. For want of a better name I will call he garageman Hagan, simply because this does not happen to be the name under which he is known. In order not to show any favoritism I will forget to mention the name of the truck, which Mr. Hagan purchased originally. As a matter of fact, any two-ton truck chassis may be used, provided the body is made as shown in our drawing.

How the Ambulance Was Constructed

In the first place, the front driver's seat was moved as closely to the wheels and controls as possible, and the cab for the driver constructed of plain boards, having two panels and one window inserted.

The body proper begins just back of the driver's seat and is constructed upon cross mem-

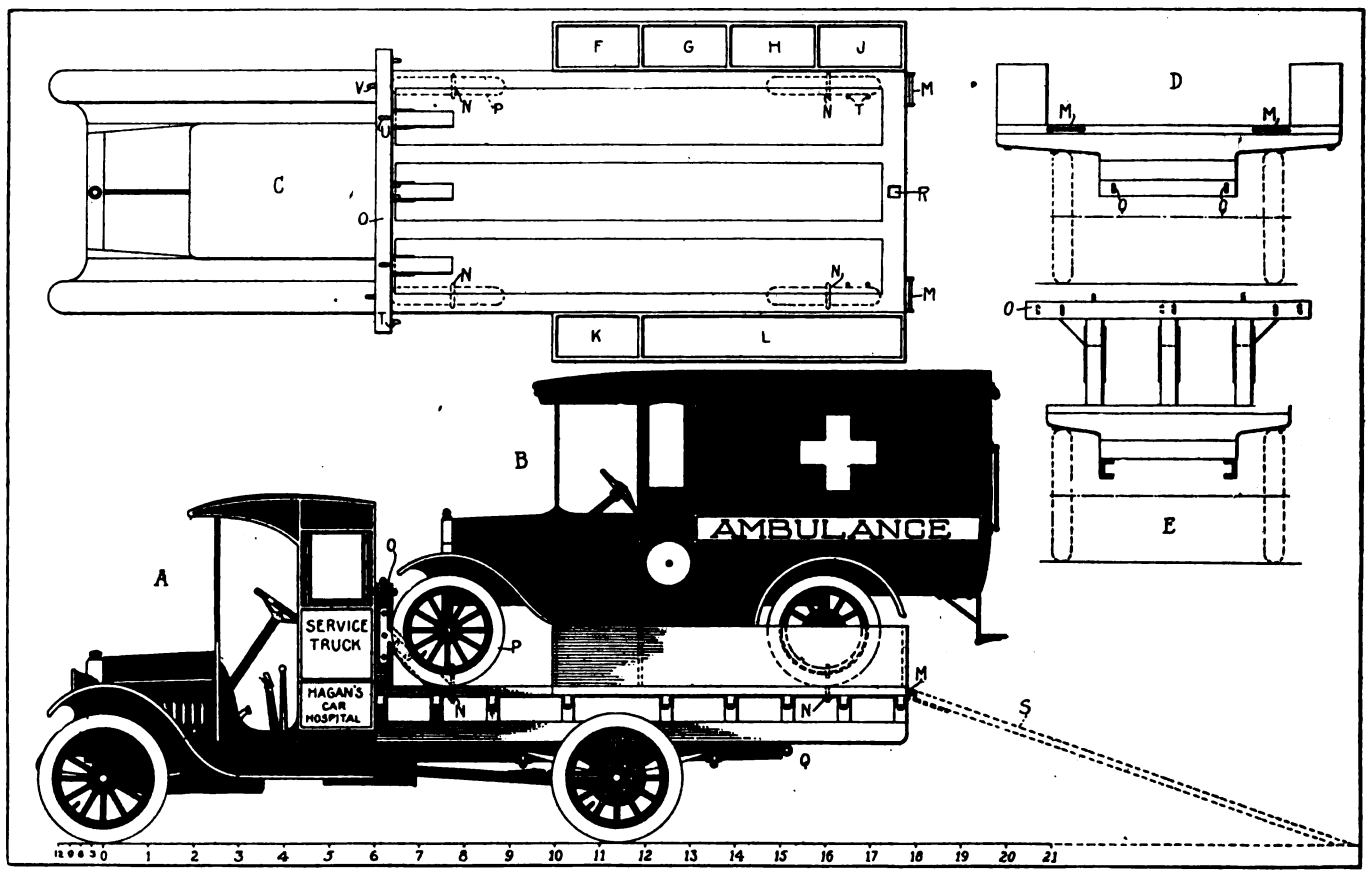


Fig. 1—Details of the "Car Ambulance" or Service Truck, Showing How a Ford Car Could be carried in the Body of the Machine.

Digitized by Google

bers rather than lengthwise pieces, in all there were nine of these cross pieces. They should be made of two-inch thick oak planks and each fastened firmly to the chassis. Mortised into the lowest edge of these cross members are two lengthwise braces, which carry the last three cross braces, which cannot rest upon the frame.

The cross pieces are so arranged that their topstops come above the truck tires, as shown in sketches D. and E, Fig. 1, and upon them is

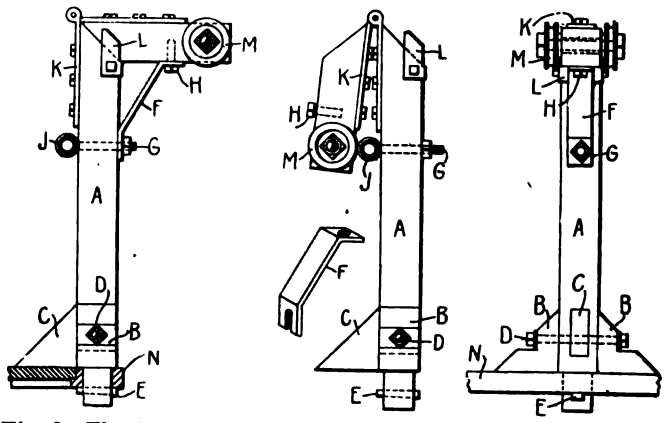


Fig. 3—The Portable Derrick and Its Con struction.

constructed the frame as shown in C. The total width of the frame inside dimension is 62 inches. The two sills at the sides are wide enough to permit the carrying of a standard car, as shown at B.

In the same sketch one will notice that the side boards begin just in front of the fourth cross brace and extend to the back. These sides serve to support the sectional tool boxes, as shown in C, at F, G, H. J. K and L. The depth of these sections may be anywhere from 12 to 15 inches, while the width need not be over one foot. In order to serve as a support for the tool boxes the widened body and the cross members beginning at the fourth from the front, are considerably wider, as shown at D, than are those nearer, and they are shown at E.

In reference to the sketch C, notice the hooks shown at N, which are shaped like the letter L, so arranged that they will fasten a car into place. At the rear of the body the arrangement is similar except that several holes, as shown at T, are provided for the hooks N. These different holes are arranged so that a longer wheel-based car may be locked into place. An important feature of the body is the front of the truck, a detail of which is shown at E in the various figures.

This dash board, if we may term it as such, is built of heavy oak timbers and re-enforced by three diagonal braces. At the top 4 x 4 joist is fastened in place, fittend with a number of eye-bolts, as shown on T, U, V.

At the rear of the body there are hinge fittings, shown at M, which consist of two braces with a bolt passed through them. Two long boards are provided, each with a hook at the end, so that they may be hooked over the members M, as shown at S, in diagram A, by the dotted lines. These boards serve as skids, up which to drag the "patient," and, when not in use, are carried in the body of the truck. A square hole R. is cut in the rear body brace, to carry the derrick, of which we will speak later.

The Drum Hoist Feature

The second feature of the device is shown in Figure 2, and consists of a miniature drum hoist, if we may be allowed to use this expression. In making this drum hoist, for each wheel, a heavy 3½ inch hydraulic pipe nipple is used; upon each end of it is fitted a floor flange. The whole devise is firmly fastened to the wheel by the same bolts which fasten the wheel hub in place.

Referring to sketch, Figure 2, C indicates the flange, which is bolted to the wheel by the bolts D. Into this flange C is screwed the nipple E and upon the nipple is screwed the flange F; F should be riveted or welded to the nipple so that the nipple and the flange form one piece. Through the flange should be bored a hole G, large enough to admit the insertion of a rope or cable. The flange C remains upon the wheels at all times, while the rest of the fittings may be carried in the tool box, until used. The flanges on the left have right hand threads, while those on the right hand side of the car should be fitted with left hand threads.

The Portable Derrick

The second important feature of the truck is shown in Fig. 3, and we will term it a portable derrick. At the left is shown the open derrick, from the side, in the middle the derrick is shown with the arm folded back, so that it may be carried in the tool box and at the right is shown the front view. The member A is made of oak and measures 4 inches square. Its height should be at least 36 inches. At the bottom is cut a small shoulder so that it may be fitted into the square hole at the back of the truck, shown at R in Fig. 1. The end ofthis projection has a square hole cut through it to permit the insertion of a wedge E.

The diagram at the left in Fig. 3 shows how the derrick looks when in place. N shows the cross section of the floor bolts of the truck. The standard of the derrick should be strongly re-enforced by two braces at the sides, B, held in place by the bold D and a single brace at the back C. The swinging arm is mounted upon a large, heavy hinge, K, and held in place at each side by straight iron pieces, L. The eye bolt J, extends 1½ inches beyond the upright, while lagscrew H is screwed into the derrick arm.

A brace, F, of heavy iron is fitted with a hole at the top into which H fits and a slot at the bottom which fits over the eye bolt G. Two wheels, M, are provided upon each side of the cross arm and may be mounted upon a piece of hydraulic pipe, held in place by a long bolt. In order that we may understand thoroughly how these various fittings are utilized let us refer to Fig. 4, which gives a diagram of the rope fittings, eye bolts, and derrick. A and F. represent the wheel hub or drum hoists, shown in Fig. 2, the derrick is shown in the center at V.

The derrick pulleys at G and H and the cross member back of the driver's seat indicated by the dotted lines. In this case arrangements have been made to lift the car from beneath a straight drop. We will assume that the truck has been backed up a precipice as near as possible an dthat the back of the truck with the derrick extends over the precipice.

Lifting a Patient Bodily

The two eye bolts V, shown in Fig. 1, are lettered L and R in Fig. 4, and are connected by length of cable to telegraph posts or pins driven in the ground ahead of the truck, as shown at J and K. These two cables serve as braces to prevent the truck from being carried over the precipice. Four blocks, B, C, D and E, are hooked into the eye bolts back in the driver's seat, while the derrick is fastened to the eye bolts N and Q by the two cables No. 3, fastened to the derrick at T. Cables No. 2 are each fastened to the wrecked car brought up through the derrick wheels G and H, through the blocks B, C, D and E, thence backwards to the wheel drums A and F.

The back of the truck is then jacked up from the ground and the engine started winding the cables, thus lifting the disabled car to the road level once more. As soon as the disabled car has been lifted high enough so that it can be fastened to the back of the truck, through the eye bolts shown at Q in Fig. 1 the truck wheels are put back upon the ground once more and the truck moved ahead.

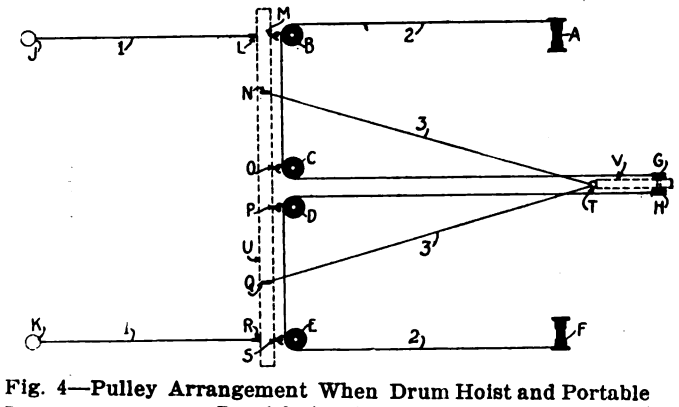


Fig. 4—Pulley Arrangement When Drum Hoist and Portable Derrick Are in Use.

No ambulance is complete unless it carries with it one or more "crutches." If a car is disabled and should happen to lose one of its wheels it may be just as helpless as a man who has lost one of his feet. If the man is given a crutch he can usually get along, while the same thing is true in the case of the wrecked automobile.

The Patient's Crutch

The automobile crutch is illustrated in Fig. 5. The body, or main part of the motor crutch, B, is made up of three planks side by side, these planks are bored through at the bottom and fitted with roller bearings and sleeves, as shown at K. Most any sort of roller bearing will do, for it is not necessary to have a tight fit; most any second-hand bearing will answer the purpose just as well as a new one. The heavy pipe or iron tube is slipped through the bearing and upon it are mounted the two iron wheels F. These iron wheels are held in place by nuts M and cotter pins O. The bearings are retained by a flange, J. As a towing bar a piece of strap iron, E, is used; this strap iron is given a half twist at H, and when in place, is fastened to the back of the motor ambulance, or sometimes to the car itself.

Three holes shown at G are fitted with bolts so that the length of E may be altered to fit the occasion. To fasten the crutch in place two U-shaped bolts, C, are placed on top of the device. In Fig. 5 is shown a cross section of the "patient's" axle, A. D shows the iron strap used in connection with the U-shaped bolts to hold the axle tightly in the crutch.

For a complete equipment two "crutches" should be carried together with plenty of strong rope or cable. The small ordinary repair tools are carried in the compartments F, G, H and J, shown in Fig. 1; the larger tools together with the "crutches" and portable derrick in the compartment L, while the compartment K is fitted

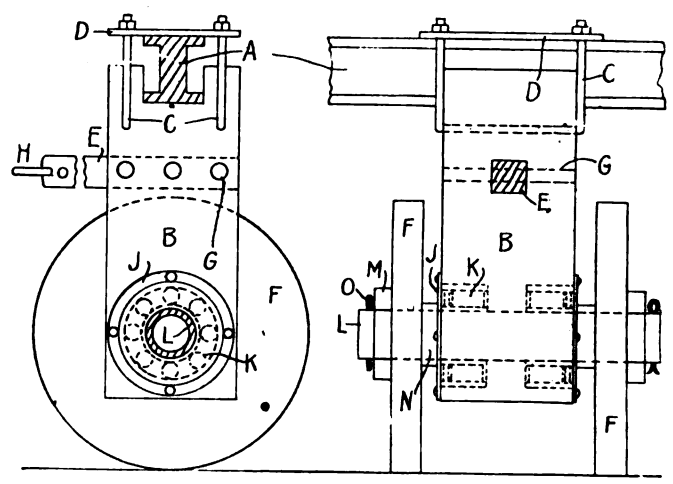


Fig. 5—Details of the Crutch.

with a gasoline tank large enough to take five gallons of fuel.

Of course there is no need for me to describe the regular equipment of small tools carried. There is one point which should be mentioned, however. Hagan never allowed anyone of his mechanics to "borrow" any of the tools from the ambulance, and he adhered to the rule himself. He realized that he owed his business to his reputation for quick service and he let nothing interfere with this reputation. A new helper or green mechanic might have taken a wrench or hammer from the ambulance once—but never twice. Then penalty for breaking the rule was instant dismissal. Hagan paid his men a good salary, was fair and honest, and men liked to work for him.

Hagan was sympathetic with his customers and I think much of his reputation was due to the fact that he was so anxious to help and prescribe for his "patients." Like a surgeon or doctor he seemed to take pleasure in doing good and repairing wrecked cars.

Our readers will recall that the reverse gear position of a Dodge car is in the same location as the second speed position of the change gear leaver of the Hudson. The driver had hurriedly changed his gears one day and backed the car over a ten foot wall. Luckily the driver escaped but the car was a total wreck.

It had landed upon its rear wheels and had turned completely over. I reached the scene about ten minutes after Hagan and found him, literally with tears in his eyes. "And to think," said he, "an hour ago that was a new machine, now it's nothing but junk." Hagan did his best, but the machine never regained its health again.

Digitized by Google

One-Man Power Barrows

A Few Ideas Which the Smith Should Be Able to Turn Into Money

By F. L. ALLEN

IT IS an undisputed fact that Nature is the wisest designer. As one notices her handiwork one is impressed by the scientific foundation of design. Note the trees, which often contain many tons of fruit, leaves and branches, subjected to high winds or river inundations. These trees carry enormous weights in proportion to their trunk area, yet stand for many years

One could quote such facts for many pages, yet not exhaust the field. Nature's secret, if such it may be termed, lies in system and unity. Occasionally she makes mistakes, but her errors are few and far between and never so crude as those made by man.

Nature's works are all, or nearly all, symmetrical. By this I mean to say that all parts are well balanced. Investigation would show that practically every growing thing, or nearly every mineral product fits into a certain scheme.

All of us may learn much from Nature and her works, for her laws are the laws of the universe. There is just one example that illustrates best a point which I wish to make in this article, that of the tree. The branches of a tree usually grow at an angle from the trunk which causes them to slant upward. One seldom finds a right angle or downward slant, except when the branches are loaded with fruit.

In practically every case, the weight of the limbs is carried by the trunk at its center, there is no side strain. When trees are grown in the open, they are symmetrical. The weight of the limbs on one side is equal, or nearly so, to the weight of those on the other. A tree might be cut off squarely with the ground and would then balance upon its trunk. This would show that the limbs all rested upon the center of gravity of the trunk.

In carrying burdens, the European peasant follows out the same scheme by supporting the weight upon his head. When he does this, there is no side strain and he can support the maximum weight possible. A person, unused to burden carrying, supports the bundle in his arms and consequently strains every muscle in his body in order to equalize the weight. Obviously the direct support admits of a greater weight carrying capacity.

I have said this much to support my argument that the American manufacturer of wheelbarrows has heretofore ignored all of Nature's laws and has designed his barrows with ancient practices, rather than physical laws, for an up-to-date wheelbarrow is so made that the weight is only partially supported by the wheel. It is the intention of this article to show the reader not only how a barrow should be designed, but to give suggestions as to barrow and cart inovations.

A wheelbarrow or hand cart should be made in such a way that it will carry a large proportion of the load in itself and not pass it along to the person guiding it. If it will carry all of the load, then it is of much greater utility.

There is a big field for the wheelbarrow and the blacksmith is the man best equipped to develop it, for he alone knows the farmer's requirements. During the slack seasons of the year, the smith needs a side line to tide him over. Large wagons or carriages call for a considerable investment of both capital and time and the smith is not always assured of a quick turnover of his money in this line.

Requirements of the farmers vary and the smith should study his field before he starts to work. If he does this, he is assured of patronage, while if he makes only stock designs, then he meets the competition of the large manufacturers.

Before constructing the cart or barrow, the smith should cut a model from heavy cardboard, making it to scale, and see if his design is correct. If, when the handles are lifted to the carrying height, the load comes over the center of the wheel, or ahead of it, the design is excellent.

If the weight falls back of the wheel center, a portion of it must be supported by the person guiding it. The nearer the load is to the center, the better the design of the barrow as regards the amount of material that can be carried.

The artist has made six suggestions for barrows and hand carts and in every case the above rules have been kept in mind. The barrow shown at B, in the sketch, is fitted with extra long handles, and when filled with dirt or crushed stone and lifted to the carrying position, only about one-third of the weight is carried by the worker.

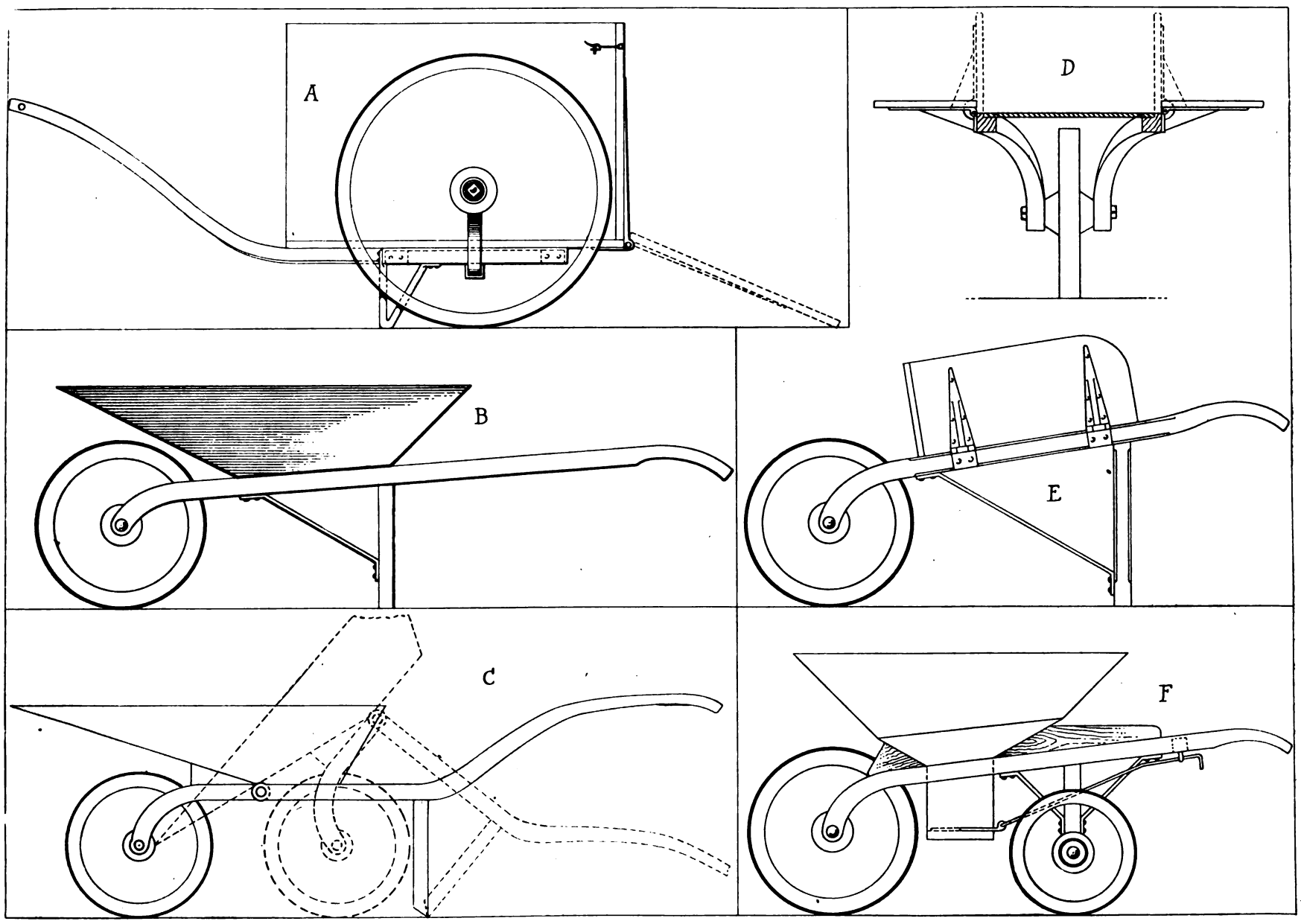
The design shown at C is worthy of consideration for this type of barrow can be used for carrying materials such as concrete or lime and the contents dumped, with practically no effort, at any place desired. The operator simply puts his weight upon the handles and the load dumps itself. While the load is being carried, the weight is practically over the center of the wheel.

Both D and E are of the same construction in that the side boards, instead of being removable, are mounted on hinges in such a way that when they are open a wide flat platform is formed. The difference between the two, is the body mounting. D is mounted practically over the center of the wheel, while E is farther back, on the handles.

At this point, perhaps it is well to consider another phase of construction. We have found that it is advisable to carry the load as near the center of the wheel as possible, but this means that the load must be elevated above the outer rim. If the load is a high one, then there is danger that the whole device will tip over easily for it will be "top heavy."

This is just where it is well for the smith to know his field. If the farmer wishes a barrow for carting fence posts or similar things, then he can safely design it with the body over the wheel as shown at D. If however the purchaser, a florist and landscape gardner for instance, wishes to use the barrow for moving shrubs and trees, then D would not be practical and E would answer the purpose.

Oftentimes a hand cart is of greater utility than a wheel barrow. The one shown in sketch F has a variety of uses, spreading lime or fertilizer, for instance, or it may be used for carting cement and gravel. With a little change in



Digitized by Google

design the body of this cart may be fitted with a special let-off attachment in place of the sliding gate at the bottom, then it can be used for planting potatoes or even corn.

Personally, I can see no reason why the smith cannot design special planting attachments of this sort. A corn planter for instance would be an easy attachment to make for the barrow shown in sketch F.

In making such an attachment, the lower gate might be punched with three or four small holes and in such a way that the holes would register with the same number of holes in the bottom of the chute. Corn would then fall into the holes but could not fall to the ground because of a second partition below the gate.

The lower partition would extend far enough back so as to cover the holes, but as the gate is pulled backward it would cover the top holes and the corn would then drop from the holes in the gate to the ground. The size and number of holes would determine the number of kernels which would be delivered.

For general all-around farm work, the cart shown at F is doubtless the most practical for it can be used to advantage throughout the year. Just how useful the device can be made, depends entirely upon the ingenuity of the smith who may make several accessories for it depending upon the demands of the farmer.

The cart shown at A can be made for less money than that shown at F, but in its way has just as large a field for usefulness. The road clearance of A need only be from ten to twelve inches for it will be used mostly for carrying milk cans or similar things from the barn to the milk room or house or between barns.

The smith should fit the cart with a large roomy box but bolt the box to the frame in such a way that it can be removed at a moment's notice. The frame is triangular in shape and fitted with a single leg at the front. The axle should be "underslung" as shown for by this means the center of gravity is lowered and it will not tip over, even if the load happens to be tall and heavy at the top.

With the box removed, the frame can be used for carting barrels or kegs. If the frame is provided with a floor, then it can be used for moving rocks and stumps.

A so called "custom built" wheelbarrow or hand cart is worth more money to the farmer than a stock design. The smith or wheelwright will find that he can pick up considerable money in this line for he can give the farmer just what is wanted. He makes the device to fit the wants of his customer and what is more, the device fits the customer himself as regards handle lengths and height of legs.

In closing, let me remark that the smith should understand that his product should fall out of the wheelbarrow or hand cart class and become a "general utility device" practical for hundreds of uses, rather than limited to just one or two.

HEARD AT THE C. B. N. A. CONVENTION

Mr. Charles E. Adams, of the Cleveland Hardware Co. of Cleveland, Ohio, is a modest man. He made a very interesting address regarding the steel situation at the meeting of the C. B. N. A., and prefaced his remarks by a story which will surely bear reepating.

He drew attention to the fact that the president, in introducing him, had said some good things about him, and went on, "The remains of a deceased brother were in an open coffin up in the front part of the church, and the minister was preaching a sermon about him; saying all those fine things that they always tell about a man after he is gone—what a wonderful man he had been in the community, how he was at the head of every great philanthropic undertaking in the town; he was this and he was that—in fact, he was the great man in the town in every way.

"While the minister was extolling the many virtues of the deceased, there was a gentleman away in the back part of the church who quietly got up out of his pew, silently tip-toed up front, gazed searchingly in the casket and then tiptoed back and sat down. Some one sitting next to him whispered, 'What did you do that for?' He said: 'Well you know I thought they were burying the wrong man!'"

Now here's where Mr. Adams' modesty comes in for he continued. "And I have been wondering whether that was not my case, because I confess to you that I think I will have a pretty big job justifying what Mr. Ahlbrand (the president) says I have done for you in years gone by."

From Wagons to Trailers

By JAMES F. HOBART

IN THE wilderness, when a body of men or horses is making its approach, a listener, at a considerable distance, may detect them by placing his ear to the ground. The blacksmith of to-day is in the position of the man who is being approached and like that man, it is up to the smith to listen well, and then act.

The smith who listens, will be informed that the motor truck is cutting into the horse-work which has heretofore been his livelihood. If he heeds he will find that it is right "up to" him, to turn around and make something out of the trucks which are replacing the horses to such an extent.

Sometime ago, the writer saw a fine example of how a smith got in his work in this direction. The smith was employed by a lumber company to do the shoeing, wagon repairing and similar work. One day, the company placed an auto truck upon the grounds on trial. Later, several trucks were purchased and nearly all the horses sold.

The blacksmith thought the matter all over, from every possible angle, and saw that shoeing, on that job, was gone for good for he knew from the work they were doing, that the auto trucks had come to stay. But this Smith was not narrow-minded. He considered that there should be as much work around half a-dozen motor trucks as around a score or more of horses, and time showed that the smith was right, for he is still on the job, but is doing a slightly different class of work now, and work which he figures is a good deal better than shoeing horses.

As soon as the first truck had been turned loose in the yard, the smith started in to convert the forty or fifty wagons into trailers for the auto trucks. He converted two or three of the vehicles in a very simple manner as shown by Fig 1, and the scheme worked so well that the smith kept on converting wagons into trailers and the company kept on adding motor trucks so that at the time of the writer's visit, there were but two horses left around the mill and nearly all the hauling and delivery within ten miles was done by auto trucks and trailers.

It was considered wise to so convert the wagons that they could at any time be used either as trailers or as horse-drawn vehicles. For that reason the smith could not make any radical changes in the wagons and had to be content with making additions for trailer use, said additions being of such nature that they would not interfere with using the vehicles as horse-drawn wagons as well.

The Converting Mechanism

To do this, as shown by Fig. 1, the smith added a part to each wagon, added another part to each

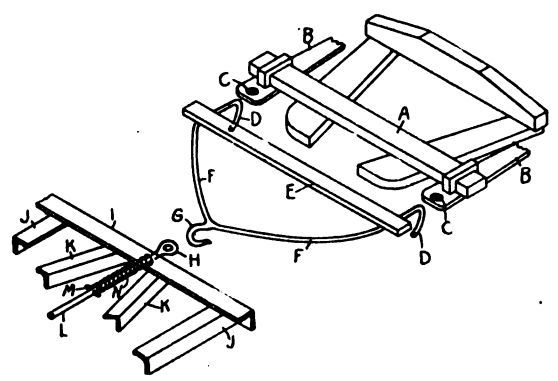


Fig. 1.

truck, and then made as many separate intermediate parts as there were trucks. When the three parts were hooked together, a wagon would be attached to a truck as a trailer. When it was desired to use a wagon with horses, the intermediate part would be detached from both wagon and from truck, the slip-pole placed again in position, with the result that the wagon was all ready for work with horses.

As shown by Fig. 1, a stout wooden bar was bolted on top of the bevel-jaws between which the slip-pole could be placed. This bar was well bolted, the fastenings not being shown in the illustration. Then a couple of stout eyes, C, C, were forged in the ends of two heavy bars, B, B, these bars being Z-bolted to bar A, also firmly attached to the forward axle of the wagon by connections not shown. These parts completed the work as far as the wagons were concerned, the bar A and irons B B and C C, remaining permanently attached to each wagon converted for trailer purposes.

An Intermediate Attachment

The smith then rigged up the apparatus shown at G, the two stout hooks D, D, being spaced at exactly the right distance apart so that they would easily enter holes C C. The spreader, E, was added to secure proper alignment of holes C C and hooks D D, and was securely bolted to the hook bar by means not shown in the illustration. The ends F F of the bars were brought together, welded, and formed into the stout hook G, which was so formed that when connected with the wagon, hook G would lie exactly central with holes C C.

This constitutes the intermediate piece, which was forged from 1 and ¼ inch round iron in bars F F, but the hooks D D were upset until they were about 1 and ½ inch in diameter, and hook G was formed from a 2 inch piece which was welded to the bars F F.

The attachment which was placed upon the truck, consists of the 3-inch angle bar I,

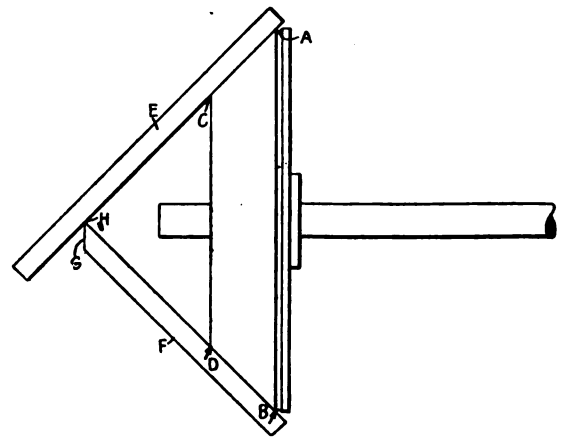


Fig. 2.

through which was placed the I-bolt H, about 1 and ½ inch in diameter, the shank of the bolt L, being slipped into a heavy coiled spring N. After a bit of experimenting, the smith found that this spring should be wound from ½ inch steel, as small as would pass over shank L, and about 14 inches of the spring allowed about the right "give" or "resilience" as an engineer would call it. The ⅝ inch pin M, served to fasten the eye-bolt in the spring.

The manner in which angle bar I was fastened to the rear of the truck, is not shown in the illustration; the smith simply rivited on four angles as shown at J J, K K, and thus made bar I fast to the rear of the truck where said bar remained all the time, no matter whether the truck was hauling a trailer or was carrying only a body load.

First Attachment Too Light

The first attachment, or rather "connection" which the smith made, as represented by E G, he formed from too light material, using only one inch black steel for the bars F F, and making the hooks D D the same size, while hook G was made 1¼ inch. This connector did not stand the strains of use for a very long time; the bars F F straightened out, the hooks were pulled out of shape and gave trouble by unhooking whenever a heavy pull came upon them. After the smith had made up some connectors from the heavier steel, as described above, no more trouble was experienced from the vehicles pulling apart under load.

But one thing the smith had to learn from experience, and that was, to so shape hook G that it could in no possible manner jump out of hole H when the vehicles passed over rough places in road or yard. The smith was troubled a bit in this manner but finally overcame the trouble by making hook G with a long and peculiarly curved "tail" to the hook. It was forged in such a manner that hooks D D must be allowed almost to the ground in order to make hook G enter hole H.

Then that hook could never jump out because of its being unable to swing near enough to the ground while hooks D D were fast to the trailer.

Digitized by Google

In like manner, the smith found it necessary to make hooks D D long and curved to a radius measured from G. Then, hooks D D could be readily raised after G had been put into H, and hooks D D would fall readily into holes C C, the radius curvature permitting several inches of hook length, so that there would be no danger of these hooks jumping out of their holes during a pull.

Another advantage was gained by the form of connector used, although the smith did not realize the fact until sometime afterwards. He then found that the connection had a three-point bearing in the three hooks D D G, thereby permitting unlimited side and vertical movement of both truck and trailer, and any amount of twisting movement between the two vehicles. He further discovered that, while the trailer thus connected did not "track" exactly with the motor truck, it *did* track closely enough to permit all yard and road movements ever found necessary.

A "Pick-Up" Motor Truck

The smith above noted was working in a saw mill located in one of the southern states, where they cut lumber by the million feet. As the boards and other stuff came from the sorting table, it was pushed by negroes upon the wagons described above and when a wagon had been filled, one of the trucks would hitch to the wagon

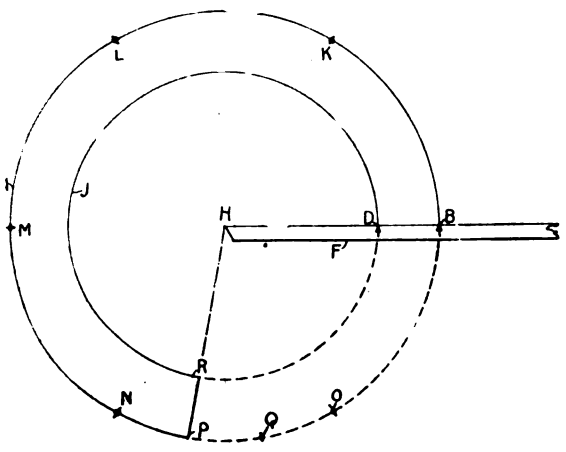


Fig. 3.

and haul it to the yard or to a loading track where the wagon would be unloaded in due time by one of the yard gangs, either directly upon a railroad car, or to be "stuck-out" upon one of the yard piles. This short description shows why the smith had forty or fifty wagons to care for. It required a considerable number of vehicles to have a dozen or more standing at the sorting table all of the time, with as many more standing in the yard or at railroad loading tracks, and several more wagons being drawn to and from the loading table.

An "Up-Stairs" Motor Truck

One day the management tried out a very queer looking vehicle and later, handed it over to the smith to be kept in good order. As the smith once described the queer contraption, it was "A motor truck, built up-stairs with an elevator just inside of each of its four wheels." The "works" of that motor truck were located about five feet from the ground, leaving a vacant space between the wheels of the truck, and under its "up-stairs" body.

The above described contraption was found to do the work of three or four motor trucks and about a score of wagons. The manner of its working was as follows:

A little foundation was prepared at each place along the sorting table where lumber was to be pushed off for the wagons. Upon this foundation —two foundations really, about ten feet apart, —were placed scantlings, one on each foundation and so placed as to overhang the end of each foundation.

Then the lumber was piled carefully and smoothly upon the two scantlings until 1000 to 1500 feet had been arranged thereupon. When the driver of the "up-stairs motor truck" saw a pile of boards on one of the little foundations, he would square off his truck at the pile and run the truck back over the pile of boards and stop exactly with the foot of each of the four elevators directly underneath an end of the two scantlings. Then, power would be turned into the four elevators, the pile of boards lifted, and away would go the truck, pile of boards and all, to lower the lumber close beside a piling foundation, or beside a railroad car as required. The smith found this "beast" a very interesting machine to take care of and he mentioned that he had "rather do that kind of work than to shoe horses and mules."

Cutting Cone Leathers

While the writer was talking with this smith, the latter was busy laying out and cutting a new leather face for a cone clutch. The manner in which he laid out the proper shape for the leather was so very simple that I sketched it while the smith wasn't looking—wouldn't have cared if he had been looking, only I find it sort of worries some men to draw pictures of the work they are doing. So I sketched it "on the sly" and here it is in Fig 2.

After stripping the cone, the smith mounted up two little strips of wood, tested them with his eye to see that they were straight, then placed the sticks against the face of the cone as shown at E and F, Fig. 2. He made sure that the sticks were exactly opposite each other upon the cone, then he brought stick F to exactly touch E at H. The end of stick F had been bevelled as shown at G in order that the "heel" of F might not touch before the "toe" came in contact with stick E.

After he made sure that stick F was in proper position, it was held securely against the face of the cone, stick E was released and two pencil marks made on stick F, as shown at B and D respectively. This completed the measuring, and the lengths H D and H B, were all that the smith required.

Laying Out the Facing

The stick F was laid flat on the bench, a pair of dividers opened until one leg touched point H, the other leg, point B, then a circle was described as shown by Fig. 3, at B I. Then the dividers were partly closed and another circle drawn with the distance H D as radius. This circle is shown by D J, and the space between these two circles contained the width of facing required for the cone.

But one thing remained to be determined, and that was the length of the facing. It is evident that the entire circle, or the area between the two circles would not be required. The smith determined the length required in a pretty "slick" manner. He measured the diameter of the clutch cone, A B, Fig. 2, and found it to be almost exactly 13 inches. Then he measured the diameter of the facing circle, Fig. 3, and found it to be almost 18 inches from B to I. The smith then figured the diameter of the cone is 13 and the diameter of the lay-out is 18. "Therefore I want 13/18ths of the length of that circle for the cone facing."

He might have calculated the circumference of both, and laid off a number of degrees on circle B I to correspond with 13/18ths thereof, but the smith lost no time in that direction. He simply set the dividers back to radius H B, then stepped around the larger circle, making marks at K, L, M and O. The smith knew that this divided the circle into six equal parts, and if he took four of these parts around from B to N. he would have 12/18ths of the circle's circumference. But he wanted 13/18ths, so he divided space N O into three equal parts as at P Q. He added one of these spaces, then from point P, he drew a line P R, straight toward center H, and the area P R, I J, B D, was the pattern of the facing required for the 13-inch cone shown by Fig. 2. That smith sure was a "slick" duck.

A HORSE THAT INTERFERES

From H. L. Berry, Kansas.—I want to take advantage of your question department and obtain advice from some of my brother readers. I often have to shoe a horse that interferes on his front feet.

This horse stands just a little toeing out on his front feet. He hits his ankles on the front feet. His hoofs are in good condition and seem to be natural and level. I have shod him many different ways but with no good results.

I always shoe the horse with toe and heeled shoes. I shod him first with light shoes; then with heavy ones; then with the inside heel of the shoe turned to the inside; then with the inside of the hoof pared lower than the outside; next with a three-quarter shoe on the inside; then with a shoe which angled the toe from the outside to the inside of the shoe; yet none of the methods gave any satisfaction, he kept cutting his ankles.

The horse belongs to a rural letter carrier and travels about 26 miles each day. The roads are both dirt and paved and the horse goes over about an equal distance on each kind.

Will some one of my brother readers tell me how to shoe this horse with toed and heeled shoes, so that he will not interefere? I would also like to know how the horse may be shod with flat shoes to keep him from cutting the ankles of his front feet.

CAR OR WAGON LIFT

From E. C. Hall, New Jersey.—I am giving you ideas for an automobile or wagon lift or jack which may be of interest to the other readers. It is of simple construction and quick acting. It is made from a piece of timber three by eight inches and of such length that when it is placed under the axle of the car, the wheel will just clear the ground. The block is shown in place in figure one.

At the back of each block should be cut a bevel as shown at D. Where these blocks are to be used around the shop, two of them should be provided, one for each front wheel and they may be joined together by a cross piece F.

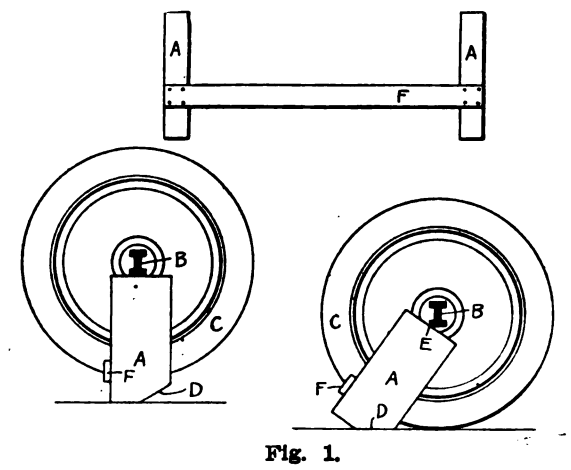


Fig. 1.

Figure one shows how they are put into place beneath the axle so that when the car is pushed forward it will rock over the bevel and when the blocks are on end the car will be supported froee from the ground.

The distance between the blocks should be about 18 inches, then they can be placed beneath the axle between the springs. Figure2 shows a handy support for the rear axle. This block is about ten inches wide and six inches thick. Two of these blocks are used for the rear of the car in the same manner as the block shown in figure 1. They can be fastened together, or better still, a board B can be placed beneath the notch cut in the top, where there is a differential in the car, the board B must be cut out slightly to meet the bulge in the axle.

In order to put the car in place, it is necessary to have some sort of a level such as is shown at C. If the handle is long enough and the lift designed correctly, it is an easy matter to remove the car from the ground with it. When all of the blocks are to be used and the whole car is to be raised from the ground, the front lift is put in front of the car as shown in figure 1 and the car is then pushed forward until the front of it is off the ground, then the blocks shown in figure

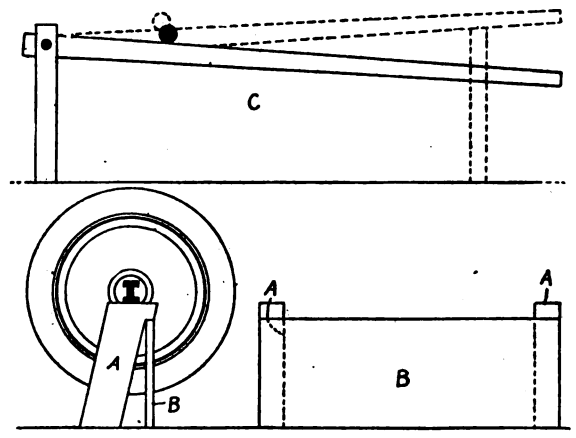


Fig. 2.

2 are put in place, and the rear lifted by means of the lever C.

The back support B prevents the car from slipping backward from the blocks. In order to remove the car from the mounts, all that is necessary is to remove the brace B and give the car a push backward.

Digitized by Google

BLACKSMITH & WHEELWRIGHT

The Pioneer Journal of Its Class in the World.

Member of the Audit Bureau of Circulations.

PUBLISHED MONTHLY BY

M. T. RICHARDSON COMPANY,

71-73 MURRAY STREET, NEW YORK.

POST OFFICE BOX, 654. TELEPHONE—7377-7378 Barclay.

CHICAGO OFFICE, Garland Building, 58 East Washington St.

Entered as second-class matter at the Post Office in New York City.

M. T. RICHARDSON, President and Treasurer
F. R. WHITTEN, Secretary
M. T. RICHARDSON, Editor
FRANK L. AVERY, Managing Editor

F. R. WHITTEN, Advertising Manager
H. F. LUDINGTON, Western Representative
HOWARD COBURN, Ohio, Western N. Y. and Western, Pa.
GEO. A. SMITH, Eastern Representative
FRANKLIN MYERS, Art and Copy Dept.

FOREIGN AGENTS:

NEW ZEALAND
MR. R. HILL, Matlock House, Davenport, Auckland, New Zealand.

GREAT BRITAIN
ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance.....$1.00
One Copy, six months, in advance.....60 cents
Single Number.....10 cents
Canadian subscriptions.....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English Money.

Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

ADVERTISING RATES SUPPLIED ON APPLICATION.

SPECIAL NOTICE

Subscribers failing to receive their magazine regularly will favor us by giving us notification to that effect.

CHANGE OF ADDRESS

Subscribers who desire the address of their paper changed should send us the old as well as the new address.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

OUR EDITOR'S LETTER

I WISH I could impress all of you with the fact that it is a difficult matter to compile this magazine in such a way as to interest all of the readers. As you look it over, you undoubtedly feel that some of the articles do not interest the trade. You also wish to find material in it of a certain nature, but never do, simply because I do not appreciate your wants.

The value of any magazine depends upon the understanding of the editor who tries to put himself in the place of the reader so as to anticipate the wishes of the subscriber. The editor may be particularly interested in welding or wagon building, therefore he will be very apt to publish articles covering these subjects.

It is impossible for one man to know trade conditions in every part of the country, therefore it follows that one man cannot know the wants of all the smiths, particularly when this class of workmen do such a great variety of work.

The value of this magazine to you depends upon your co-operation. If you want a particular kind of article, write us a letter and you may rest assured that we will do our level best to give you what you ask for.

There is one thing that you must realize. As soon as you pay your subscription money, you are entitled to just as much consideration as any other reader, therefore do not hesitate to make your wants known.

Our readers are our friends and as editor, I feel that you also hold a friendly feeling for me. I want to keep you satisfied so that you will help me make more friends, therefore I will do all in my power to favor you.

THE PRINTING SITUATION

DESPITE the fact that we are able to print our magazine this month, our work is done under rather trying conditions. We have been forced to print this number out of New York City, away from our home office.

For this reason we have not been able to keep everything to its special place. We have been forced to eliminate departments and to use text matter most convenient.

Our December number will be printed in the usual style and carry its regular departments, however, and what is more it will be mailed shortly after the first of the month.

Printing conditions in New York are just the same as they were when we published our October, Mimeograph number. The fight still is on between the unions. Fortunately the International Union is on our side and are giving us their whole-hearted support.

It is to the International Union men that we give our hearty thanks. We feel that they are to be congratulated upon their stand.

This magazine is being printed by loyal International Union men who are true Americans, strong in their stand for right and against the radical elements which are tending to destory all business.

The International Union still stands for honest dealings; for binding contracts between employer and employee. This is our stand, as well.

Practical Horse Shoeing

How the Build and Stride of the Horse Affects the Hoofs and the Wear of the Shoes

THE wear of the hoof is occasioned principally by a relative movement between it and the shoe. If the shoe were an absolutely tight fixture, substantially a part of the hoof, there would be no wear and tear to amount to anything. But, at the inner and outer quarters, there is a degree of movement between horn and the shoe. The effect is to wear away the hoof at these points and to polish the shoe at the ends of its branches.

There should be no bright places on the upper surface of the fore part of the shoe. Such bright places are to be understood as indications of loose nails. The wear of the hoof at the quarters and the polished condition of the corresponding locations of the shoe are normal and to be expected.

The hoof wears, ordinarily, a little more upon the inside quarter than upon the outside quarter. If the horse has base-wide feet, this difference in wear may be accentuated. The wear of the hoof at the quarters may be very trifling. At the most, it will not usually be more than, say, one-quarter of an inch. The effect of the wearing away of the quarters has the tendency to loosen the nails at these locations. This is apt to occur more especially with the fore feet than with the hind feet.

Wear of the Shoe

The wear and tear of the shoe naturally occurs more underneath than on top. It is caused not so much by the mere weight of the horse or by direct flat blows of the shoe upon the ground, but by scraping movements as the shoe strikes the ground and as it leaves it. The wear caused by the sliding blow when the shoe strikes is called *grounding wear;* that which is brought about by the scrape or slide as the shoe leaves the ground is termed *swinging off wear.* For a normal horse, acting normally, the two kinds of wear are pretty much alike. There is always swinging off wear at the toe. The length of the stride affects the wear. Thus, there is apt to be rapid wear of both kinds at the toe when the stride is shortened. Such shortening of the step may occur when a horse prances, is engaged in drawing a heavy load, or the like.

The horse-shoer should seek to shoe a given horse from time to time so that the wear will be as evenly distributed as possible. When he has found a good solution to this problem, it will perhaps be possible to lighten the weight of the shoe. Since he does not need to put on a heavy shoe in order to make sure of enough metal at all points, he has the privilege of conferring a benefit on the horse and his owner.

It is claimed that the nearer any part of the shoe is to the center of the hoof the greater will be the wear at that point. The toe, one of the quarters, or one of the heels may be relatively near to the center and in consequence suffer more than it should. Tere is the horse-shoer's opportunity to shape the shoe so as to give the part where unusual wear has been occurring a position somewhat further from the center. If a shoe is poorly formed, for example; made too long or too short at the toe—there will be apt to be parts disadvantageously situated with reference to the center. Unequal wear will probably result.

An uneven tread of the horse will naturally cause unequal wear on the shoe. His uneveness of tread may also be caused by faulty shoeing. Thus, the dressing of the horny wall preparatory to placing the shoe may leave one part too high or too low. This is apt to make the horse place his foot wrongly and thus lead to unequal wear. Naturally a horse whose legs are on wrong, may be expected to step unevenly and so to promote uneven wear.

When any very marked uneveness of wear of an abnormal kind occurs, the thing to do is to look for the cause. If the horse has properly set and formed legs and feet; if he steps as he should and has no disease, then it will be well to consider the shoeing. The form of the shoe may be wrong. It may be put on wrong or carelessly secured. The tread of the horny wall may have been wrongly dressed.

Shoeing is a Compromise

Shoeing is done largely to prevent the excessive wear and tear of the bearing edge of the hoof on the hard roads and pavements of civilized regions. It does this service almost perfectly, the only wear permited in a properly shod hoof being at the quarters. But this advantage is not secured without some loss. This perhaps needs explanation.

Evidently a hoof in action is alternately subjected to load and relieved of load. This alteration of pressure and no pressure sets up certain movements within the hoof. These result in transient changes in the hoof form, repeated with every step. Thus, as the fetlock joint reaches its lowest point and the maximum pressure comes on the foot, this pressure acts through the coronary joint. This joint, it may be remembered, is formed by the lower end of the coronary bone as the uper part of the joint and by the coffin bone and the navicular bone as the lower part of this joint. The pressure is distributed through the sensitive laminae and horny laminae to the horny wall. In fact, it is understood that the coffin bone under the pressure sinks down and back, the navicular bone accompanying it.

This, with one or more other pressures, results in several things (1) The horny wall is spread at the quarters; (2) the fore part of the hoof, at the coronary joint, is narrowed; (3) the hoof loses something in height; (4), the sole sinks and flattens. It is understood that such movements tend to absorb shock. This is, naturally, of very great importance. Further, the whole limb benefits from the elastic action of the hoof and interior parts, and the circulation of blood is promoted. The shoe doubtless tends to restrain some or all of these, and may thus be viewed as having disadvantages. However, the shoe is a modern necessity. View it as a compromise, if you will. It is still necessary to have it. The thing to bear in mind is the advisability of avoiding everything in shaping, fitting and securing that will add to the necessary evils.

Examing the Horse

When a horse is brought to the horse-shoer to be shod, the smith will do well to seize the opportunity and make practical use of some of the information set forth in preceding articles. For example, he may now ascertain whether the horse's limbs are set normal to his body, whether his feet are normal, how he throws his feet and places his hoofs, etc.

Thus, if his helper leads the horse from him in a straight line on a level surface, turns him and brings him back along the same path, the horse-shoer will have opportunity to note several things.

(1) As the horse walks away, he may note the direction of the hind legs relatively to the body; (2) how the hoof comes to ground and takes off from the ground; (3) how the hind feet are thrown when passing from resting point to resting point.

Digitized by Google

Similarly, when the horse approaches, he may note the same or similar matters relative to the forelegs. A trot may also be employed in the same way as the walk, and will sometimes settle some point as to which the horse-shoer is in doubt when the animal merely walks. The foot-prints may also be examined to determine or confirm whether the horse uses his feet normally or abnormaly. They should show whether he toes in or toes out or whether the hoofs continually point straight ahead.

With the horse standing quietly, the horse-shoer steps squarely in front and notes precisely the direction of the axis of the foot from the fetlock joint down. The shape of the hoof may now be noted as to whether its appearance is normal. The foot and hoof are now examined, (1) to determine whether the foot-axis is exactly parallel to the front line of the hoof; (2) whether the lines of the hoof from the coronary joint down to the tread of the hoof are straight; (3) whether the foot-axis or the front line of the foot makes an angle of 45 or 50 degrees with the ground. It may now be noted whether the hoof has rings, and if so their character. The front line of the hoof may be compared with the heel lines to see if they are all parallel. All this may be observed from the front and rear, espcially if the horse-shoer uses a short piece of wood as a straight-edge. A view from the side is taken to confirm certain front and rear observations.

The foot is lifted and examined on the bottom. The character and condition of the horny sole and horny frog are noted. Thus, the horn may be rough and flaky. The side grooves of the frog are inspected, as their depth gives an indication of the thickness of the sole. Any cracks or abnormal cavities are to be noted.

The horse-shoer may next examine the old shoe and the manner in which it is set and secured. Its shape and the manner in which wear has affected it are important points. The number of nails and their locations are items that may tell some story.

FINAL PRIZE PHOTOS

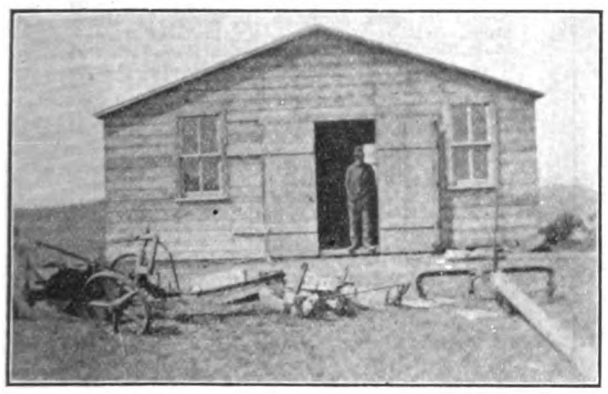
WELL, this is the last of the Prize Photograph contest and next month we will announce the winners. We are sorry that the smiths do not like to write letters, few of them do but these few are always interesting.

Mr. Burnap's photograph came to us with nothing but his address on it. We should think that he would have a lot to say, but judging from the size of his shop and the apparent amount of work before it, he probably has not had much time for letter writing.

Mr. Dickson's remarks were few and we don't blame him. If he averages to keep nine horses ready for shoeing we can see where he can work steadily without wasting time talking abotu it.

A PHOTO FROM MONTANA

From R. R. Tichenor, Montana.— I am sending you a small photograph of my shop which I want to enter in the prize photo contest. This shop has grown steadily although it is way out on the prairie in northern Montana.



Mr. Tichenor's Shop.

The shop is 24 by 32 feet and has eight foot posts. There are eight windows in the shop; three of them are double windows, so you can see that I have plenty of light. I have a good outfit for hand work, but haven't got any kind of power yet. I shall probably put in some power tools in the Spring as I have more work than I can do by hand.

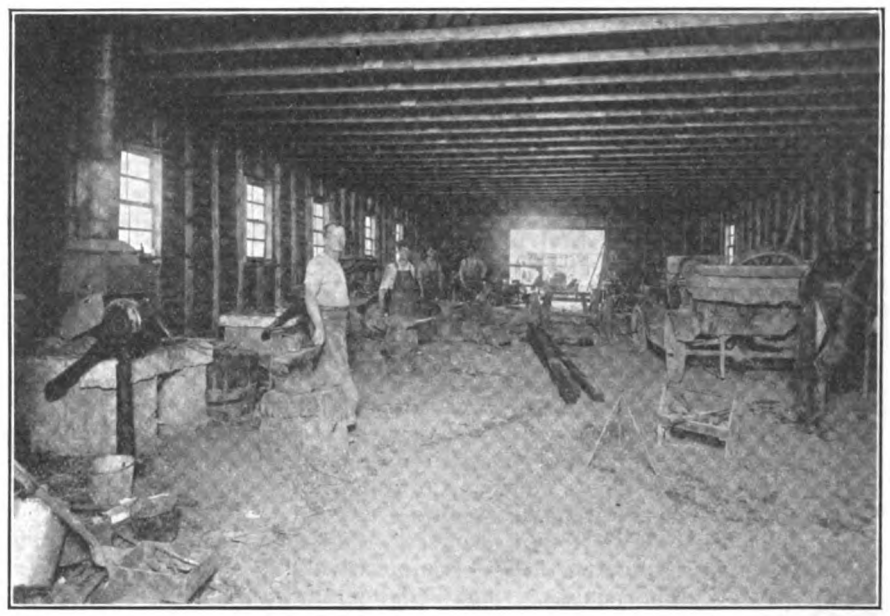
I have to freight all my goods to the railroad (70 miles away) but prices are good and there's plenty of work as the nearest shop is five miles away. I also get quite a lot of trade from Canada for I am within three miles of the border.



Albert Dickson of South Africa says: "This is a photo of my shop. It is not as dark inside as the picture indicates. The shop is 50 by 22 feet and has six windows. My picture is indicated by the cross. We do shoeing only."

Below and to the right is the picture of W. R. Clepper's shop, located in Texas. Mr. Clepper writes as follows: "In the enclosed picture of my shop, two of my helpers do not appear, nor does the picture show all of the shop for there were four horses in it when the picture was taken.

We do all kinds of work, shoeing and general blacksmithing. We are located in one of the biggest oil fields in the world and work for the best people in the world too. We seldom have anyone complain of our work and my policy is to do the work right even though it takes more time. I have found that this is the kind of treatment that people like. The price does not matter if the work is well done.

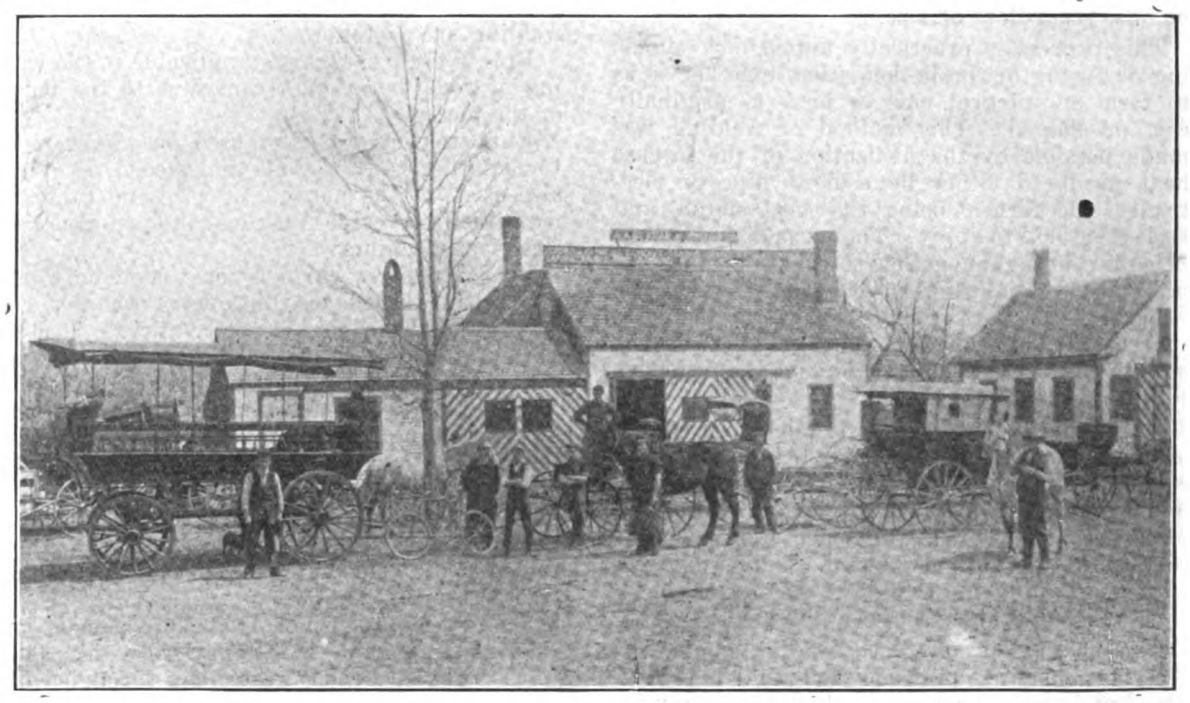


I have been in the business for 15 years, have been working in this place for nine years and own the shop.

I have been a reader of the Blacksmith and Wheelwright for 15 years and think it is a great helper. I have received much profitable information from it.

I will give you some of my prices and wish that the smiths could be more closely combined so as to make personal interests more general and for the good of all. These are some of the prices which I charge for work. Horse shoeing number 2 or under, plain, $2.50; 3 and 4, plain, $3; 5 and 6, plain, $3.50; 7 and 8, plain, $4.50; toeing all sizes, $1; wagon axles, $8 to $10; wagon tongues $7 to $9; wagon reaches, $3 to $10. Spokes, 75 cents; felloes, $1 each. Setting tires, narrow, cold, $1; hot, $2; wide tires from $2 to $5, according to size. I charge $1.75 per hour for labor; $2 per hour for forging, material of course is charged in the bill as extra. I pay my helpers from $8 to $15 per day and do from $100 to $150 worth of business daily.

Referring to the picture, the man at the front anvil is Charley Johnson; at the second one, Will Jorden; and the third my second son; and I am the fourth. One brother and my eldest son, who work for me, do not show in the picture.



Arthur A. Burnap's Shop, Located in New Hampshire Looks Like a Busy Place.

Digitized by Google

Various Welding Methods

Welding Presents Many Money-Making Opportunities for the Progressive Blacksmith

CONSIDERING the great chances for profit in welding work, it seems odd that so few blacksmiths have taken up this line as a means for expanding the scope of their field and greatly increasing their earnings. Probably their reluctance to become interested is due to the fact that they have only given the subject light consideration thinking that it involves too complicated a process and requires too much extra equipment to prove attractive.

Welding, the fundamental principles of which every blacksmith thoroughly understands, is very simple and when practiced successfully requires painstaking effort and quite a little thought. The demand for such work exists in every community regardless of size, as farmers, factories, railroads, mills and practically all lines of manufacture have work in the welding line.

The fact that the demand for such work in small communities has not been active, is in most cases due to the impression that such work is not done by the blacksmith, consequently the man with a broken machine part or other piece, which could be made good as new by welding, sends off for a replacement part that costs him many times the outlay that would have been expended in repairing the part satisfactorily by the welding process.

Many instances can be cited wherein hundreds of dollars have been saved by users of machinery through the welding of parts that otherwise would have to be replaced at high cost for new parts. When it is known that broken parts can be welded and become as good as new for use, the customer desiring such work done, is ready to pay a very good price for the work as he has no other alternative and often is willing to pay from 50 to 75 per cent. of the cost of the new article to have the welding done.

Welding as formerly done exclusively by the smithy and the only practical method up to within a few years, simply consists of heating the parts of wrought iron or steel until they become plastic under the hammer when they were welded together by force of the hammer or press. In this process the metal was protected from oxidization by the use of some flux that would fuse.

This method was crude as compared with the new methods for it was entirely dependent for success upon the skill and conscientiousness of the operator; even then a good smithy could not be certain that every weld he made was a good one. This line of work was also very limited as only simple shapes and those of comparatively small cross-section could be handled by the smith, except where he was provided with a steam hammer.

The modern process, however, enables one to place together rigidly and permanently broken parts or pieces with the same strength when repaired as the part originally possessed. The work, when done, is lighter and applicable to practically every conceiveable part whether of iron, steel, brass, bronze, aluminum or alloyed metals, regardless of size.

This process is practically autogenous soldering or fusing of the broken parts together so as to form an integral part or piece as originally cast or shaped. This method of welding was made possible by the utilization of the intense heat produced either by a blow pipe or electricity, the former being the most simple and easiest method to apply. The parts of the broken piece are brought together so that the edges are in relatively the same position as when in the whole and the heat applied raising the temperature of the joint to the fusing point when the metal flows together forming a homogenous joint.

The flame blow pipes in practical use consist of arrangements for producing a jet of flame of regular form and size and direction it at the point where the heat is to be applied. The pipes are fitted with arrangements or means of regulating the proportions of combustible gas with air, mixing the two gases so that the most effective temperature may be obtained.

The most extensively used welding gas is oxy-acetylene meaning half acetylene and half oxygen, but in actual practice a little more oxygen than acetylene, which produces a flame with an inner core which has a temperature of 4000 degrees Fahr.

The oxygen is generally supplied in cylinders in a highly compressed form and after passing through a regulator which keeps the pressure constant, it provides the mechanical energy for mixing the gases and projecting the flame. The oxy-hydrogen blow pipe has been used for more than 100 years, but it has been used for welding on a large scale only during the past 20 years, and for about the same length of time that the oxy-acetylene method has been in use.

One of the disadvantages of oxy-hydrogen for welding is that the water vapor produced by combustion oxidizes some fused metals, particularly iron. It is necessary for this reason to use an excess of hydrogen over the proportion required for complete combustion in order to eliminate this excess oxidization. Many advocate the oxy-hydrogen blowpipe for the more fusible metals as the work may be more easily observed in the process of welding. It is superior, however, for lead burning and metal cutting.

Welding by the thermit process is particularly applicable to use on metals of an iron base. aluminum and ferric oxide, when mixed will burn or deflagrate with the formation of metallic iron and alumina. A very high temperature results from the reaction, much above the melting temperature of iron and alumina.

In using this method the parts to be fixed are joined in their proper positions and surrounded with a mold of refactory material in which the space to receive the metal coincides with the jointing line. The process is the same as the old method of "burning for repairing broken cast-iron articles by making a stream of molten cast iron flow over the joint, but the thermit metal is far hotter, attaining a temperature of 5000 degrees Fahr.

This method has been extensively employed in joining rails and for repair work of various kinds where there are no twisting or pulling strains upon the parts so fixed.

Resistance welding is a form of electric welding which is the closest approach to original smith welding. The surfaces to be united are approximately fitted, brought into close contact, and an electric current of sufficient strength is passed to bring the surfaces to welding heat. Then pressure is applied to force them into contact and force out oxide, etc., as far as possible. The heat produced by the passage of the electrical current is much greater at the contact surfaces than in the solid metal. The heat is further localized by using clamping electrodes of low resistance which hold the work as near as possible to the weld.

Owing to the rapidity of the heating and the very small amount of air between the opposed surfaces, very little oxidation can occur. The earliest resistance welding was performed on iron and steel, but it was also found that other metals could be welded together. For resistance welding a large current at a low voltage is necessary. The several methods of resistance welding are as follows:

Butt Welding, which is applicable to the welding of rods, bars, etc., transverse to the length of the pieces.

Butt welding was first used on a large scale for jointing railway rails and steel tires. It is also used for the jointing of wire and tubing in manufacture, cable making and windings of electrical machinery.

Spot Welding, which is most commonly used for uniting sheets or thin plates where a continuous weld or joint is not required. The two shees are placed between electrode clamps which press them together, current is then switched on, the surfaces in contact are brought up to welding heat, and the pressure is maintained after current is off until sufficient cooling occurs. The sheets are then moved on to the next spot to be welded, and the operation repeated. Work so welded is therefore united by a line of small welds and may be compared to flush riveted work.

Seam Welding, which is an extension of spot welding, applicable to compartively thin sheetwork. The electrodes are rollers through which the two sheets are passed when current is applied and the rollers revolved. The electric current heats up the sheets to welding points as they pass between the rollers, and they are thus united along the whole of the roller path. This continuous sam joint is stronger than spot welding, is fluid tight, and is comparatively rapid, as it is continuous. The surfaces to be joined must be absolutely clean, either sand blasted or pickled with acid.

A Legal Question

From J. S. Kansas:—I have eight binders standing in front of my shop, and as repair parts are hard to get, someone has take parts from some of these machines. I would like to know if I am responsible for the parts that were stolen from the binders standing in the street.

REPLY

Under the facts stated, which are very meagre, it is a question of fact for the jury to decide whether or not you are responsible for the loss of the parts. As a broad proposition of law, a man who undertakes to repair property for another, must take the same care in protecting the property as a prudent man would take of his own property.

The location of the shop, its size and the number of binders already in the shop are all factors to be considered in determining the question of liability. If there was room in the shop to store these binders awaiting repairs, I would have no hesitancy in saying that the loss of the parts must be borne by the repairman. If the shop was in a locality in which there were many people and boys, it would sem necessary to me that the repairman should employ some one to watch the binders while they were outside the shop on the street.

It is comon sense that a man cannot assume the care of another's property and give it no attention whatsoever, and practically invite the public to help themselves.

In conclusion I might add that if I were called upon to decide the matter upon the facts as stated, I would hold the repairman liable for the loss of the parts.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1919, OF The Blacksmith and Wheelwright, published monthly at New York, N. Y. for October 1, 1919.

State of New York }
County of New York } ss.:

Before me, a notary public in and for the State and county aforesaid, personally appeared F. R. Whitten, who having been duly sworn according to law, deposes and says that he is the business manager of The Blacksmith and Wheelwright, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, M. T. Richardson Company, 71 Murray Street, New York City, N. Y.; Editor, M. T. Richardson, 71 Murray Street, New York City, N. Y.; Managing Editor, F. L. Avery, 71 Murray Street, New York City, N. Y.; Business Manager, M. T. Richardson, 71 Murray Street, New York City, N. Y., and F. R. Whitten, 41 Pinehurst Avenue, New York City, N. Y.

2. That the owners are: M. T. Richardson Company, 71 Murray Street, New York City, N. Y. Stockholders: M. T. Richardson, 71 Murray Street, New York City, N. Y.; A. J. Richardson, Ridgewood, N. J.; Mrs. A. Louise Giardeau, Jr., Monticello, Fla.; Mrs. Mildred Ulmer, New Rochelle, N. Y.; Mrs. H. L. Johnston, New Rochelle, N. Y.; W. F. Etherington, 341 Fifth Avenue, New York City, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding one per cent or more of total amount of bonds, mortgages, or other securities are: None.

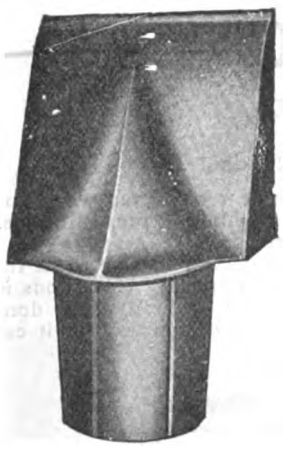
4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustee, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds or other securities than as so stated by him.

M. T. RICHARDSON CO., Publishers,
The Blacksmith and Wheelwright.
FRANK R. WHITTEN, Business Manager.

Sworn to and subscribed before me this 24th day of October, 1919.

[Seal] ROBERT F. W. SCHMIDT,
Notary Public.
(My commission expires March 30, 1921.)

Digitized by Google



Quality and Service

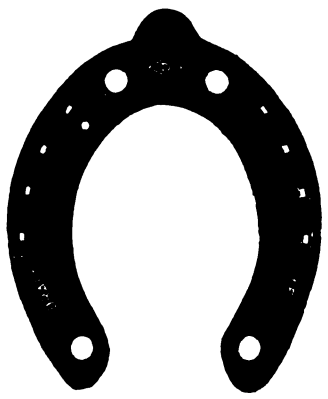
in *design, wear, fit, finish* and all-around efficiency have been, are and always will be, the first consideration in the manufacture of

DIAMOND CALKS and SHOES

We aim to make our product of such superior excellence in everything that makes for satisfied dealers and satisfied users that they will not only ask for, but insist on the DIAMOND line because they cannot buy a better one.

Your good will and your customers' good will are what we want above all else.

Diamond Calk Horseshoe Co
Duluth, Minn.



The C. B. N. A. Convention at Chicago

THIS year it was the great city of Chicago that was honored in having the convention of the Carriage Builders' National Association held within its boundaries. The Forty-Seventh Annual Convention of the C. B. N. A. was held at the Hotel La Salle, Chicago, Ill., on September 23, 24, and 25, 1919, and if those who are deploring the fact that the carriage building trade is on the wane, could have been there, we know they would have changed their minds.

The forty-seventh annual convention was just as interesting as those held "in the good old days" and the exhibits were in good taste, contained many innovations for the horse and buggy, and reflected the prosperity of the trade.

President Ahlbrand of Seymour, Ind. called the first meeting to order on Tuesday morning. He introduced Hon. Frederic P. Vose of the Chicago Association of Commerce, who extended to all a most hearty welcome. Mr. Vose's address was very humorous and elicited much laughteer and applause. He told of the early history of Chicago, and spoke of the various industries of the city. Mr. O. B. Bannister of Muncie, Ind. responded to the address of welcome and paid tribute to Chicago, Chicago's spirit, and Chicago's citizens.

President Ahlbrand, who spoke next, gave some very interesting statistics relating to the advance in the cost of materials which enter into the construction of buggies. His figures covered the period between 1916 and 1919. Turpentine, it appears has advanced the most, having increased 288 per cent in the three years, and so it goes down the list,—whee's, shafts, lumber, bolts, etc., so that on an average, it costs two and a half times as much to build a buggy in 1919 as it did in 1916. In closing his address, Pres. Ahlbrand spoke of the secretary and treasurer of the C. B. N. A., Mr. Henry McLear, who did not attend the convention this year.



Frank H. Delker, the New President

Mr. McLear, who has been secretary and treasurer of the organization since 1887, and has been identified with it since 1872, fell and fractured his hip last Spring, and sustained injuries from which he has not as yet entirely recoverd. The president, who read a letter from Mr. McLear, paid a spendid tribute to the absent secretary, and Mr. P. E. Ebrenz, chairman of the Executive Committee, who followed President Ahlbrand, read a telegram which had been sent to Mr. McLear urging him to be of good cheer, and regretting the fact that he could not attend the convention.

Nominations were then called for a president for the ensuing year, and Mr. Frank H. Delker of Henderson, Ky. was nominated, and the nomination seconded.

The following committees were then appointed by the president:

Committee on Resolutions:
O. B. Bannister, Muncie, Ind., Chairman.
A. L. Black, Norfolk, Va.
E. E. Ebrenz, St. Louis, Mo.
A. T. Jackson, Rockford, Ill.

Committee on Recommending Officers for the Ensuing Year:
W. H. Roninger, St. Louis, Mo.
W. G. Norman, Griffin, Ga.
Gale B. Smith, Henderson, Ky.

Committee on Exhibition:
R. S. Tripplett, Owensboro, Ky.
George B. Ogan, Chicago, Ill.
James B. Kaler, Columbia City, Ind.

Obituary Committee:
Homer McDaniel, Cleveland, Ohio, Chairman.
J Frank Hutcheson, Cincinnati, Ohio.
R. C. Ware, Philadelphia, Pa
E. V. Overman, Cincinnati, Ohio.

On motion, the convention adjourned to 10 a. m. Wednesday.

Wednesday's Meeting.

Immediately after the opening of the meeting by the president, a report was given by the publicity committee which reiterated the fact that the horse and buggy had come back "with a vengeance" and stated that it seemed to have been the almost unanimous opinion of carriage builders that for the year 1919, each would act on his own initiative.

The Executive Committee then gave its report which was greeted by applause.

The President then introduced Mr. Homer McDaniel of Cleveland, Ohio; who spoke on "Accessory Trades." Mr. McDanie' gave some details regarding leather which were very interesting.

In the name of the Executive Committee, Mr. Theodore Luth offered a resolution recommending that Mr. Henry C. McLear be elected as an honorary member of the association for life and receive from the treasury of the association each year a sum equal to his present salary of $1,500 per year, payable in equal monthly installments, in view of the general desire of all members of the association to pay a fitting tribute to the faithfulness of the secretary.

The reading of this resolution was received with hearty

(Continued on Page 20)





Digitized by Google

BREMER BABBITTERS MEANS MORE MONEY TO YOU

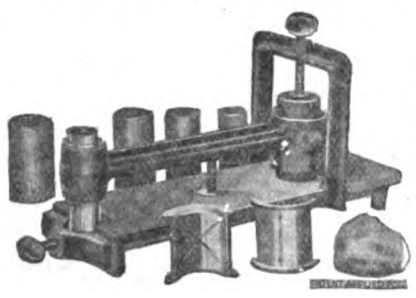
N-A-SIZE BABBITTER

For Any Size Connecting Rods

This Babbitter will babbitt any size auto engine connecting rod bearing, and do it quickly, accurately, and in a serviceable manner. It casts the bearing to the size required, either solid in the rod or the removable type. This tool will enable you to turn out your work quickly, giving the auto owner immediate service, and eliminate the long delays caused by waiting on factory shipments on new rods or bearings.

There is no other tool on the market today that will compete with the N-A-Size Babbitter and do the work it will do with as great a degree of satisfaction.

Babbitter furnished complete with four wooden mandrels and instructions. Price, $10.00. Weight, 15 lbs.



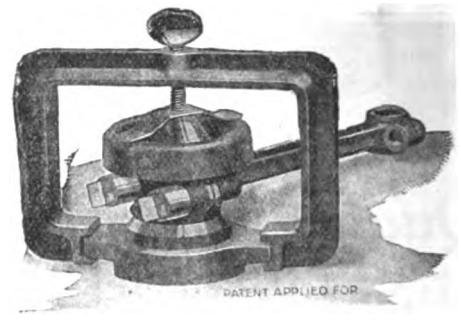
BABBITTER

For Ford Connecting Rods

Why send Ford connecting rods to the factory to be rebabbitted when you can do it in your own shop with this machine and make big money besides saving all the delay and inconvenience to the motorist?

The Babbitter casts the bearing exactly the right shape and size to fit the crankshaft — all in one operation. The work is done quickly (four rods in an hour); it is done accurately (to one-thousandth of an inch); it is done economically (saving from $1.75 to $2.50 on each set of four rods); it can be done easily by anyone — even by an apprentice.

Babbitter furnished complete with metal mandrel and instructions. Price, $11.00. Weight, 8 pounds.



Combination of both Babbitters complete $18.00. Weight nineteen pounds

WRITE FOR DESCRIPTIVE MATTER

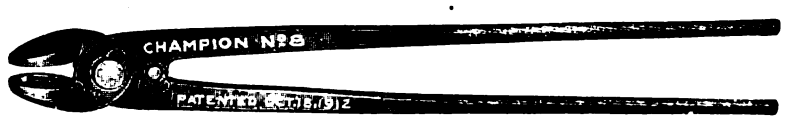
ORDER FROM YOUR JOBBER.

O. A. BREMER COMPANY, MANUFACTURING MACHINISTS

222 Division Street **BURLINGTON, IOWA**

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge



Nothing to get out of order.
Will hold securely any size of shoe.
No. 8 16 inches long

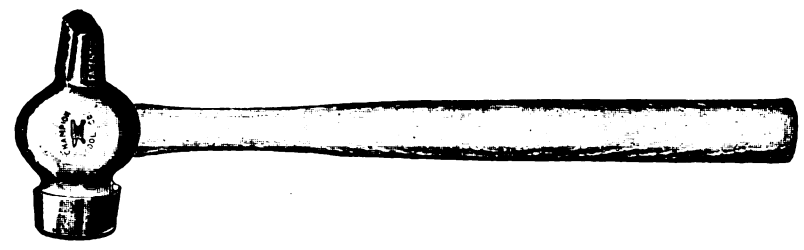
This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR — YOU WILL BUY MORE.

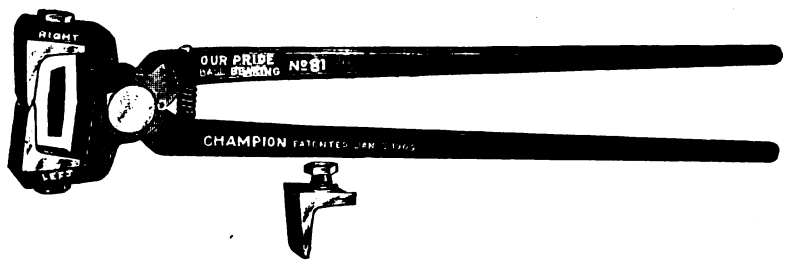
No. 12 ELECTRIC SHARPENING HAMMER

Weights, 1¾ to 3 lbs. Corrugated Pein.

This Hammer is the most popular Sharpening Hammer on the market.

IT GIVES RESULTS





OUR PRIDE — BALL BEARING HOOF SHEAR

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.

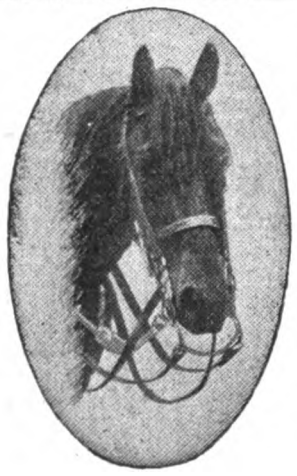
Blades easily replaced when worn out.

All parts interchangeable.

Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY Meadville, Pa., U.S.A.

THE LIVINGSTON CO., 131 E. 23rd Street, NEW YORK, Eastern Representatives



Make More Money

Selling Columbia Veterinary Remedies

Our Special Offer for October

2 doz. Columbia Stock Tonic, 60c. size, $4.80 doz...$9.60
2 Doz. Columbia Liniment, 60c size, $4.80 doz..... 9.60
1 Doz. Columbia Hoof Ointment, 60c. size, $4.80 doz. 4.80
$24.00

FREE

FREE—1 doz. Hoof Ointment, 60c. size, $4.80..... 4.80
$19.20

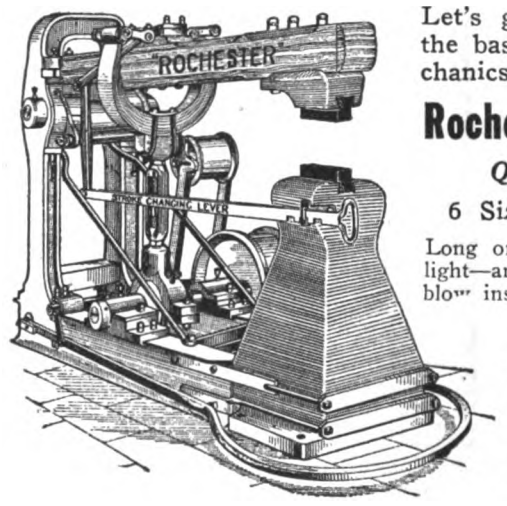
We include Free goods to cover transportation charges to your town.

Selling Price of above $43.20
Cost to you 19.20
Net profit $24.00

Send your order direct to

THE F. C. STURTEVANT CO. :: :: Hartford, Conn.

Nagging the Umpire Never Got Anyone Anything



Let's get together and slam out the base hits. You have the mechanics, we have the

Rochester Helve Hammer

Quick Change Stroke

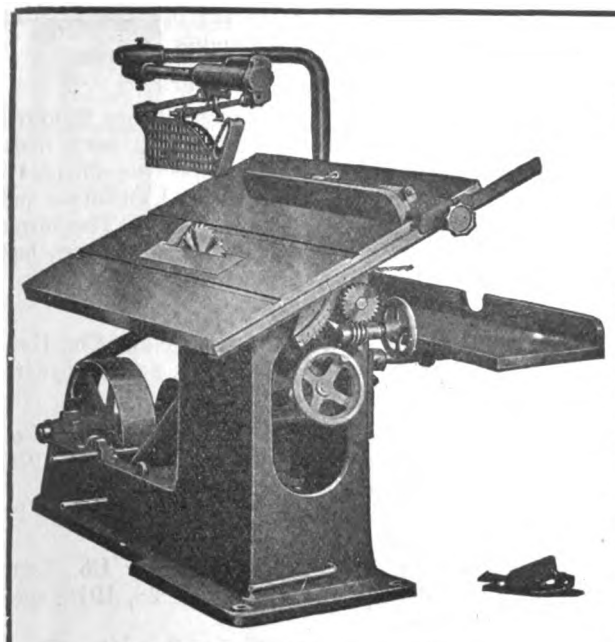
6 Sizes—2 Styles of Frames

Long or short, fast or slow, heavy or light—any length, weight and force of blow instantly secured on the Rochester "Helve" while the machine is running. This feature alone saves so much time where there is a variety of small work to be forged, swaged or welded, that it recommends the tool without reference to its other distinctive features.

Ask for the Helve Hammer Book

THE WEST TIRE SETTER CO., Rochester, N. Y., U.S.A.

Digitized by Google

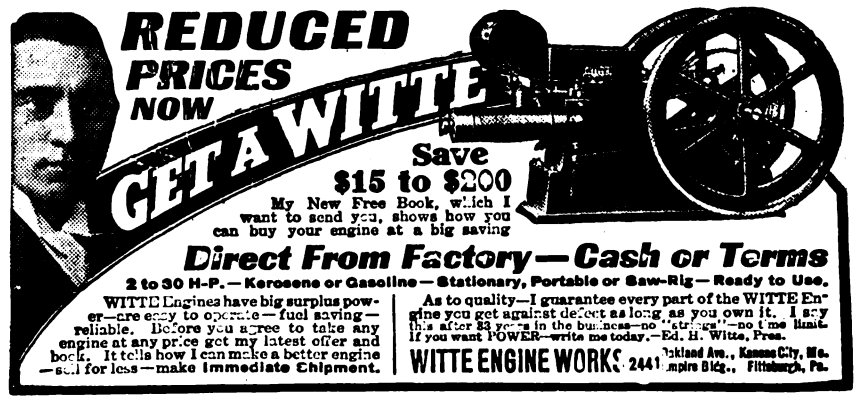


CRESCENT Wood Working Machines

will always satisfy those particular users who want the highest quality at reasonable price.

Send today for catalog of band saws, saw tables, shapers, jointers, variety wood workers, planers, planers and matchers, swing saws, cut off table, disk grinder, borers, hollow chisel mortiser, Universal wood workers.

THE CRESCENT MACHINE CO.
203 Main Street
LEETONIA, OHIO, U.S.A.



H-B Tempering Process

BLACKSMITHS,—are you making a business of TEMPERING? It is a general fact that Tempering of Steel is a side issue with the Blacksmiths. Why not make it a business that will bring more MONEY and GREATER RESULTS.

WRITE FOR PARTICULARS

A ready mixed sample will be sent on the receipt of $1.00 with directions how to use.

ORDER AT ONCE **IT WILL CONVINCE**

Manufactured by the

H-B TEMPERING PROCESS CO.

Clearbrook, Minn.

Prices Advanced on Wheels, Rims, Spokes, Shafts, Bolts, Seats

Get our Catalog No. 62

If Interested in Autos

Ask for Catalogue No. 62

Wheel Top & Hardware Co.

Dep. W-2

CINCINNATI, O.

PLYMOUTH COMBINED HAND POWER PUNCH AND SHEAR

ALWAYS READY **STRONG and SIMPLE**

No lost or misplaced Punches — always in the machine.

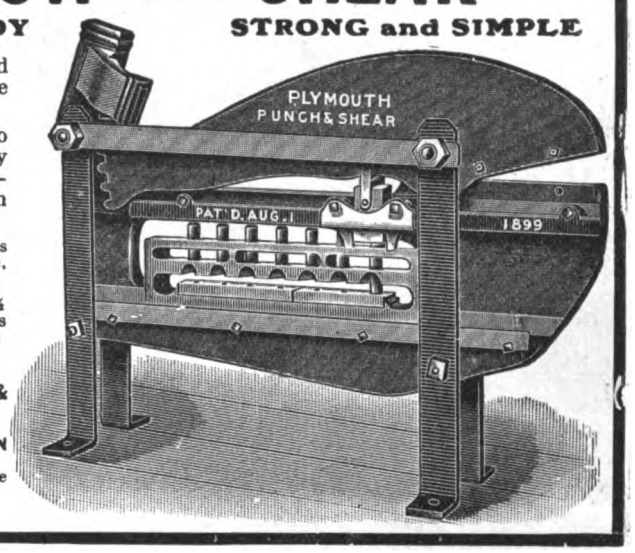
Punch Rack shifted to position for use of any punch in a moment without the need of a wrench or any other tool.

Seven different size punches with every machine, ¼, 5/16, ⅜, ½, ⅝, ¾, and ⅞.

Will punch ½ in. hole in ½ in. iron or its equivalent Shears 4x½ or 3x¾ or 1 in. Round Iron

Manufactured By
PLYMOUTH FOUNDRY & MACHINE CO.
PLYMOUTH, WISCONSIN

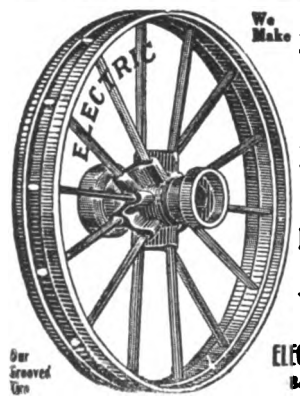
For sale by all Heavy Hardware Jobbers and Blacksmiths' Supply Houses.



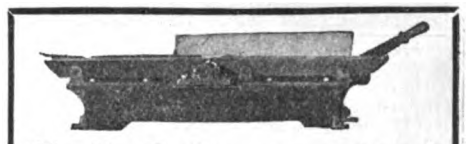
Tradesmen and Laborers Headquarters

FURNISHING best class of help to employers, free of charge. Phone write or wire us your wants.

DIAMOND LABOR AGENCY
557 W. Madison St. Chicago, Ill.
Phone Main 5074



We Make **STEEL WHEELS**
To Fit Any Axle
Plain or Grooved Tire
Steel or Hickory Axles
Any Size
A Full Line of Wood and Steel
Farm Trucks
With Steel or Wood Wheels
Write for Large Catalog and Prices
ELECTRIC WHEEL CO.
Box N, Quincy, Ill.



5" Hand Planer or Bench Jointer for $36.00

Same quick easy adjustable features used on our larger sizes of machines. Cast iron and steel construction.

Catalogue No. 15 gives further information on the above and other sizes.

W. L. SHERWOOD, Kirksville, Mo.

Advertising has saved many a business man when his ship was near the rocks—but why wait that long?



SAMPLE OF WELDING COMPOUND FREE

BLACKSMITHS! Anchor Welding Compound has no equal for strength. It welds the hardest steel. Good for both big and little jobs. Try it.

Write to-day and mention The Blacksmith and Wheelwright.

N. D. DOXEY, ELMIRA, N. Y.



ABSORBINE

TRADE MARK REG. U.S. PAT. OFF.

Reduces Bursal Enlargements, Thickened, Swollen Tissues, Curbs, Filled Tendons, Soreness from Bruises or Strains; stops Spavin Lameness, allays pain. Does not blister, remove the hair or lay up the horse. $2.50 a bottle at druggists or delivered. Book 1 R free.

ABSORBINE, JR., for mankind—an antiseptic liniment for bruises, cuts, wounds, strains, painful, swollen veins or glands. It heals and soothes. $1.25 a bottle at druggists or postpaid. Will tell you more if you write. Made in the U. S. A. by

W. F. YOUNG, Inc. 55 Temple St., Springfield, Mass.

PATENTS

C. L. PARKER

Ex-Member Examining Corps, U. S. Patent Office
Attorney-at-Law and Solicitor of Patents

American and foreign Patents secured. Trade marks registered. Searches made to determine patentability, validity and infringement. Patent suits conducted. Pamphlet of instructions sent upon request.

McGill Building WASHINGTON, D. C.

Edwards Shears

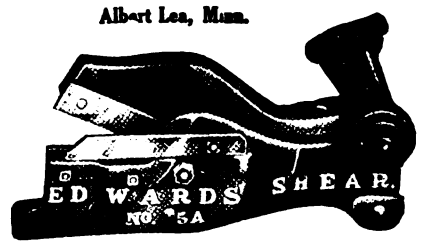
For twenty-four years the Two Leading Low Priced Shears in the U. S., representing the Greatest Value for the Least Money.

No. 5, weighs 200 lbs., cuts 4x½ inch soft steel.
No. 10, weighs 430 lbs., cuts 4x¾ inch soft steel.

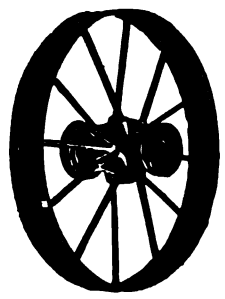
At their price you should have had one long ago. Order one from the first iron man that calls on you. They All Sell Them.

Write for descriptive circular and prices.

C. D. EDWARDS MFG. CO.
Albert Lea, Minn.



EMPIRE STEEL WHEELS



Plain or Grooved Tire
To Fit Any Wagon.

FARM TRUCKS
All Standard Types

Write today for Proposition to Blacksmiths

EMPIRE MFG. CO.
P O B. 209
QUINCY, ILL.

Campbell Iron Company

WHOLESALE SUPPLIES

Still carry a stock of Wagon, Blacksmith Materials, Farrier Supplies, as well as Tools, Hardware Supplies and Duplicate Parts for Fords.

Write for General Catalogue.

Our Price, Discount Sheet and Supplement is being distributed.

817 CASS AVENUE ST. LOUIS, MO.

Digitized by Google

applause. In seconding the motion, Mr. Homer McDaniel of Cleveland said in part:

> "I would like, Mr. President, to second that motion, and to say to your Executive Commitee that I know of no act in the thirty years that I have belonged to this Association that reflects as much credit to the soul of you as that resolut on ..... Henry McLear is worthy of all we could say and all we can do——— He is the dean to-day of the American carriage-building industry, and no nicer or greater tribute could be paid him than through this action of the Association."

The Blacksmith & Wheelwright wishes to congratulate the Association upon this fine action of theirs, and can assure the members that no man is more deserving of it than Henry C. McLear. No man could give more whole-heartedly than he has given, nor could one have been more faithful.

Two amendments were proposed to the constitution and duly accepted

Mr. Charles E. Adams then delivered a very instructive address on the present steel situation.

The report of the secretary-treasurer was next read and disclosed the fact that the finances of the association were in a healthy condition.

Nominating Committee's Report

Following is a report of the members who



A. H. Ahlbrand, the Ex-President.

were offered for nomination by the Nominating Committee:

For Executive Committee:

C. R. Crawford, Moon Bros. Mfg. Co., St. Louis, Mo.
Clen Perrine, Brown Carriage Co., Cincinnati, O.
P. E. Ebrenz, Reliance Buggy Co., St. Louis, Mo.
R. S. Triplett, F. A. Ames, Co., Owensboro, Ky.
A. H. Ahlbrand, Ahlbrand Carriage Co., Seymour, Ind.

Secretary:

George W. Huston, Cincinnati, O.

For Vice-Presidents:

A. T. Jackson, Rockford, Ill.
J. A. Evans, Griffin, Ga.
John Gummer, Elkhart, Ind.
W. T. Shaver, Des Moines, Iowa.
Gale B. Smith, Henderson, Ky
C. C. Bradley, Syracuse, N. Y.
George M. Hoffman, St. Louis, Mo.
N. H. Cannady, Oxford, N. C.
George Gerstenslager, Wooster, O.
August Geissel, Philadelphia, Pa
T. M. Robinson, Nashville, Tenn.
Mr. George B. Shephard of the Eberhard Mfg.
Ed. E. Hughes, Lynchburg Va.

Co., of Cleveland, Ohio, gave some facts concerning the saddlery trade which were received with applause.

Next in order was the election of president for the ensuing year, and Mr. Frank Delker was unamimously elected. Our best wishes and congratulations go to the new president

It was announced that the Carriage, Harness



George W. Huston, the New Secretary

and Accessory Traveling Salesmen's Association, which was in session, was holding a banquet, and members of the C. B. N. A. were asked to attend. Folowing a few more announcements, a motion to adjourn was made and seconded and the convention adjourned to September 25th.

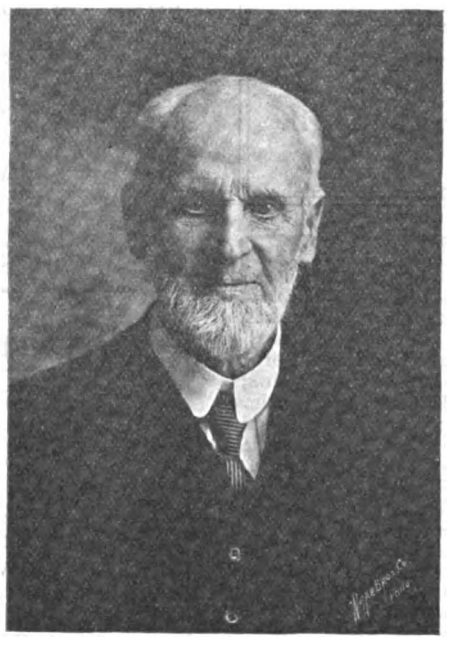
The Third Day's Meeting

After the opening of the meeting by the President, a condensed report of the Statistics Committee was given, and then Mr. John W. Gaver of St. Paul, Minn., who is connected with the Saddlery Association, spoke of the intention of his associates to start an investigation and get facts with which they might educate the public to the use of the horse drawn vehicle, particularly among users of motor trucks.

After Mr. Garver's remarks, the report of the Membership Committee was read, and the carriage builders were urged to secure members to the organization.

Mr. Walter Goodnow of Chicago, Ill., who was then heard from on the subject of "The Horse and Future Outlook," in turn introduced Mr. Walter J. Munro whose remarks were of value to those whom he addressed. He spoke of a survey which is being made by the Department of Investigation, of the Green, Fulton, Cunningham Co., with which he is associated, and the facts he gave were of an interesting character.

The Freight and Classification Committee and the War Service Committee gave their respective reports, the latter Committee being relived from further duty as its work had been completed.



Henry C. McLear, the Retiring Secretary.

The Resolution Committee offered several resolutions among which was one recommending that the railroads be returned to private ownership as soon as practical, another stating that the Association is in sympathy with and heartily supports any movement to further the interest of the horse and its attachments.

Election of Officers

The all-important election of officers followed with the result that those who had been nominated were elected to their respective offices.

The reports of the Committe on Exhibition and the Obituary Committee came next. The latter report showed that the following members had passed away since the last convention:

Active:

E. J. Schlamp, The George Delker Co., Henderson, Ky. Oct. 12, 1918, aged 41 years.

Associate:

O. E. Walker, Queen City Forging Co., Cincinnati, Ohio, November 12, 1918, aged 80 years.
E. F. Alf, Edward F. Alf Co., November 17, 1918, aged 43 years.
Charles A. Willey, C. A. Willey Co., Long Island City, N. Y., October 28, 1918, aged 60 years.
G. W. Leutkemeyer, Union Bow Co., Cleveland, Ohio, December 6, 1918, aged 54 years.
George McMaster, Mutual Wheel Co., Moline, Ill., August 10, 1919, aged 46 years.

Selection of Convention City for 1920

President Ahlbrand read the invitations from several cities to hold the 1920 convention of the C. B. N. A. within their boundaries, and the selection of the location was referred to the Executive Committee. Mr. Charles E. Adams, of Cleveland, Ohio, gave his opinion on the subject as the Executive Committee desired an expression of opinion as to the members' choice for the 1920 convention city to aid the committee in deciding. The matter was further discused, and finally it was decided that the Executive Committee would be able to draw its conclusions



J. F. Hutcheson, Secretary-Treasurer of C. H. A. T.

from the discussion, and select a place of meeting agreeable to the members.

A rising vote of thanks was tendered to the retiring president, and there being no further business, a motion was made by Mr. Clen Perrine for adjournment. The motion was seconded and carried.

Other Matters

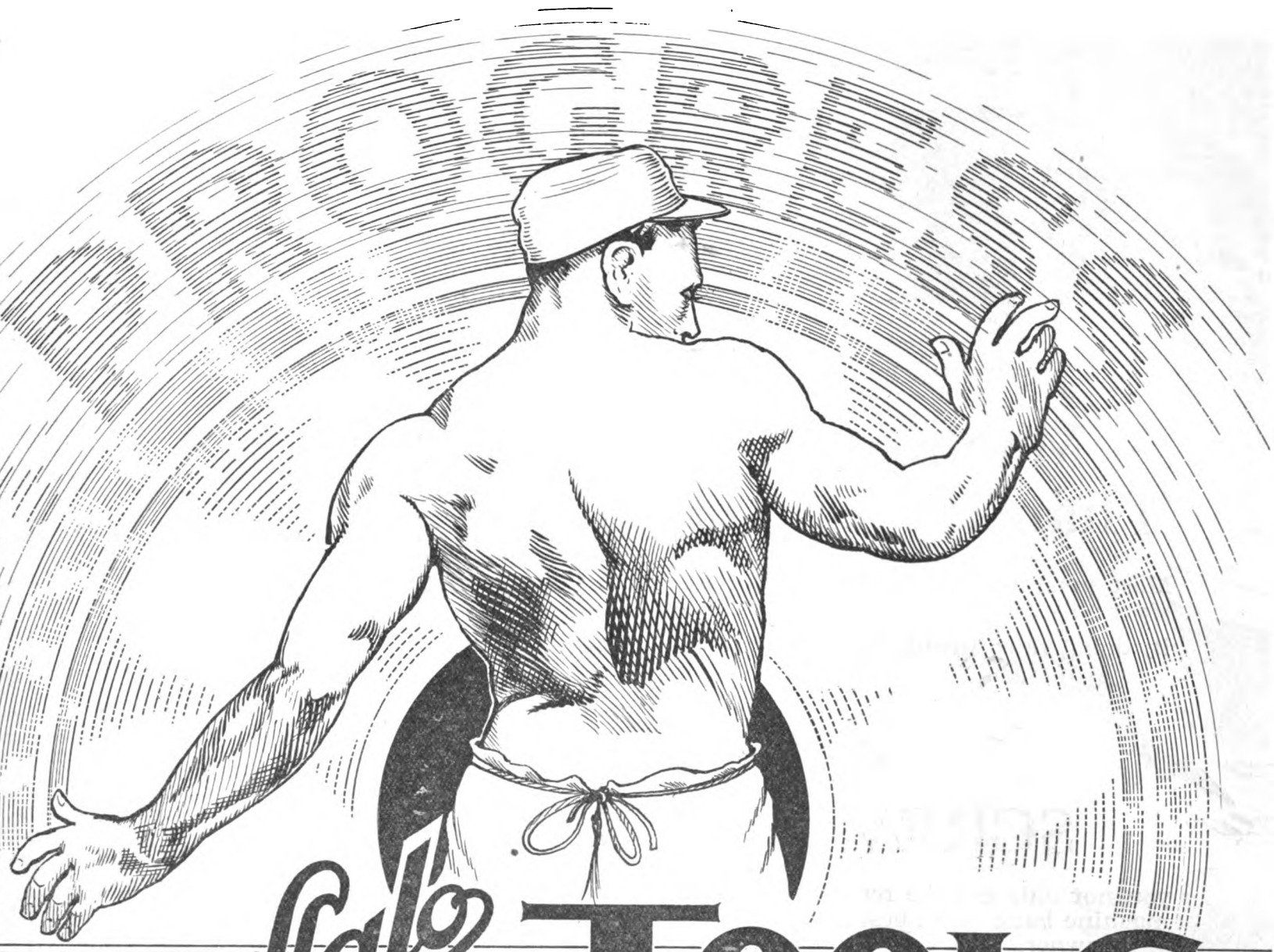
Thursday evening the annual banquet of the C. B. N. A. took place in the Louis XVI room of the Hotel La Salle and we are sure the members enjoyed themselves. There was also a reception and dance on Tuesday.

All in all, we can truthfully say that the forty-seventh annual convention of the C. B. N. A. in every way compared favorably with the previous conventions. Everyone was optimistic, and there was a feeling of good cheer which sent the members home feeling as Mr. Charles E. Adams said:

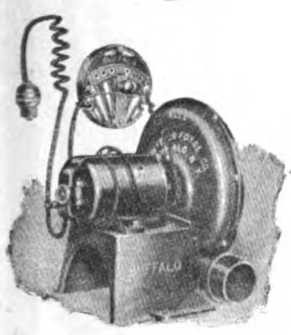
> ".....brighter and happier and rejoicing that we have twenty-five million horses and mules that can haul a buggy to smash."

We are indebted to the "Spokesman" Publishing Co. for a number of the cuts used in this report.

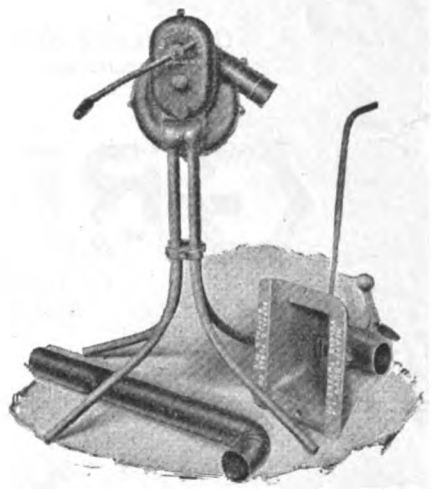
Digitized by Google

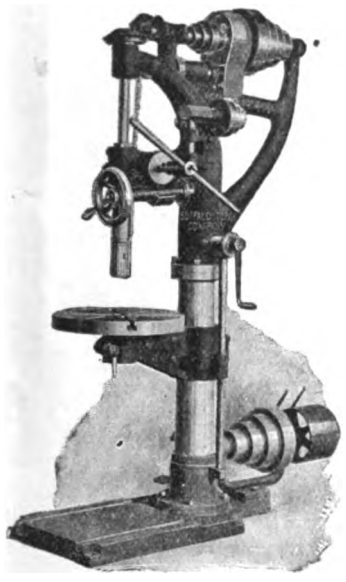


Buffalo TOOLS



MODERN SHOP EFFICIENCY

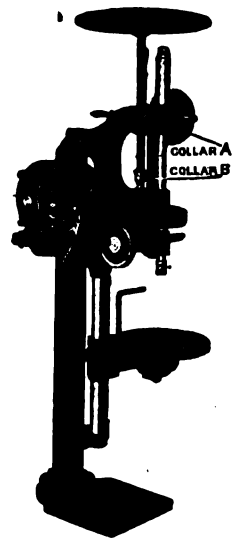




BLACKSMITHS AND GARAGEMEN are determined to have the best that may be had in Blacksmith Shop Equipment.

The work of the modern shop demands modern efficient tools—tools that will stand up under severe service.

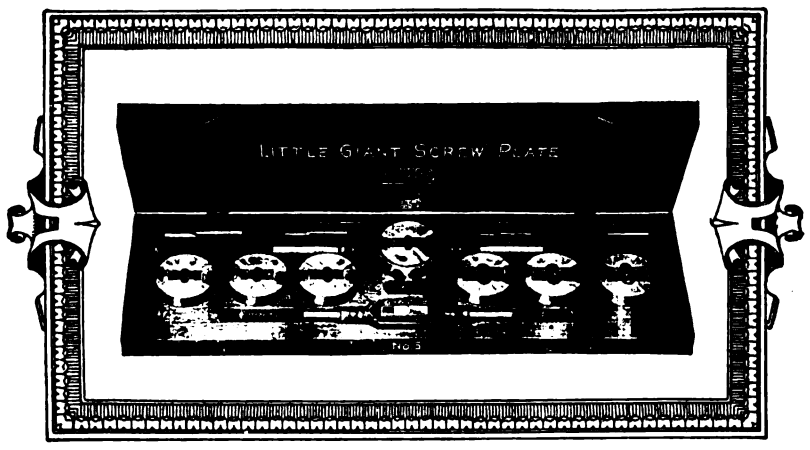
Forges; electric blowers; drills—floor and post type; shears—for cutting angles, bars and sheets—and of every size from the little bench type hand power shear to the heaviest power shear made—these are the tools you should know about.



Buffalo Forge Company, Buffalo, N. Y.

WRITE DEPT. 6 FOR CATALOG

Digitized by Google



A Machine is No Better Than its Threaded Parts

Most machines are built right—but they are built to *stay right* only as the threaded parts fit.

By doing your thread-cutting and re-threading with

GTD

Look for the trademark

SCREW PLATES

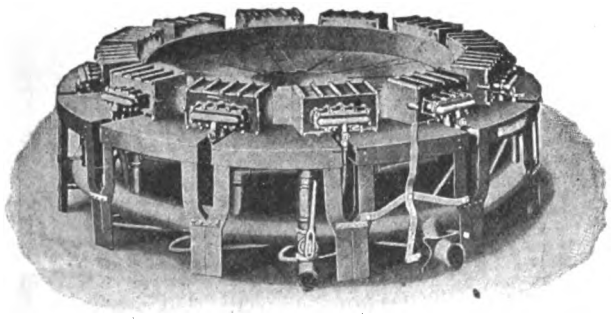
you not only get the repair jobs done quickly—but put the machine back at its best order—to the complete satisfaction of its owner.

For auto, tractor, implement or machine repair work, these handy tools are reliable, reasonably priced and always in the stock of good dealers. The first choice of experts for nearly fifty years.

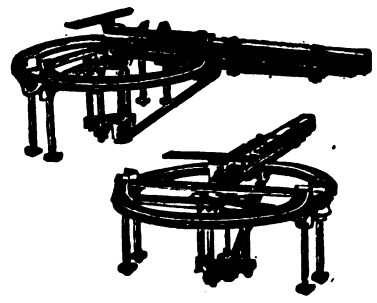
"LITTLE GIANT," "O. K.," "GREEN RIVER," "LIGHTNING,"
The Screw Plates that save you dollars.

Our catalog shows cuts of special Screw Plates for all kinds of auto repair work. Requests will be promptly complied with.

GREENFIELD
TAP & DIE CORPORATION
Greenfield, Massachusetts, U.S.A.
World's Largest Manufacturers of Screw Cutting Tools





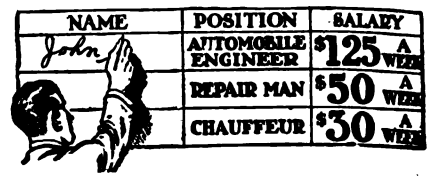


TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas, Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.
OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.

Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE GOGEL MFG. CO., TOLEDO, OHIO.

Advertising Rates in The Blacksmith and Wheelwright made known on application.



Put Your Name On This Pay-Roll

Men like you are wanted for big-pay positions in the fascinating field of automobile engineering. We have made it easy for you to fit yourself for one of these positions. You don't have to go to school. You don't have to serve an apprenticeship. Fifteen automobile engineers and specialists have compiled a spare time reading course that will equip you to be an automobile expert without taking any time from your present work.

AUTO BOOKS

6 Volumes Shipped Free

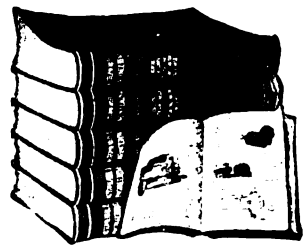
Partial List of Contents
More than 100 Blue prints of Wiring Diagrams
Explosion Motors
Welding
Motor Construction and Repair
Carburetors and Settings
Valves, Cooling
Lubrication
Fly-Wheels
Clutch
Transmission
Final Drive
Steering Frames
Tires
Vulcanizing
Ignition
Starting and Lighting Systems
Shop Kinks
Commercial Garage Design and Equipment
Electrics
Storage Batteries
Cars and Repair
Motorcycles
Commercial Trucks
Glossary

Now ready for you—an up-to-the-minute six-volume library on Automobile Engineering, covering the construction, care and repair of pleasure cars, motor trucks and motorcycles. Brimming over with advanced information on Lighting Systems, Garage Design and Equipment, Welding and other repair methods. Contains everything that a mechanic or an engineer or a motorcyclist or the owner or prospective owner of a motor car ought to know. Written in simple language that anybody can understand. Tastefully bound in American Morocco, flexible covers, gold stamped, 2,650 pages and 2,100 illustrations, tables and explanatory diagrams. A library that cost thousands of dollars to compile but that comes to you free for 7 days' examination.

Only 7c a Day

Not a cent to pay in advance. First you see the books in your own home or shop. Just mail coupon and pay express charges when books arrive. You can read them and study them for seven whole days before you decide whether you want to keep them or not. If you like the books send only $2 in seven days and $2 a month until the special introductory price of $19.80 has been paid. (Regular price $30.00.) Along with the set goes a year's consulting membership in the American Technical Society. (Regular price $12.) This great bargain offer must soon be withdrawn.

Send No Money Now



Don't take our word for it. **See the books without cost.** There is so much profit in this offer for you, that we urge you to waste not a moment in sending for the books. **Put the coupon in the mails today. Send no money — just the coupon!**

American Technical Society, Dept., A-67, Chicago, Ill.

American Technical Society,
Dept. A-67, Chicago, Ill.

Please send me the 6-volume set, Automobile Engineering, for 7 days' examination, shipping charges collect. If I decide to buy, I will send $2 within 7 days and the balance at $2 a month until the $19.80 has been paid. Then you send me a receipt showing that the $30.00 set of books and the $12.00 Consulting Membership are mine and fully paid for. If I think I can get along without the books after the seven days' trial I will return them at your expense.

Name .....

Address .....

Reference .....

Digitized by Google



Made by the largest manufacturers of Horse and Mule Shoes in the world. Also manufacturers of

BULL DOG
TOE CALKS

PHOENIX HORSE SHOE CO.

ROLLING MILLS AND FACTORIES } JOLIET, ILL. POUGHKEEPSIE, N. Y.

CHICAGO, ILL.

Digitized by Google

YOU'VE GOT TO KEEP UP TO DATE TO GET THE MONEY!

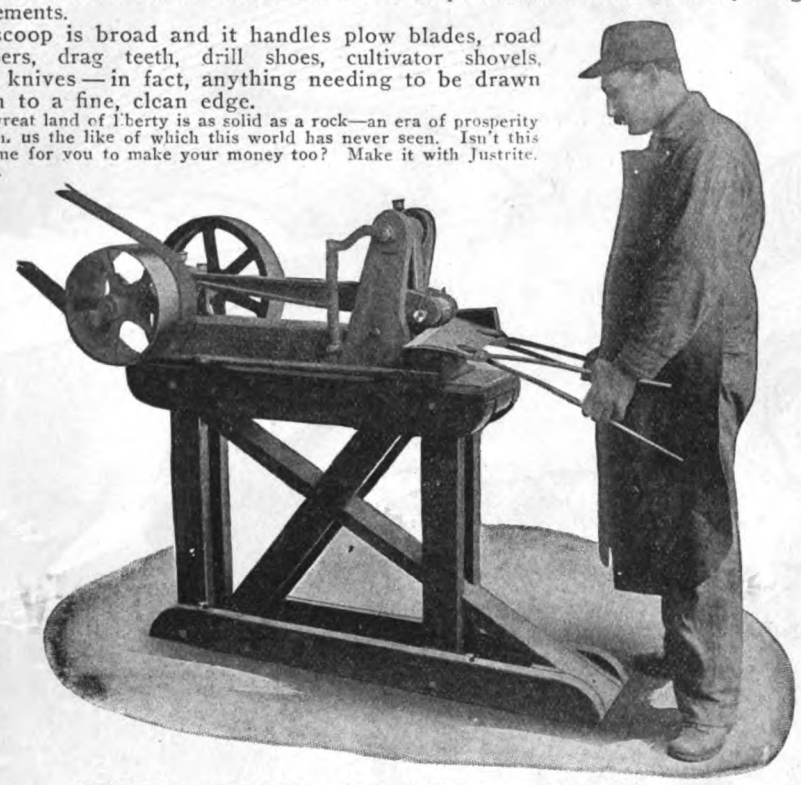
This is the live truth — we see before our very eyes the great period of reconstruction. Old methods are not just passing away — **they have passed!**

JUSTRITE PLOW BLADE SHARPENER

has any machine on this great green earth beaten to a standstill for strength, power, speed and profits? Two horsepower is all that is needed to handle it. The plow lay is simply worked back and forth across the Justrite anvil and the roller AUTOMATICALLY works the blade down to a clean, sharp, smooth edge — without battering or nicks. This ROLL is what makes the Justrite the most modern and the most profitable method of sharpening implements.

Its scoop is broad and it handles plow blades, road scrapers, drag teeth, drill shoes, cultivator shovels, corn knives — in fact, anything needing to be drawn down to a fine, clean edge.

This great land of Liberty is as solid as a rock—an era of prosperity is upon us the like of which this world has never seen. Isn't this the time for you to make your money too? Make it with Justrite. Write.



STRITE GOVERNOR PULLEY COMPANY
307-309 SOUTH THIRD STREET MINNEAPOLIS, MINNESOTA

I AM NOT TIED

To Old Time Methods Jus For Old Time Sake

This is the common sense attitude the up-to-date blacksmith takes when he uses.

Laffitte Brazing Plates

It is the new and better way to braze. All the necessary iingredients for a perfect braze are contained in the one piece.

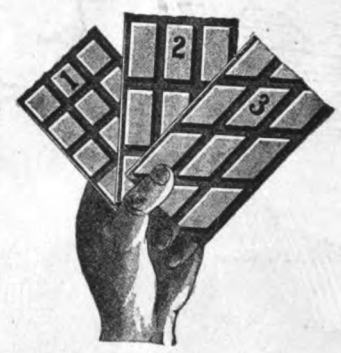
Quicker, Cleaner, Better Work. No Swelling, Blistering, Oxides or Residues. No loss of Spelter due to waste.



No. 1. For Brazing Brass, Red Copper and Bronze.

No. 2. For Brazing Red Copper and Iron.

No. 3. For Brazing Iron and Steel, unexcelled for Brazing High Speed tool steel points to mild carbon steel shanks.



Watch your step! Keep up to date —don't be tied down to old methods. Samples of Laffitte Brazing Plates, will be sent you by return mail, if you will send us your address.

The Phillips Laffitte Company
Pennsylvania Building Philadelphia, Pa.



"E-Z" and "Crescent" Welding Compounds

It Pays to Use Only the Best

For welding axles, tires, springs and lap welding of all kinds, no other compounds give you such uniformly perfect results at low heats as "E-Z" and Crescent Compounds. In all around blacksmith work they have no equals.

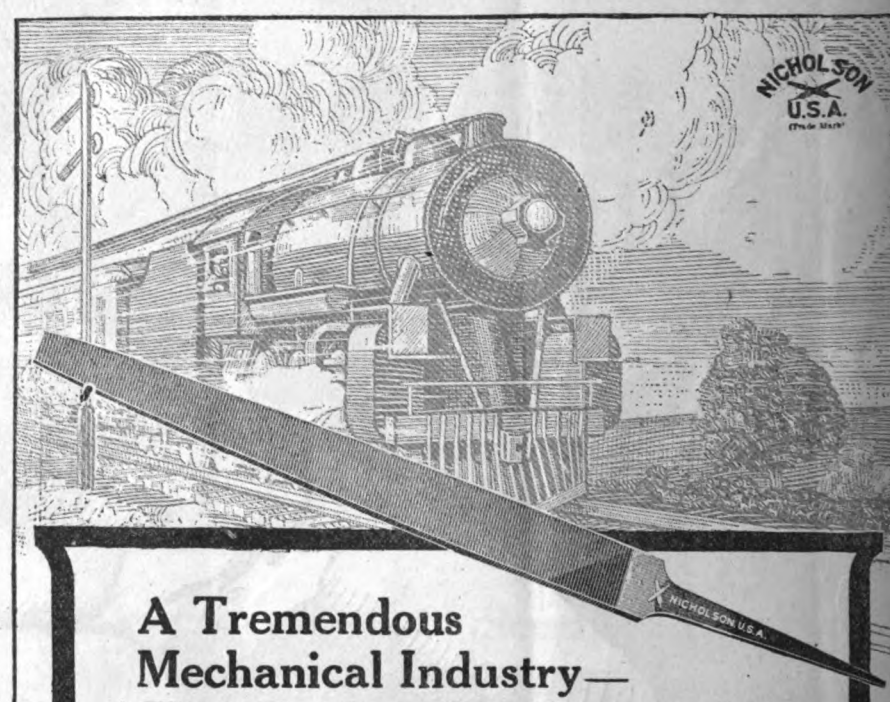
"E-Z" works equally well on all kinds of steel. Welds at lower heat. Sticks to the metal. Does not boil away and waste. Leaves no scale.

Crescent is especially good for plow work. Makes perfect welds on toe-calks. Insures smooth finish on split welds, finishing heats, welding under dies, etc.

Carried in stock by leading jobbers and dealers in United States and Canada. Your money back if not satisfied.

Write for large free sample.

Anti-Borax Compound Company
FT. WAYNE, INDIANA



A Tremendous Mechanical Industry— *The Railroads of America*

And for every thunderous mile that is covered by passenger train or freight, much *filing* must be done—filing to fit and filing to repair the mighty engines of internal trade. It is filing best done with

NICHOLSON FILES



Fastest and smoothest cutting files because every keen edged shearing tooth is cut at an angle exactly correct.

Longest-service-giving files because they're tempered invariably right.

Specify NICHOLSON'S for maintained filing Economy.

File Filosophy and the NICHOLSON Catalog are of vital interest to file users.

NICHOLSON FILE CO.
Providence, R. I., U. S. A.

Digitized by Google

NEW YORK PUBLIC LIBRARY
C
De 30

ESTABLISHED 1880

The Pioneer Journal of its Class

THE BLACKSMITH & WHEELWRIGHT

Devoted to the Interests of Blacksmiths, Wheelwrights, and Wagon Builders.

M. T. RICHARDSON CO., Publishers, 71-73 Murray St., New York. Registered in U. S. Patent Office.

Entered as Second-class Matter March 4, 1880, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Published Monthly.

Vol. LXXX. No. 6 NEW YORK, DECEMBER, 1919 TERMS: { Foreign, $1.50. (6s. 3d.) / One Dollar a Year.

THE ART OF HORSE SHOE MAKING



WE MAKE
SHOES
TO MEET EVERY REQUIREMENT

Here Are a Few of Our Specialties

Sideweights—Bryden "C" Horse and Mule Ideal Calked — Toeweight — Clipped Goodenough.

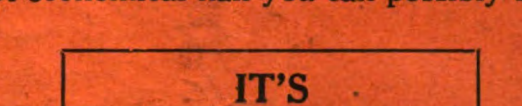
Send for Descriptive Catalog which Shows Our Full Line with Weights, Etc., Etc., Etc.



Bryden Horse Shoe Works
Catasauqua, Pa.



There is One Particular Nail



which will drive easily where you want it to go—which will not crimp or split—which will prove itself the most economical nail you can possibly buy. . .

IT'S
"THE CAPEWELL"
HORSE NAIL

Why accept something inferior when you can get the very best nail at a fair price? The Capewell having no equal in quality is by all odds the cheapest in the long run. Capewell customers are satisfied customers. . . . . .

The Capewell Horse Nail Company
HARTFORD, CONN., U. S. A.
The World's Leading Horse Nail Manufacturers

Hi-Lo-Jacks
Six Sizes



Close to 6 in.
Extend to 17 in.

Capacities ½ to 12 tons

Made by
The RoweCalk & Chain Co.
Plantsville, Conn.

SEND US YOUR NAME



and Address and you'll get information worth while regarding this splendid Shear and Punch.

THE MARVEL
A Double Lever Machine.
One man does all the machine is capable of and he faces his work all the time.

ARMSTRONG-BLUM MFG. CO.
340 N. Francisco Ave., Chicago, Ill.

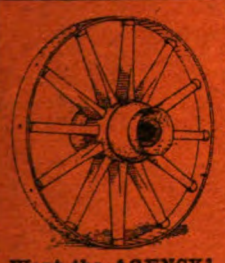
THE TEETH IN
BLACK DIAMOND RASPS
ARE MINGLED
So as to Cut Clean and Free and Leave no Furrows in the Work

Twelve Medals of Award by Jurors



At International Expositions

C. & H. BARNETT COMPANY
Black Diamond File Works, PHILADELPHIA, PA.
Owned and Operated by NICHOLSON FILE CO.
Copy of Catalog sent Free to any interested file users upon application.



WONDERFUL INVENTION

Makes the repaired WOOD Wheel better than new. Guarantee every wagon against loose tires or dished wheels.

PLEASE EVERY CUSTOMER

Saves Time, Costs Less, A Business Builder, A Money Maker.

Want the AGENCY! Then WRITE TODAY.

ADJUSTABLE WAGON TIRE MFG. CO.
Shipping Point Near You. OKLAHOMA CITY, OKLA.



SUREGRIP CALKS

American Calk Co.
DETROIT, - - - MICH.

AETNA STEEL TOE CALKS
Made by THE AETNA NUT CO., Southington, Conn.
BLACK HORSE BRAND

BEST SHAPE
BEST SPUR
TO DRIVE
BEST STEEL



TOE AND HEEL CALKS

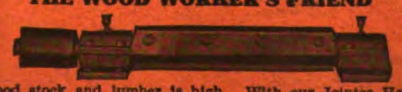
SOLD BY ALL DEALERS

Stokes Bros.' Improved Horse Rasps
Every Rasp Warranted Perfect



STOKES BROS. MFG. CO., Freehold, N. J., U. S. A.

THE WOOD WORKER'S FRIEND



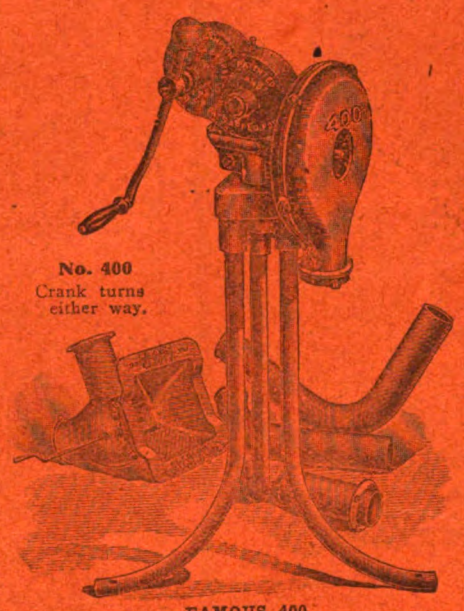
Wood stock and lumber is high. With our Jointer Heads you can buy rough lumber of any kind and dress it to suit your job. Saves time, money and lumber. Would this be any object to you? If so, get circulars and prices. Sold on 30 days' trial. Manufactured by
Whisler Mfg. Co. Gibson, Iowa

STEEL STAMPS
BURNING BRANDS
RUBBER STAMPS
STENCILS
GEO. M. NESS, JR.
61 FULTON ST. NEW YORK
Send for price list.

Digitized by Google

WORK WITH THE FAMOUS CHAMPION BLACKSMITH TOOLS





No. 400
Crank turns either way.

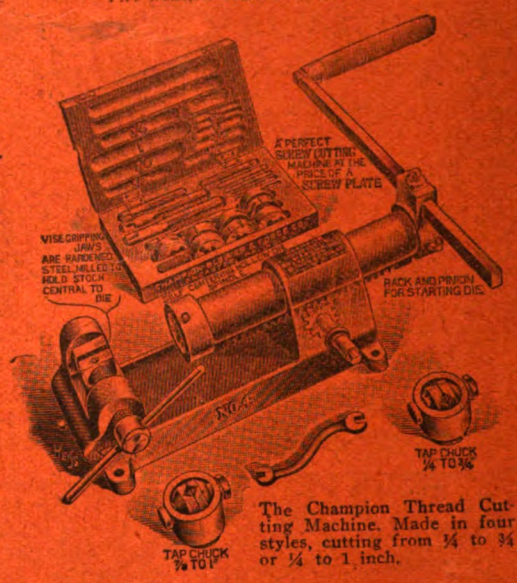
FAMOUS 400

Don't Fail to Get Our 1918 Catalog

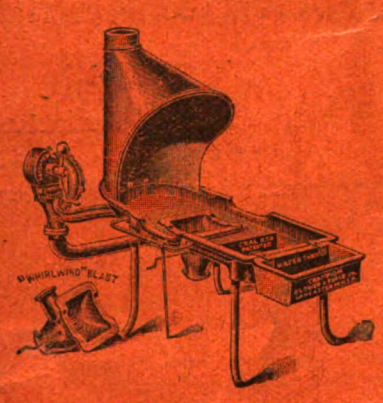
Before purchasing a Hand Blower Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power and Electric Blower, Hammer, Punch, or Shears, write for our free catalog, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



The Champion "Columbian" Tire Bender. Made in 8 sizes.



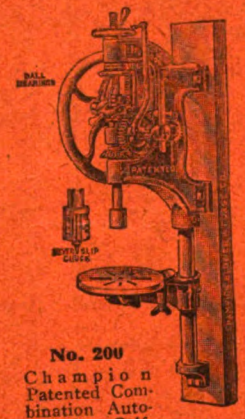
The Champion Thread Cutting Machine. Made in four styles, cutting from ¼ to ¾ or ¼ to 1 inch.



No. 433. Cast Iron Blacksmith's Forge.



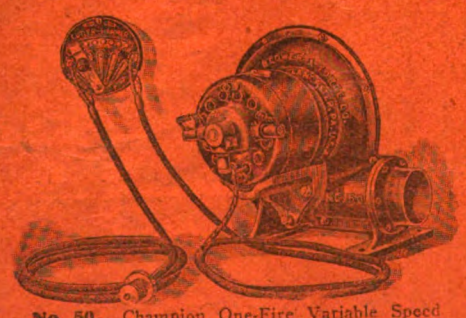
No. 4. American Tire and Axle Shrinker. Will shrink up to 4x1 inch round edge tire, and axle up to 1¼ inch.



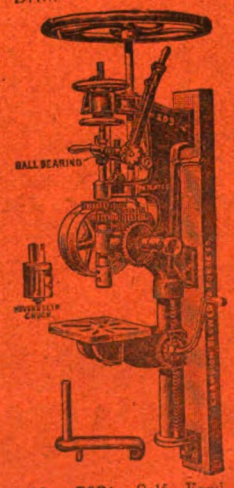
No. 200
Champion Patented Combination Automatic Self-Feed and Double Compound Lever Feed Upright Post Drill.



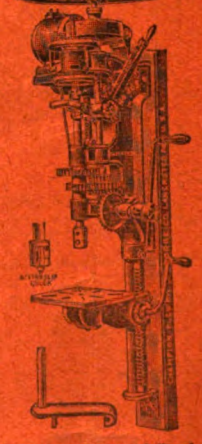
No. 408. Steel Blacksmith's Forge.



No. 50. Champion One-Fire Variable Speed Electric Blacksmith Blower.



No. 203. Self-Feed and Double Compound Lever Feed Drill.



No. 203. Self-Feed and Double Compound Lever Feed, Electrically Driven Post Drill.



Hercules Patented Power Hammer. Weight of ram, 65 pounds.

CHAMPION BLOWER AND FORGE CO - LANCASTER PA · U·S·A·

SOLE AGENTS FOR GREAT BRITAIN AND IRELAND FARMER & CO - CLERKENWELL LONDON

Digitized by Google

OUT OF THE (A) COMES BETTER PAY THAT'S BECAUSE THE SHOE'S O. K.



American Horse and Mule Shoes

Quality is infinitely more important than price – the worth-while customer will always pay the price for the right quality. Our (A) mark on horse shoes is an insurance policy for the purchaser, denoting the unvarying quality that has made American Horse and Mule Shoes a pleasurable possession. When you make an all-time patron out of a one time purchaser, Mr. Blacksmith, you have accomplished your greatest business desire—because you see growth—it means a steady income. That's what contact with that (A) means to you—for out of the comes better pay—that's (A) because the shoe's O. K.



Perhaps the man you was talking to put the catalog in his pocket-all right-send for another.

AMERICAN HORSE SHOE COMPANY

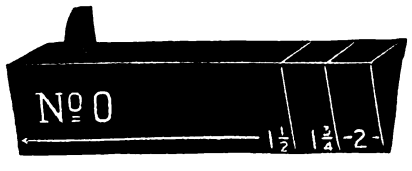
ROLLING MILLS WORKS AND OFFICES

PHILLIPSBURG - - - NEW JERSEY

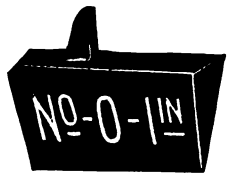
American Toe and Heel Calks

The assertion that American Toe and Heel Calks are better calks is no mere claim. It is a well substantiated fact, which can be demonstrated thoroughly to your own satisfaction at any time. Get your order in today.

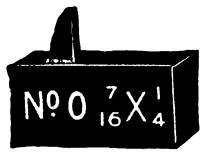
SHARP PATTERN



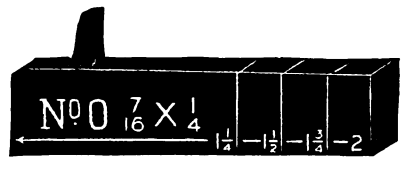
SHARP



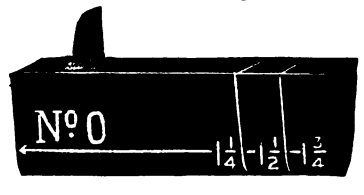
BLUNT



BLUNT



COUNTRY PATTERN
Half Sharp



Digitized by Google

UNIFORMITY

SHELDON AXLES AND SPRINGS

HAVE LONG BEEN

INTERNATIONALLY FAMOUS

For Their Superiority In

DESIGN, MATERIALS and WORKMANSHIP

REASON:

Sheldon Took Guesswork Out of Axle and Spring Manufacturing

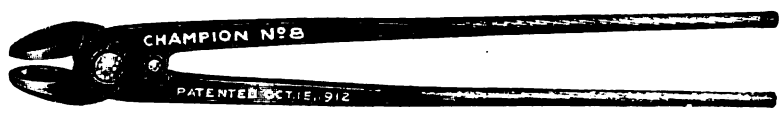
which means

UNIFORMITY OF PRODUCT

Sheldon Axle & Spring Co., Wilkes-Barre, Pa.

A NEW TONG

One tong to take the place of all the tongs on the shoer's forge



Nothing to get out of order.
Will hold securely any size of shoe.
No. 8 16 inches long

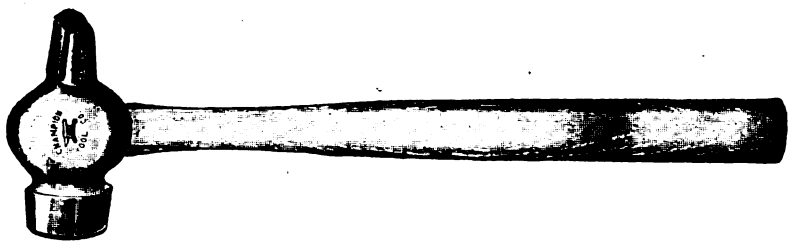
This tool is so constructed that it automatically adjusts itself to any thickness of shoe. The jaws are milled and are therefore parallel. The tong is correctly designed, having nicely tapered reins. TRY A PAIR—YOU WILL BUY MORE.

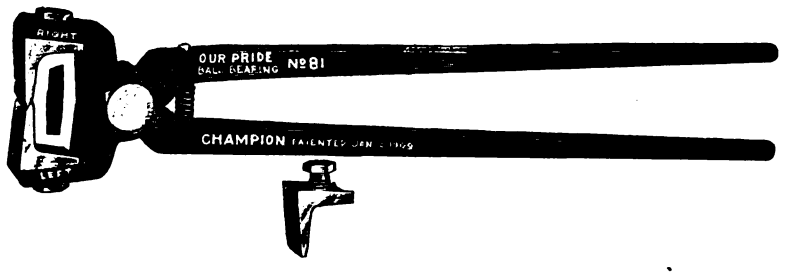
No. 12 ELECTRIC SHARPENING HAMMER

Weights, 1¾ to 3 lbs. Corrugated Pein.

This Hammer is the most popular Sharpening Hammer on the market.

IT GIVES RESULTS





OUR PRIDE — BALL BEARING HOOF SHEAR

This tool hardly needs an introduction as you are probably using one. IF NOT, someone else has purchased yours because he knows how good it is.

Blades easily replaced when worn out.

All parts interchangeable.

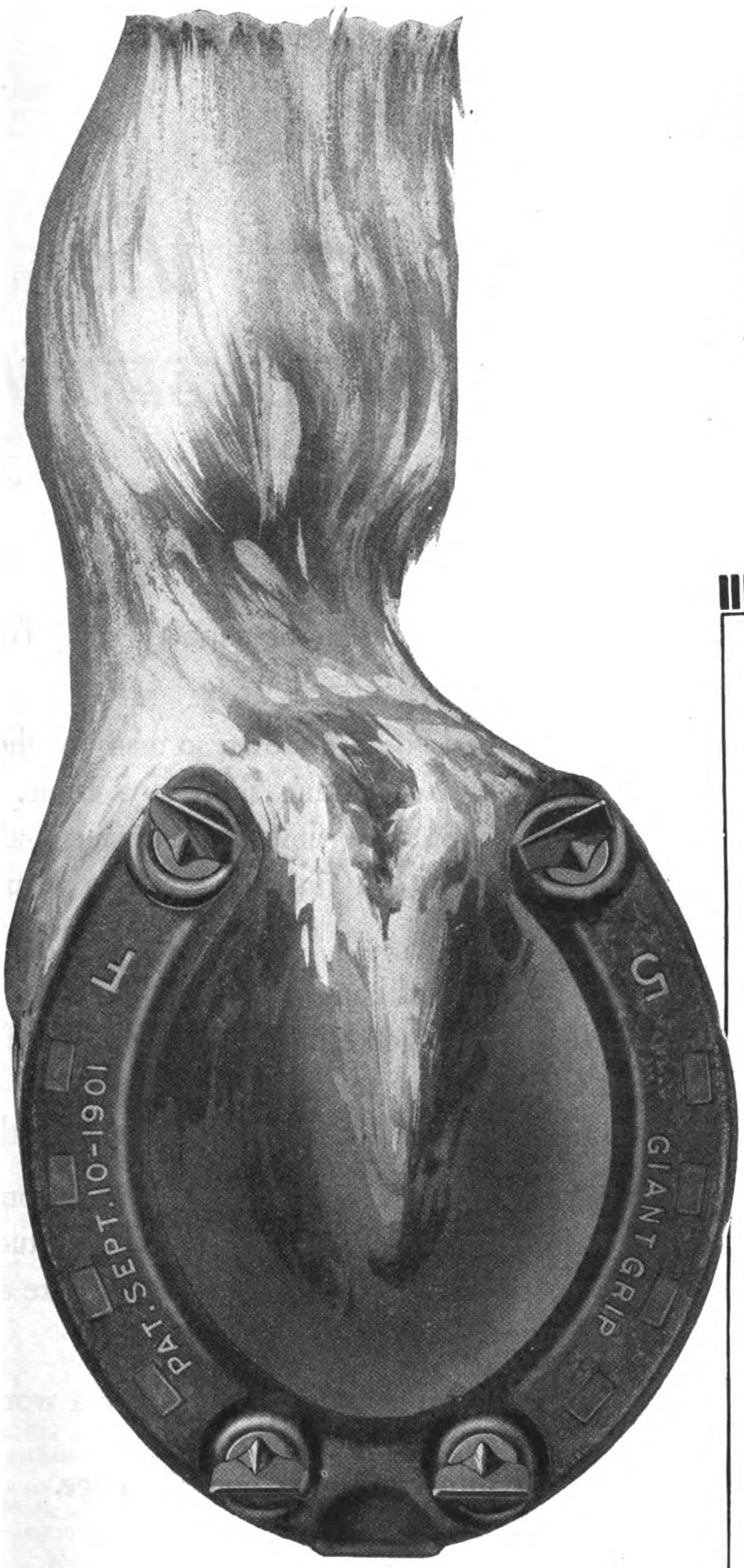
Our new catalog No. 65, showing 92 labor saving tools, mailed free on request.

CHAMPION TOOL COMPANY Meadville, Pa., U.S.A.

THE LIVINGSTON CO., 131 E. 23rd Street, NEW YORK, Eastern Representatives

Digitized by Google

Giant Grip



Shoes
Calks
Tools

"GIANT GRIP" Shoes and Calks give sure footing on icy roads and pavements. Their accurate fit and exceptional strength assure the fullest measure of protection to draft or driving horses.

The tough horseshoe steel used in Giant Grip Shoes insures them against breakage of any kind. Long experience has taught us the scientific shaping that makes them easiest to fit. Calk holes are strongly reinforced, nail holes accurately placed and punched clean.

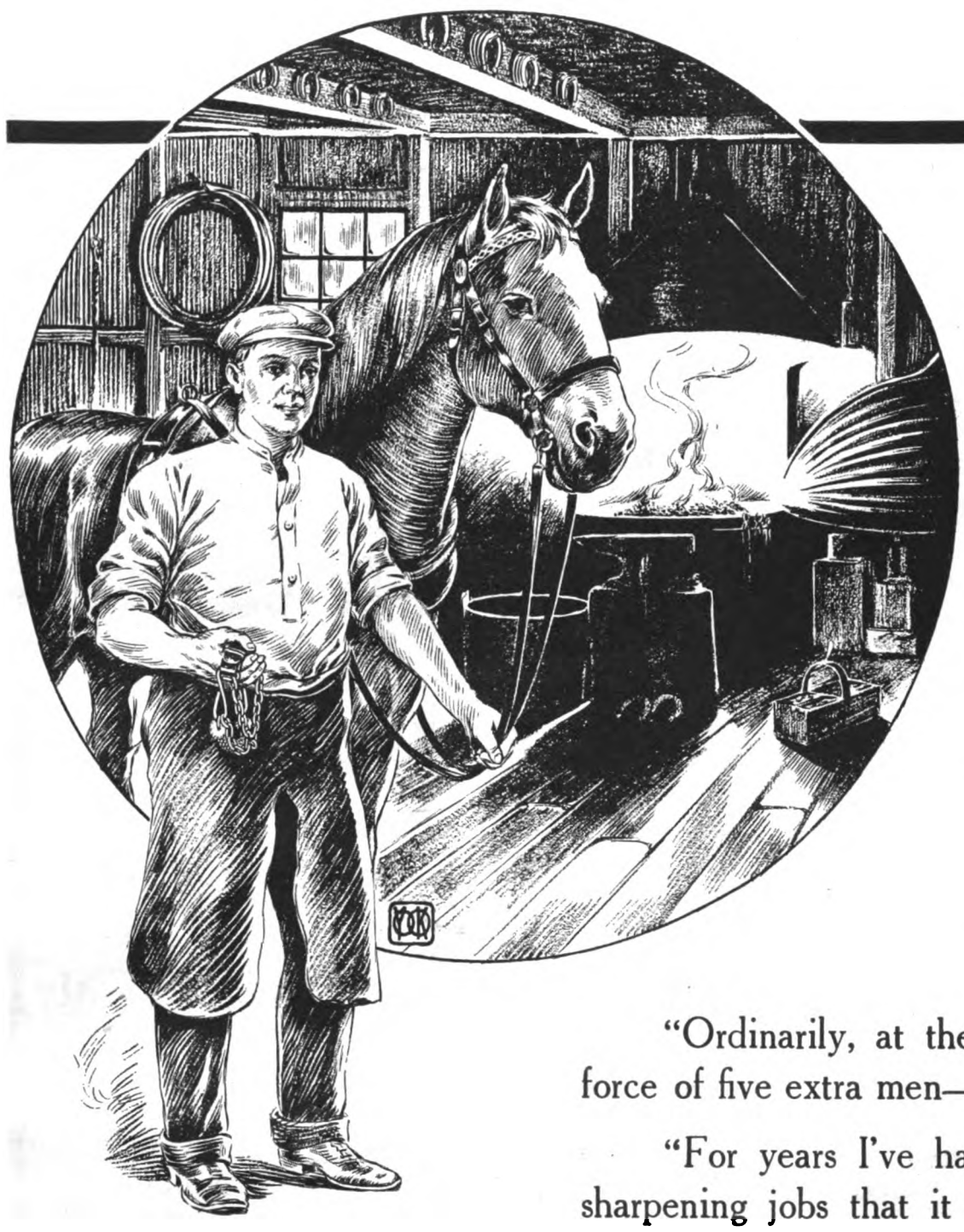
The calks are correctly tempered to give maximum hardness and wear. The shanks fit the holes with absolute accuracy.

Write for catalog and price list

Giant Grip Horseshoe Company

Oshkosh, Wisconsin

Digitized by Google



Jim, the blacksmith, says:

"Ordinarily, at the first sign of slippery going I'd need a force of five extra men—and I wouldn't get 'em.

"For years I've had to turn down so many of these shoe sharpening jobs that it was nothing short of a crime. It was always that way at ice and snow time; horse owners and drivers swooping down on me with a rush—every man wanting his work done first.

"With only two pairs of hands—my own and my helper's—I was compelled to see good, big money slip away from the shop door—but I do not have to stand for it any more, because I have got something so good that it successfully stops the leak.

"I sell American Chain Over-Shoes to every customer who cannot await his turn for sharpening, and thus I effectually kill all disappointments—hold all my customers, and I make a bigger profit in the bargain.

"I do all this without so much as touching a work tool."

Read full information on opposite page.

AMERICAN CHAIN

TRADE MARK REG. U.S. PAT. OFF.

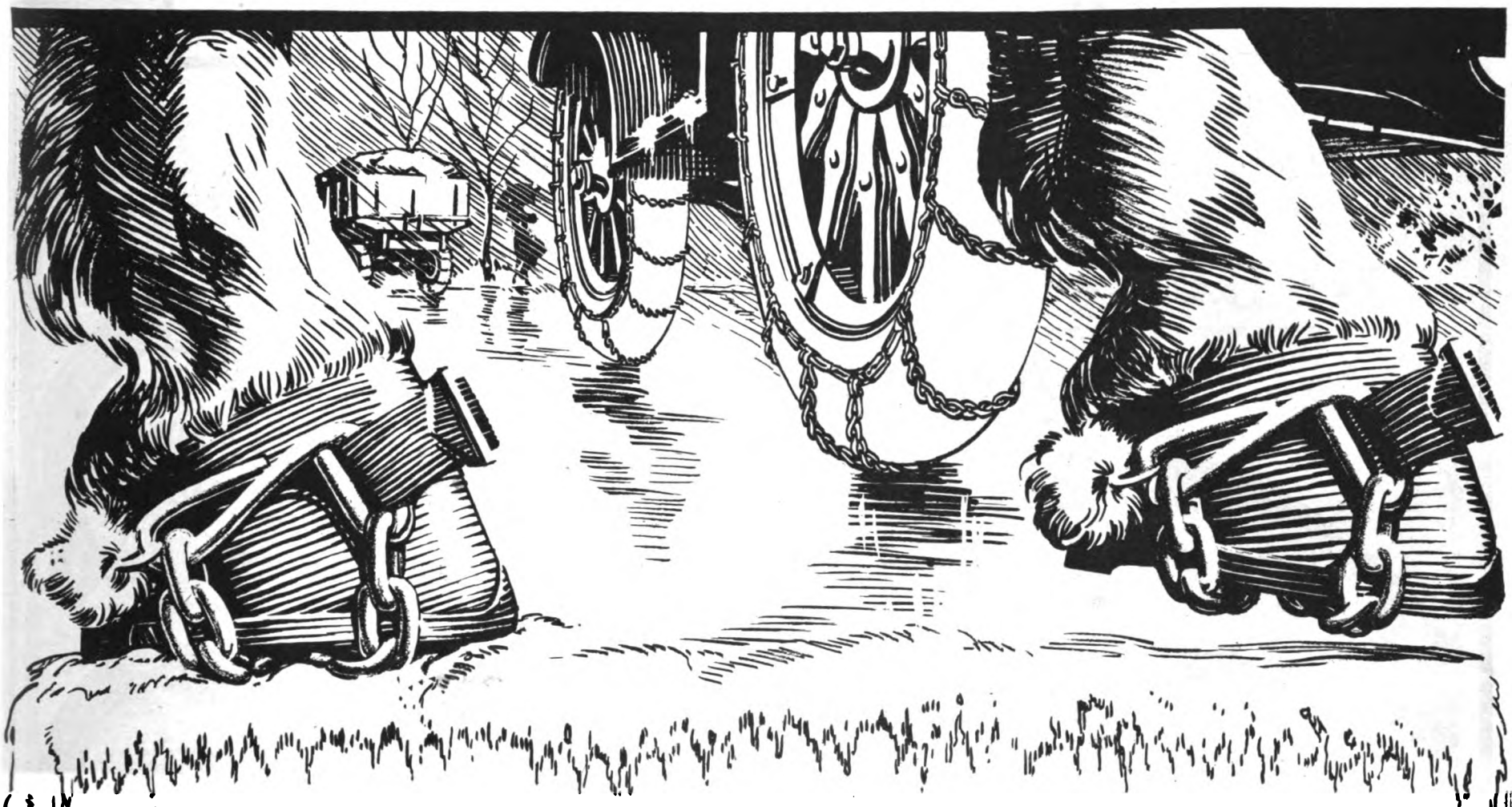
General Sales Office:
Grand Central Terminal
New York City

BRIDGEPORT,
In Canada — Dominion Chain
Largest Manufacturers

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers

Digitized by Google

—And now you can "Weed Chain your Horse to Safety"



AMERICAN CHAIN OVER-SHOES

Protected by American and Foreign Patents

The Principle of the Weed Tire Chains for Automobiles and Motor Trucks Humanely Adapted to Horses' Hoofs

American Chain Over-Shoes make horses sure-footed on ice and snow covered roads and pavements. The Chains are so constructed and arranged that they give the animal 48 points of contact—12 under each foot.

Awarded a prize of $500.00 by the American Society for the prevention of Cruelty to Animals—the only one of its kind ever granted. Warmly endorsed by the Massachusetts S. P. C. A. and the New York Women's League for Animals.

American Chain Over-Shoes cannot injure the foot or leg in any way, as it is impossible for the chain or center link to touch the frog. They also prevent the "balling" of snow and ice in the shoe.

American Chain Over-Shoes enable a horse to step out fearlessly on the slipperiest pavements and roads, and thus every ounce of his strength can be used for pulling power instead of being wasted in pitiful efforts to keep on his feet.

It is cruelty to send horses out without American Chain Over-Shoes when pavements and roads are covered with ice or snow. They strain their muscles and tendons, fall and injure hips or knees; and sometimes break a leg which means the use of a pistol and the loss of valuable horse-flesh. American Chain Over-Shoes should be kept in trucks and wagons ready for use at the first indication of slippery going.

DIRECTIONS FOR ORDERING

No. 1	Horseshoe	(4½	in.	across	middle)	takes	No. 3	Over-Shoes
No. 2	"	(4½	"	"	"	)	"	No. 4	"	"
No. 3	"	(5	"	"	"	)	"	No. 4	"	"
No. 4	"	(5½	"	"	"	)	"	No. 5	"	"
No. 5	"	(5¾	"	"	"	)	"	No. 6	"	"

No. 6	Horseshoe	(6⅛	in.	across	middle)	takes	No. 6	Over-Shoes
No. 7	"	(6½	"	"	"	)	"	No. 7	"	"
No. 8	"	(7	"	"	"	)	"	No. 7	"	"
Extra Large Size								No. 8	"	"

The average 1400 lb. horse requires a No. 5 Chain Over-Shoe and the average 1600 lb. horse requires a No. 6 Chain Over-Shoe. American Chain Over-Shoes for Mules are made in small, medium and large sizes, and fit all mules. **Price for any size: $5.00 per set of four for horses or mules.**

For sale by Dealers in Blacksmith, Hardware and Harness Supplies. If you cannot obtain them from your dealer, send us his name and address, with $5.00 for each set of four of any size you require, and we will send them to any point in the United States you designate, all charges prepaid. For delivery in Canada send us $6.50 for each set of four that you require.

Mr- Dealer: Please order from your regular jobber. If he hasn't them in stock, write us and we will see that your needs are supplied.

COMPANY, Incorporated

CONNECTICUT
Co., Ltd., Niagara Falls, Ontario
of Chain in the World

DISTRICT SALES OFFICES

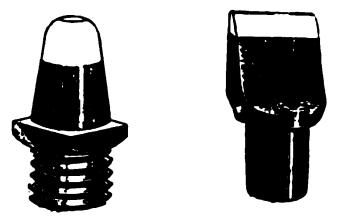
Boston	Chicago
Philadelphia	Pittsburg
Portland, Ore.	San Francisco

A C C
TRADE MARK REG. U.S. PAT. OFF.

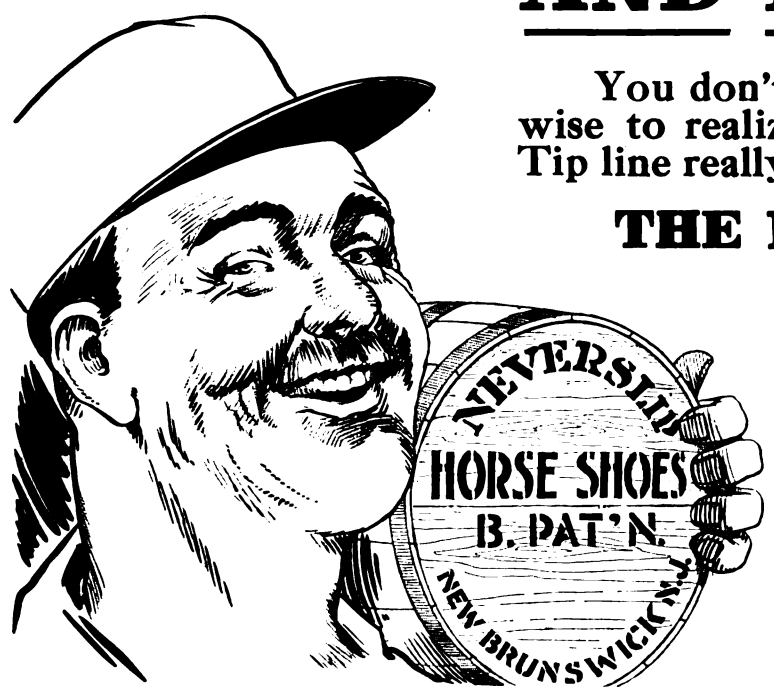
Digitized by Google

I'VE GOT MINE!

Fall in line men!—It's time to meet the Icy, Sleety weather. Having the goods while the going's good is the safest way to know that you're prepared for your customer when the going's bad—for the horse.



MEET THE DEMAND FOR
RED TIP CALKS—HORSE AND MULE SHOES



You don't have to be price-keen or style-wise to realize how vastly superior the Red Tip line really is.

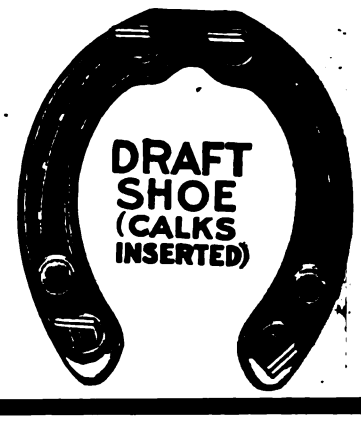
THE NEVERSLIP LINE

embraces all styles of Screw Calks, Iron, Steel and Extra Light Steel Shoes, Drilled or Calked; Drive Calks, Sharp or Blunt, Driving Draft or Mule Shoes and all necessary tools.



ORDER NOW

THE NEVERSLIP WORKS
New Brunswick, N. J.



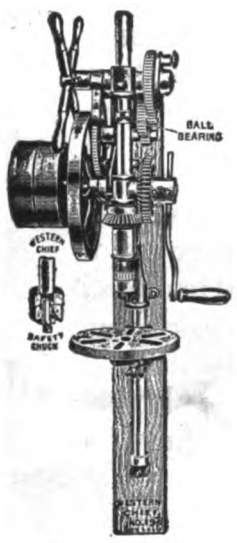
The Better Your Equipment The Bigger Your Profits

Buy CANEDY-OTTO
AND INCREASE YOUR INCOME

Once Tried, Always Used : There's a Reason—Quality

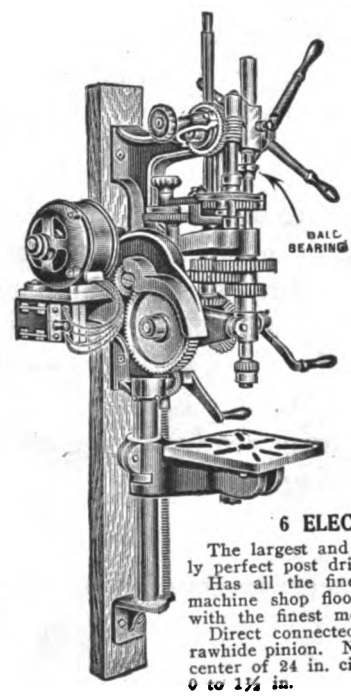
OVER 200 DIFFERENT STYLES

SEND FOR CATALOGUE No. 12



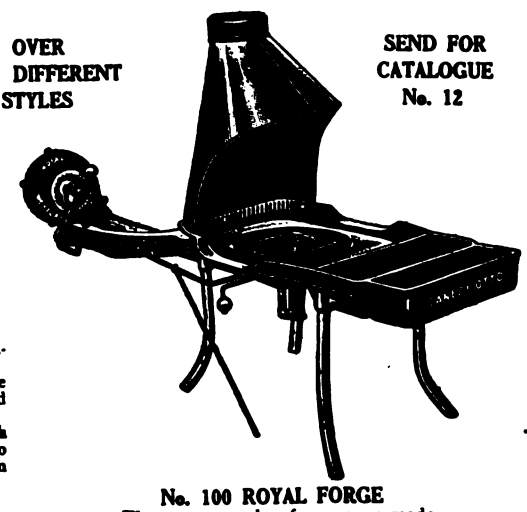
No. 19 DRILL

A low-priced combined hand and power self-feed drill.
Drills to center of 16½ in. circle.

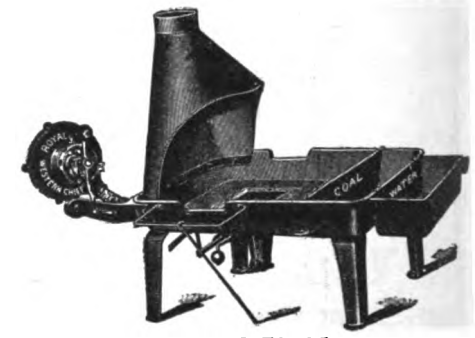


6 ELECTRIC DRILL

The largest and most mechanically perfect post drill manufactured.
Has all the fine features of the machine shop floor drill. Equipped with the finest motor obtainable.
Direct connected gear drive with rawhide pinion. No belts. Drills to center of 24 in. circle. Bores from 0 to 1¼ in.



No. 100 ROYAL FORGE
The most popular forge ever made.
Fan, 12 in. Hearth, 31½x45½ in.



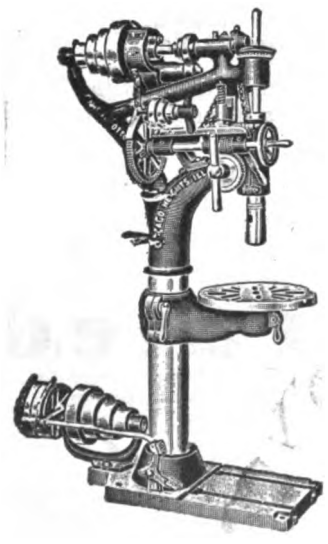
No. 9 ROYAL FORGE
Capacity for the heaviest work. Hearth, 38x50 in Blower, 13 in.



Blower, 12"
Wt., 135 lbs.
Height, 47"

ROYAL BLOWER
(Ask the man who owns one)

Gives more powerful blast than any hand blower made. Crank turns forward or backward.
Fire pot is 8x9 in. inside.

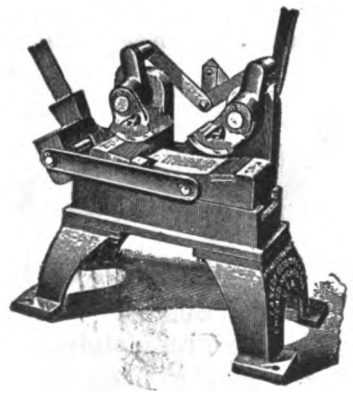


No. 36 POWER DRILL

A very valuable machine for all-around work. All parts are solid, simple and compact. The best of material and workmanship used throughout.
All machines are tested before leaving the factory, and guaranteed in every respect.
Drills to center of 21 in. circle. Also furnished with plain lever or wheel and lever feed only.

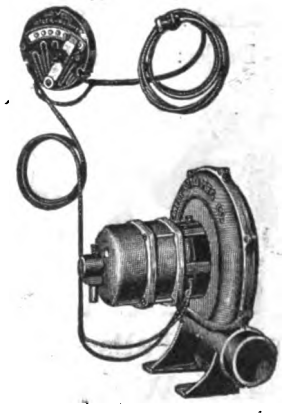
CANEDY-OTTO MFG. COMPANY

"Safety First—Insist on Canedy-Otto Tools"
Forges, Blowers, Drills, Punches, Shears, Shrinkers
CHICAGO HEIGHTS, ILLINOIS



No. 1½ SHRINKER

The most popular and easiest operated hot metal shrinker in the world. Will shrink from smallest to 4x1 in. round edge tire and 1¼ in. square axles.



No. 8 ELECTRIC BLOWER

The best outfit money can buy.

Digitized by Google

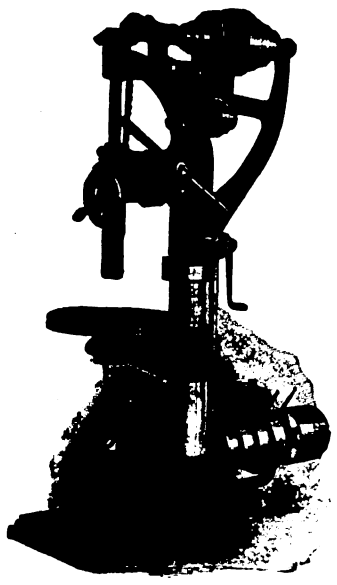


Buffalo TOOLS



MODERN SHOP EFFICIENCY

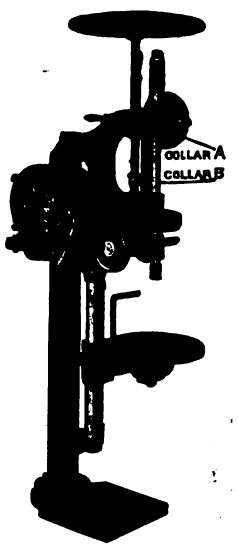




BLACKSMITHS AND GARAGEMEN are determined to have the best that may be had in Blacksmith Shop Equipment.

The work of the modern shop demands modern efficient tools—tools that will stand up under severe service.

Forges; electric blowers; drills—floor and post type; shears—for cutting angles, bars and sheets—and of every size from the little bench type hand power shear to the heaviest power shear made—these are the tools you should know about.



Buffalo Forge Company, Buffalo, N. Y.

WRITE DEPT. 6 FOR CATALOG

Digitized by Google

LINDE OXYGEN

From Coast to Coast 65 Producing Plants and Distributing Stations provide an unlimited supply of Linde Oxygen for users everywhere.

LINDE SERVICE means no investment except for oxygen actually received—no expensive overhead or upkeep charges.

Linde Oxygen may be obtained from any of the following Linde Plants and Distributing Stations where a large suppply of charged 100 to 200 cu. ft. cylinders is kept on hand constantly to insure immediate shipments.

Mail or telephone your order to THE LINDE AIR PRODUCTS CO., at the nearest point. Shipments will be made on day order is received.

PRODUCING PLANTS AND WAREHOUSES

Alabama
*Birmingham
10th Ave. & 28th St.
California
*Emeryville, Oakland
*Los Angeles
1405 Mission Road
Colorado
*Denver
S. B'way & Exposition Ave.
Connecticut
Hartford
1095 Main Street
District of Columbia
Washington
9th & Maryland Ave., S. W.
Georgia
*Alanta
Piyant St. & Southern R. R.
Savannah
OgeecheeCanal,So.of BaySt.
Illinois
*Chicago
3633 Wall Street
East St. Louis
6th & Walnut Ave.
Peoria
721-731 So. Washington St.
Indiana
*East Chicago
S.E.Cor. Kennedy& 145th St.
Fort Wayne
414 E. Columbia Street
*Indianapolis
2819 Roosevelt Ave.
Iowa
Davenport
118 Harrison Street
Des Moines
117 W. 5th Street
Kansas
Wichita
Rock Island Ave. & 2nd St.
Kentucky
Louisville
126 East Main St.
Louisiana
New Orleans
861 Fulton Street
Maryland
*Baltimore
25th & Montebello Ave.
Massachusetts
Cambridge
25 Waverly Street
Springfield
Napier Street
*Worcester
961 Southbridge St.
Michigan
*Detroit
St. Aubin Ave. & Newton St.
Grand Rapids
Pearl Street by the Bridge
Minnesota
Duluth
Seventh Ave., West
*Minneapolis
1809 Hennepin Ave.
Missouri
*North Kansas City
14th & Charlotte St.
*St. Louis
4218 Forest Park Blvd.
Nebraska
Omaha
1007 Jones Street
New Jersey
*Elizabeth
Linden Ave.
Newark
354 Plane Street
New York
Albany
Montgomery & Colonie Sts.
*Brooklyn
475 Driggs Ave.
*Buffalo
Broadway and Ideal Sts.
*Utica
Walnut & Schuyler Sts.
Ohio
*Cleveland
802 East 72nd Street
*Cincinnati
Stanton & Mellish Aves.
Columbus
310 Dublin Ave.
Dayton
521 E. First Street
Lima
338 East High Street
Ohio
Toledo
441 South Erie Street
*Youngstown
601-621 Jones Street
Oklahoma
Oklahoma City
27 E. Grand Ave.
Tulsa
1 North Boulder St
Oregon
Portland
15th & Hoyt Streets
Pennsylvania
Allentown
211 Gordon Street
Erie
1502 Sassafras Street
*Norristown
*No. Philadelphia
13th & Cambria Streets
Pittsburgh
16th & Pike Streets
*Trafford
Tennessee
Chattanooga
212-238 King Street
Memphis
203 Washington St.
Texas
*Dallas
Harwood and Coombs St.
Houston
Cedar and Baker Sts.
San Antonio
512 Dolorosa St.
Utah
Salt Lake City
112 West Second St., South
Virginia
*Norfolk
22nd St. and Colonial Ave.
Richmond
1709 E. Carey Street
Washington
*Seattle
Henrietta St. & 8th Ave., So.
Spokane
121-123 S. Madison St.
Wisconsin
Manitowoc
810 Quay Street
*Milwaukee
36th St. & National Ave.

(Star) * Designates Plants.

Other Plants and Distributing Stations are planned for other industrial centers throughout the country and will be established as fast as and wherever the local demand for oxygen warrants.

THE LINDE AIR PRODUCTS COMPANY

Largest Producers of Pure Oxygen in America

Forty-Second St. Building NEW YORK

Why Buy Two Sets When One Will Do.



It is no longer necessary to buy two sets of screw plates. You have all the sizes and pitches you can possibly require when your shop contains a

BUTTERFIELD Combined Automobile Screw Plate Assortment

No Blacksmith or repair man doing automobile work can be without these screw plates if he would have a properly equipped shop. The assortments are equipped with the ever-dependable Derby Dies. Each die is in a collet with guide attached.

Smiths who are using Butterfield sets write us that Derby Dies are the easiest and smoothest cutting dies on the market. Have you tried them? They are adjustable for tight or loose fits by a simple screw arrangement.

It will pay you to know which one of the several Butterfield screw plate assortments you need in your shop. Write us for complete information and let us help you become better equipped for your auto trade.

Butterfield & Company, Inc.
Derby Line, Vermont, U. S. A.

New York Store: 126 Chambers Street

THE HORSE RASP OF QUALITY



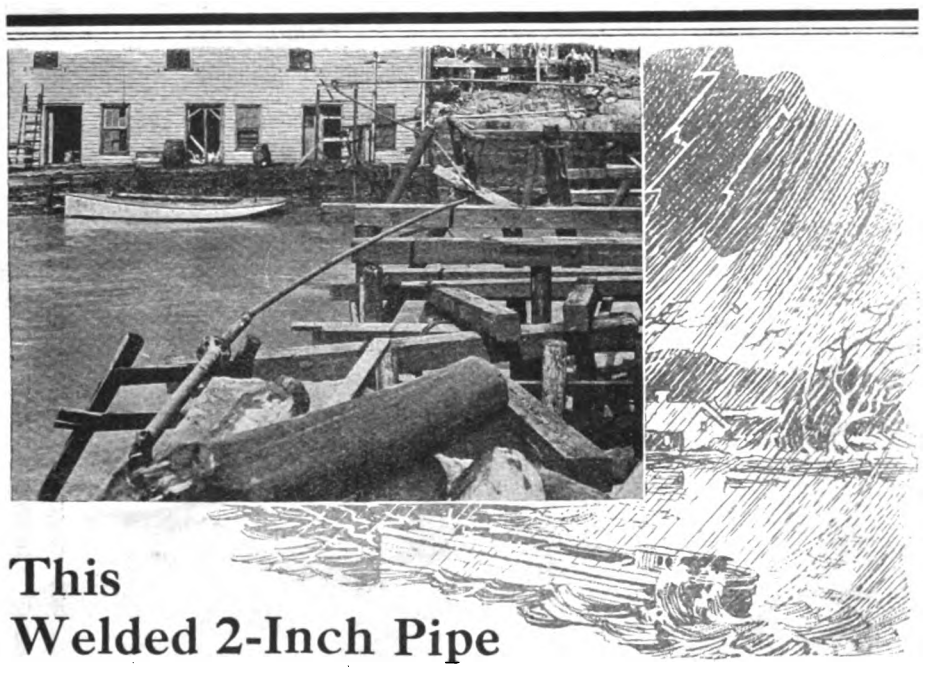
Ask Your Dealer for the *Improved*

HELLER RASP

with keen cutting hard teeth. Made in all patterns and cuts, "Slim," "Light," "Slim Light" and "Fine Cut." Insist on getting the size, kind and cut best suited for your work. It will pay you to give them a trial.

New catalogue mailed free on application.

HELLER BROTHERS CO., *Established in 1836,* Newark, N. J.



This Welded 2-Inch Pipe Stopped a Flood-Driven Barge —*And Never Sprung a Leak!*

TO meet a temporary situation, the load from a 6" high pressure gas main was put through this welded 2" pipe line, laid on temporary piling across a river.

Floods came, washed away the false structure of a new bridge, tore a barge loose from its moorings aud hurled the entire mass down on this slender 2" pipe.

It held them all. Not a single leak developed.

Wherever strength, permanence and tightness are essential, you will find joints are being welded—joined together "for keeps," using

Prest-O-Lite
DISSOLVED ACETYLENE

Nation-wide Prest-O-Lite Service brings straight to the user's hands a single cylinder of highest temperature gas—or hundreds of them.

Forty plants and warehouses insure Prest-O-Lite users prompt and adequate service; wherever located, there is an efficient Prest-O-Lite producing plant near.

THE PREST-O-LITE COMPANY, Inc. General Offices 30 E. 42nd St., New York
Kohl Building, San Francisco
1219 In Canada: Prest-O-Lite Co. of Canada, Limited, Toronto

THE ARMSTRONG MFG. COMPANY

BRIDGEPORT CONN., U.S.A. NEW YORK OFFICE 248 CANAL STREET

like their products, need no introduction to the experienced steam or gas fitter. To others, our catalogue No. 14 will show why we are so popular.



"Makers of the Genuine ARMSTRONG Stocks and Dies."

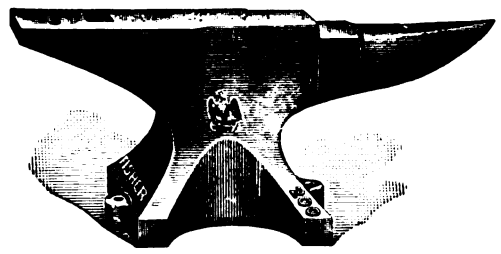
1843 **EAGLE ANVILS** 1919

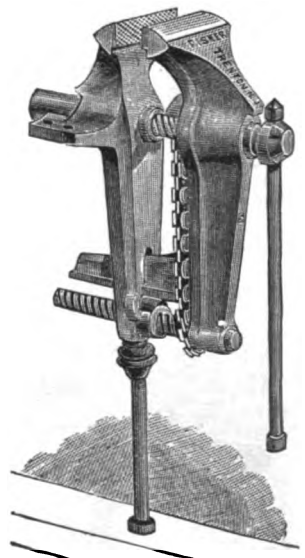
AND "FISHER" VISES

The favorites of thousands of Blacksmiths for three-quarters of a century. Why? Because they satisfy.

Write for descriptive circulars to us or dealer.

FISHER & NORRIS, "Eagle" Anvil Works
TRENTON, N. J.





Digitized by Google

THE

BLACKSMITH AND WHEELWRIGHT

Vol. LXXX. No. 6 NEW YORK, DECEMBER, 1919 { TERMS ONE DOLLAR A YEAR

Sick Cars and the Diagnosis of Trouble

How One May Find and Cure the Various Engine Troubles Commonly Occurring. The Last Article of the Sick Car Series

EVERY time I take a walk in the street and see abused automobiles limping along, I am prone to think of them as people. Every time I ride in an automobile, hear its grumbling and its moans, the resemblance is brought home to me strongly.

I have a neighbor who is a God-fearing man and looks as though he might be extremely kind-hearted as well as benevolent. The dogs on the street are his friends and I seldom hear him speak a harsh word to his nearest relative, his wife. At the same time, however, I will admit that I am a bit prejudiced against the gentleman. If there were a society for the prevention of cruelty to automobiles, my neighbor would soon find himself caught in its toils.

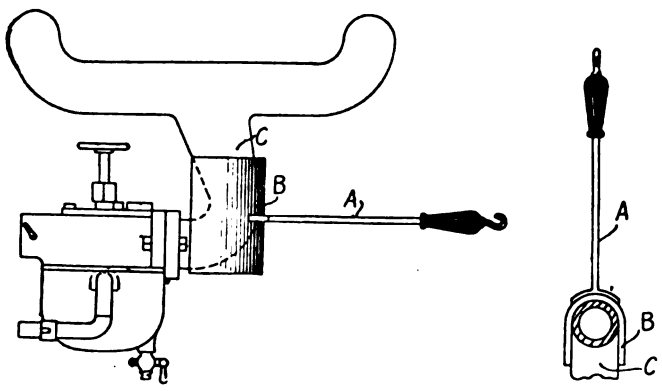
He has no mercy for his machine and I really believe if his automobile happened to lose three wheels, he would try to get home upon the fourth. I often wake in the middle of the night, my hair standing upright and a chill running down my spine, cold sweat on my brow, all from horror at the fearful moaning and wailing of his machine which he is enticing into his garage.

An automobile is very much like a person. Its years of life are short, but into these years are often crowded much kindness and usefulness for man.

Automobile sickness and ills may be divided into two great classes, nervous disorders and stomach trouble. Stop and think a minute and see if you can make any other classification than this. If an automobile engine stops it stops either because the ignition system has gone wrong or because it is not getting a sufficient supply of gas.

Now don't misunderstand me. I said automobile sicknesses. I didn't say automobile accidents, for it is not my intention to take up all of the accidents that an automobile might undergo.

An automobile's stomach is its carburetor. The carburetor is obliged to chew the food, if we may use this expression, mix it with the correct amount of air, or digest it, and pass it along to the engine in a digested condition. If the carburetor does not vaporize



A "Stomach Warmer." A, Handle; B, Iron Casting to Fit Manifold; C, Intake Manifold.

or chew its food completely, the engine acts sluggish or possibly does not run at all.

This trouble is noticeable particularly in the cold weather. The engine has a "stomach ache" and needs a hot-water bottle.

At the end of this month many motorists will be arming themselves with suitable medicines and paraphernalia to cure or prevent this disease which I call engine stomach trouble.

There is one medicine which can be carried in the tool kit very handily. Its action is immediate upon application. The medicine I speak of is ether. The dose ordinarily is about one spoonful. Divide this liquid into four portions and pour one portion into each priming cock. It is a predigested food and the engine usually starts off with a "bang" immediately.

Now ether for an automobile is like morphine for a person. Don't use it too much. Its affect may be lasting if it is used in quantities. Don't use it unless it is absolutely necessary.

A hot-water bag on its stomach often solves the problem. Let me tell you how to make a handy hot water bag for it. Take a long stocking and fill it with sand, or make up a tube two inches in diameter and twelve inches long and fill this with sand. On a cold winter's morning put this bag in the oven or near the furnace and let the sand warm through thoroughly. Then when you get ready to start your machine, wrap the bag around its "neck." I mean around the intake manifold just above the carburetor. In about two minutes the manifold will be warmed through and the engine can be started very easily.

Luckily, an engine does not mind extremes of heat and cold like a human being. This being the case, you don't need to worry about whether the sand is too hot or not. You can use a horseshoe around the manifold or most any piece of iron will answer the purpose if it is heated through before it is put in place. When an engine's stomach is warmed it digests the food much more easily than when it is cold. Just remember that, or in fact, if you know anything about physiology or anatomy, when there is something the trouble with the engine, compare it with a person and see if you cannot think of the remedy.

A few paragraphs back I suggested that automobile illnesses may be divided into two classes, stomach and nervous troubles. Let us see just what I mean by these two divisions. If an engine stops or will not start at all, it is because it is not getting an ignition spark or because it is not getting the fuel. Suppose you are out in the country and the engine refuses to exert itself, or in other words, "goes on a strike." First look and see whether it is getting anything to eat or not. That is, be sure that there is fuel in the tank. Then see if the pipe line is clear between the tank and the carburetor.

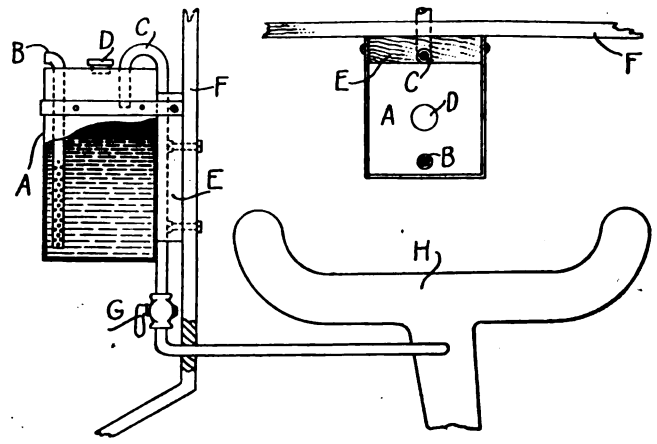
It is an easy matter to find this out if the carburetor is fitted with a drain cock. All you need to do is to open the drain cock and if gasoline flows from it, you can assume that there is gasoline in the carburetor. If, however, the carburetor is not fitted with a drain cock and there is no means for you to tell whether there is gasoline in it or not, try the following experiment:

Fill each pet cock with gasoline or if there are no pet cocks opening into the engine cylinders, remove the spark plugs and pour about half a teaspoonful into each cylinder. Close the pet cocks or replace the plugs, throw on the ignition switch and start the engine. If the engine runs a few explosions and then stops, the trouble is probably in its stomach.

It may be that the needle valve of the carburetor is stopped up, or it is very possible that there is dirt in some of the small gasoline passages in this device. Remove it from the car and clean it thoroughly. Before removing it, however, be sure that there is no trouble in the fuel line between the tank and the carburetor.

If after priming the engine still refuses to run, the trouble is probably in the ignition system. Some of its wires may be broken or some of the electrical units may be out of order.

You know that if the main nerves leading into your hand were cut, you could not move your hand. To a certain extent, the same thing is true of the engine. If any one of the wires is cut or broken between the ignition system units and the magneto or battery, then the engine cannot be made to operate



"A Medicine Feeder" for the Engine. A, Air Tight Tank; B, Inlet Tube; C, Tube to Manifold; D, Filler Vent; E, Bracket; F, Dashboard; G, Valve; H, Intake Manifold.

until the wire is repaired or replaced. There are two kinds of "nervous systems" installed on automobiles: single coil and multiple coil systems.

The single coil ignition systems are fitted with a device in the primary circuit called a breaker box and a device in the secondary circuit to distribute the current to the proper cylinder called a distributor. The multiple coil systems are provided with a coil for each cylinder and a device called a timer which automatically brings into action or completes the circuit for each coil in succession.

The coils are connected so that the timer will bring them into action in the firing order of the engine. Either type or coil system is easily tested.

If after priming the engine it cannot be started, remove all the spark plugs, leaving them connected with their respective wires. Put them on their sides against the cylinder head and crank the engine. A spark should appear at each plug in succession if the ignition system is in condition and should the spark not appear, then remove each secondary wire and while the engine is being cranked, hold it about one-quarter inch away from the metal of the engine. If the ignition system is in condition a spark will leap from the wire to the engine.

If a spark is not obtained at the plugs, while the engine is being cranked, the trouble is at some other point in the ignition system. In order to explain the method for finding ignition troubles, let us consider the various types of ignition systems.

The Single Coil System

First, the single coil system which employs a battery for the source of current. Remove the distributor cover and examine the breaker contact points. Upon turning the engine

Digitized by Google

over, these contact points should touch each other just as the pistons reach the top of their stroke, or shortly thereafter. If they do not touch, adjustment should be made so that they will touch at the proper point.

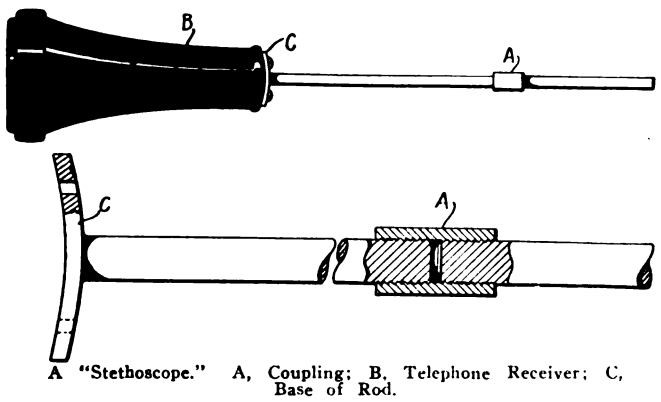
With the spark fully retarded the points should spring apart just as the piston has reached the top of its stroke, in some cases; in other systems they are together at the top of the stroke, and separate after the piston has traveled one-eighth of an inch downward. In every case they should snap apart after the piston has started on its down stroke. Adjust them so that when they are fully separated the clearance between them is approximately the thickness of a piece of paper or about .025 of an inch.

These contact points should be smooth and parallel with each other so that when they do come together, they touch across their full face. Turn the engine over until the contact points are together and remove one of the wires from the battery. Throw the ignition switch on and make a quick contact with the battery and the ignition wire which has been removed.

A spark should be had at this point. If not, indications are that the wiring is broken or disconnected between the battery and the coil or breaker box. It may be that the contacts are poor or that the wire is broken inside the insulation. Remedy this trouble.

There is one other possibility, however, and that is that the battery is not furnishing current. Take a short length of wire. Connect one end with one terminal of the storage battery and snap the other one across the other terminal quickly. Do not leave it connected as it will short-circuit the battery. The spark should be had when contact is made; if not, the battery should be replaced with a new one.

If in the first test a spark is had when the ignition wire is connected with the battery,



A "Stethoscope." A, Coupling; B, Telephone Receiver; C, Base of Rod.

put a piece of paper between the breaker points and try the experiment over again. In this test there should be no spark at the battery. If there is, it is an indication that there is a short-circuit in the line or one of the wires has been grounded. This short-circuited wire should be repaired or the break in the insulation covered to prevent grounding.

If it is found that the ignition system is all right from the coil to the breaker box, locate the secondary wire which leads from the coil to the center of the distributor. Remove this from the distributor and hold it about one-eighth of an inch away from the engine base.

Remove the piece of paper from between the breaker points and allow the points to come together. Snap them apart quickly and you should obtain a spark between the secondary terminal and the engine. If not, there is evidently trouble in the coil itself. Either repair this trouble or obtain a new ignition coil. If a spark is had, there is evidently trouble in the distributor. Clean this unit thoroughly with a cloth moistened with lubricating oil and wipe it dry.

See that the distributor brush functions properly and that all of the secondary wires are properly connected. After having made sure of this, make the first test again, when a spark should be obtained at all of the secondary terminals. If not, then the indications are that there is trouble in the plugs themselves.

Remove the porcelain and clean the plug with kerosene oil. Examine the porcelain for small holes or cracks.

If the system is of the multiple coil type, test the battery to make sure that is is furnishing current. Remove each wire in succession from the timer and touch it to the engine base. If any one of the coils does not vibrate, adjust the vibrator. If no current seems to pass through the coil, trace the wiring from the coil to the battery and also from the coil to the timer. Remove each of the coils that does not function from the battery box and see that the spring contacts touch the coils properly.

Make a secondary wire test as directed in instructions for single coil systems.

Magneto Systems

There are two types of magneto systems, low and high tension. The low tension magneto systems are divided into two classes. Magnetos of the ordinary magnet type driven through gearing or by belts from the engine, and the Ford magneto. The latter is different from any of those and perhaps the easiest tested of all. Remove all of the spark plugs so that the engine may be turned rapidly. Disconnect the wire leading from the magneto terminal to the coil box at the coil box terminal. While the engine is being turned over, touch this wire to the engine base. A spark should be noticed, and if not, there is trouble in the magneto. Remove the plug at the top of the magneto and clean it with a piece of waste and sandpaper. You will note that this plug is fitted with a point and a spring. The point rests upon the magneto terminal plate inside the housing. Clean this plate by means of a screwdriver or a chisel and replace the plug.

Be sure that the spring is drawn out enough so that it forces the point down upon the magneto terminal plate. Try the first test again and see if the spark can be had from the brush wire to the engine base. If not, it is best to have the magneto repaired by an expert.

There is little that can be done with the second type of magneto. If the magneto is of the low tension type and a coil is used, make the same tests as you made with the single coil system. In any type of magneto always examine the breaker box first. Be sure that the contacts are clean and that the points come together across their full surface, and that they separate approximately 1/50 of an inch when the breaker arm is riding upon the cam.

Distributor boxes of magnetos require the same attention as a distributor box of any coil system. If the above procedure is carefully followed, one will have no trouble in finding out the reason for ignition line failures, and though one cannot always remedy the trouble one's self, it can usually be located.

Cleanliness Is Essential

Cleanliness is essential. Always remember that the secondary current, that is, the current which supplies the spark plugs, is of very high voltage and that it will travel across any oil or water-soaked surface. All contacts in the primary circuit must be cleaned and tight. Remember that a primary wire may break inside the insulation and the break go unnoticed. In testing out the primary system, replace each wire in turn by one which is known to be good.

If you find that the engine will run, but will not run on all four cylinders, but you cannot locate which of the cylinders is missing, short-circuit each plug in succession. You can do this with a screwdriver. Touch the end of the screwdriver to the cylinder head and bring the metal part of the screwdriver against the top of the plug. Note the action of the engine when this is being done.

If the action changes, you can well assume that the particular plug which is being short-circuited functions properly when the screwdriver is removed. One cannot always locate a missing cylinder by short-circuiting one plug, and if such is the case, short-circuit two of the plugs at one time. In this way, one can eliminate various sets of cylinders until the cylinder is found which is missing fire.

Spark plugs usually fail from either of two causes. Either the electrodes are separated too far or the insulation is broken down. The distance between the electrodes on a coil system should be approximately 1/16 of an inch or slightly less, while the distance between the electrodes on a magneto system should be between 1/32 and 1/16 of an inch.

Bear in mind that a spark may leap across this space when the plug is removed from the cylinders, but may not have strength enough to jump across when the plug is in place and subjected to high compression. Examine the porcelain very carefully for breaks or holes.

A Stomach Pump

I have spoken of feeding an engine with medicine and herewith is illustrated a device which most any automobile owner can make and use for feeding his engine with any sort of liquid, either for removing carbon or for starting it in cold weather.

Obtain a tin can such as is used for containing chocolate or cocoa, which is fitted with a tight fitting top, and in it punch three holes. Fit one of them with a short length of tubing which is punched through with a number of holes at its end and solder this tubing into place so that it extends nearly to the bottom of the tank. Provide the second opening with a tight-fitting screw cover, while the third opening should be provided with a long tube which leads to the intake manifold. This tube should be provided also with some sort of a shut-off arrangement such as a pet cock. This second tube should not extend into the tank, but should be soldered to the cover only. The whole device should be made air-tight.

If it is filled with water to within about one inch from the top and the engine started when the pet cock is open, moist air is drawn into the manifold and the engine action improved. Water if used in small quantities has a tendency to drive off carbon and often increases the power of the engine. Kerosene oil or carbon remover may also be placed into this feeding arrangement to great advantage.

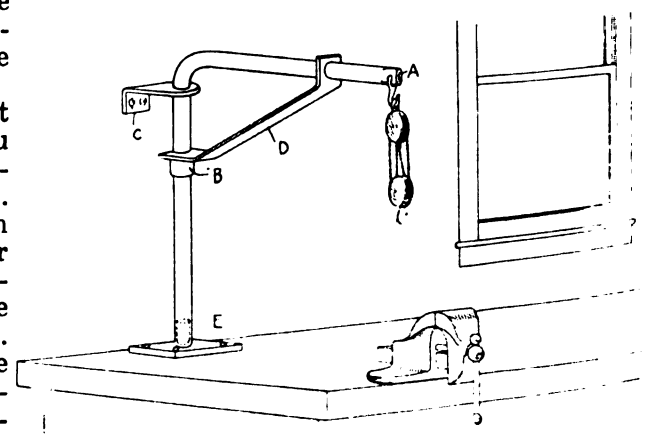
If your automobile has stomach trouble, one of the first indications is extreme carbonization. If you are feeding it too heavily the carbon will stay in the cylinders and cause lack of power. The engine will protest against overfeeding and voice its anger by emitting a sharp knock after it has been heated. This knock is caused by preignition and the overheating of the carbon on the piston head.

Knocks can usually be located by means of what I will term a stethoscope made from an old telephone receiver and a number of lengths of steel wire fitted together by couplings. A drawing of this device is shown herewith.

VISE BENCH CRANE

By Charles H. Willey

Garage owners and repair men in general would do well to follow the example of the manager of one of the local repair shops by procuring, as he did, several lengths of old



The Bench Vise Crane.

steel pipe and some flat iron bar stock at the junk dealers, and converting the material into several jib bench cranes for lifting heavy work from the floor to the bench and vise. The sketch plainly shows the manner in

Digitized by Google

which they were constructed.

The crane upright and horizontal arm were made of two parts from two-inch pipe, the upper section being bent at a right angle and the end *A* flattened and drilled for the tackle hook. The other end *B* was threaded for a pipe coupling. A wall bracket *C* and a brace bar *D* were made of one-half by three-inch bar iron and these put on the crane.

The coupling provided a shoulder for the brace to rest on, the *Y*-shaped foot slipping on over it. Another piece of pipe screwed into the coupling formed the lower section of the upright. A piece of one-half-inch boiler plate *E*, with a short piece of one and one-half-inch pipe screwed in its center, formed the pedestal base, the crane setting on this and swinging around on the pipe.

By installing the cranes at the end of the benches they swing around the end and clear the bench and swing back directly over the center of the bench vise. When not in use they swing against the shop wall out of the way.

Up In Old New Hampshire

How Blacksmithing is Done in Some of The Little Old New England Villages

BY JAMES F. HOBART

"WISH you would make those forward shoes very long," said a New Hampshire Farmer as he led a rangy looking horse into a Hampton Center shop. "I never saw a horse reach forward so far with his hind feet as this one does and when he runs, he sure reminds me of pictures in the Sunday Comic Papers, where some dogs and 'mule Maude'

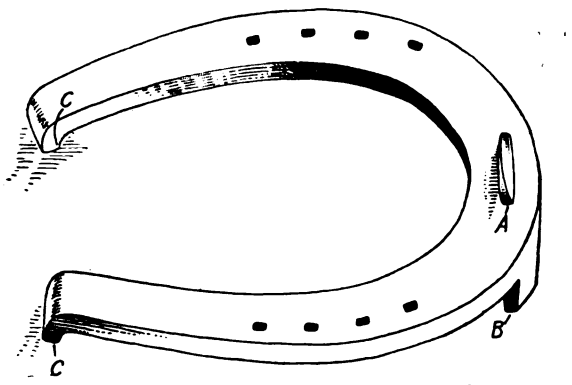


Fig. 1. How the Toe Clip Was Applied.

are shown going fast and strong, with their hind feet away in front of their forward hoofs!"

"The longer the shoe, the quicker she picks up her feet, eh?" said the Smith. "Well, I'll make the shoes as long as I can and the clip in front, instead of forging up the edge of the shoe. For that, I'll just stick on a light toe-calk on the wrong side of the shoe and forge it thin for a toe-clip."

"That will do first rate," said the Farmer, "but don't make the forward shoes too long behind, or she will pull them off for fair—by hickory she will, every time!" (See Fig. 1, for the manner in which the toe-clip was put on and where it was located at A, the high toe-calk at B, and very low heel calks at C. C.).

"There," said the Smith as he finished the funny looking toe-clip, "that shoe ought to pry up old Dobbin's front feet for him! The shoe sticks out in front nearly a half inch and the heel calks are clear back as far as any hoof goes. The heel calks are very short, the toe-calk long, and when he lifts up his foot, it rolls over the far-ahead toe-calk and the heel can't help lifting fast and high from the ground."

"Yes," said the Farmer, "that heel will come up, when Dobbin steps, just like cracking a whip and when the hind foot gets where the front one was, his heel is away up in the air, safely out of the way of those far-slinging number sixes!"

A "Slick" Shop

It surely is a "Slick" place, that Hampton Center shop. It has two fires, one driven by a modern electric blower, the other fire being operated by a hand-blower. The owner, being asked why he did not put in another electrically driven blower, said he "reckoned" he would, as soon as he could find one. He said: "I bought that electric blower several years ago for eighteen dollars and I've been looking out ever since for another one just like it but I haven't found it yet!" and the writer thinks he will not, yet a while, not at the same price; for the blower is a good one and the rheostat is never pushed more than half way over, even for the heaviest blast needed on the forge.

"I thought a whole lot of setting that blower to drive both forges," said the Smith. "It will give plenty of blast and I could put in a pipe to each fire, rig a gate at each forge, then let the blower drive into the pipe all the time that either forge fire was a-going, regulating the blast at each fire by a gate, same as they do in big shops where one blower drives all the fires. But the blower-makers advise against that sort of thing and I wonder why? I can't see a thing against it except that if I make one fan run two forges, the fan manufactures lose a chance to sell another fan!"

Electrically Driven Drill

In this shop there is also a fine electrically driven drilling machine which is attached to a post at one end of the shop. The drill is no light "post drill," as usually designated by that term. The machine is a fine back-geared drill, evidently made for machine shop use, with the motor coupled direct, giving power through a worm and gear, right to the shaft-spindle of the drill. In addition, the drill spindle is back-geared, with two changes of speed available by simply shifting the transmission gears.

The charges for electric current in this shop, are about $1.50 per month, and the owner said that it might be divided between the two motors in about the ratio of $1.00 per month for the forge blower motor, and 50c for the drill, as that machine was run but little compared with the forge motor, which "Ran about all the time and then some!"

Hand-Sharpening Rock Drills

"Cling-ling-clan-clingle" rang out from the front of the shop and the writer arose from a comfortable empty horse shoe keg in time to see a man dump on the shop floor the last of a lot of rock-drills which had been sent in to be sharpened.

"That's my job," remarked one of the smiths. "I have a lot of drills to sharpen every day. They are putting in a new hotel at Rye Beach, about six miles from here, and they bring all the drills here to be sharpened. They have to come over to Hampton every morning with a motor truck to get the workmen, so it don't cost them anything to bring the drills over to me to sharpen. They are excavating a big cellar for the hotel and as it all must be blasted from solid granite, I have something of a "chore" keeping the drills in shape."

The drills were of modern type, with a hole through their entire length. The smith had an end-swage fitted with a handle, the swage to be struck with a sledge in the usual manner. This swage came with the drills, but as the smith placed two of the dull drills in the fire, he placed upon the anvil, a tool something as shown by Fig. 2. He called it a "Rock Drill Swage." It fitted snugly into the hardy hole of the anvil and was used without any fastening whatever.

The lower member D, was evidently a very large "dead-head" which had been forged to fit into the hardy hole but which had not been drawn down to a cutting edge. A spring F had been fastened to swage D, by means of a bolt through the tool and through the yoke G. By means of a close fitting shoulder at H, the spring F was prevented from swinging downward under stress of hard work and hammer blows.

The upper end of spring F, had evidently been squared, shouldered and nut-fastened firmly into top-swage E, which had been so placed and fitted as to member fair with the top of swage G. The business edges of both these swages were almost a right angle, but rounded a bit so as to avoid an actual sharp corner. This swage was used for "splitting" and "drawing" the body of the drill just above the four-cornered cutting edge. This and the end-swage, were the only extra tools used in sharpening and re-sharpening, from day to day, all the rock drills required in excavating a big cellar from granite.

Welding Vehicle Springs

One of the smiths in this shop has quite a reputation for repairing vehicle springs—the same smith, by the way, who sharpens the rock drills. Wagon and automobile springs of all kinds find their way to the Hampton shop for repairs, and it is to the credit of this smith that when possible, he makes a new leaf for the broken spring; but when this is impossible, he welds the broken leaf and is not afraid to guarantee it to "hold!"

One day, while sitting in this shop, the writer saw a spring welded for a driver who had broken down a mile from the shop. A passer-by told the driver of the spring-mender, so the driver and a friend, removed the broken spring from the auto and "packed" it to the shop. It was a very long spring, the longest the writer ever saw under any automobile. It was from a car made somewhere near Syracuse, N. Y., and evidently was assembled from parts bought in the market.

The spring was all of six feet long. It was the outside leaf which had broken, with both ends rolled up to receive a bolt. There was no material in the shop from which to make a new leaf, so the smith started to weld the broken one. He scarfed the broken

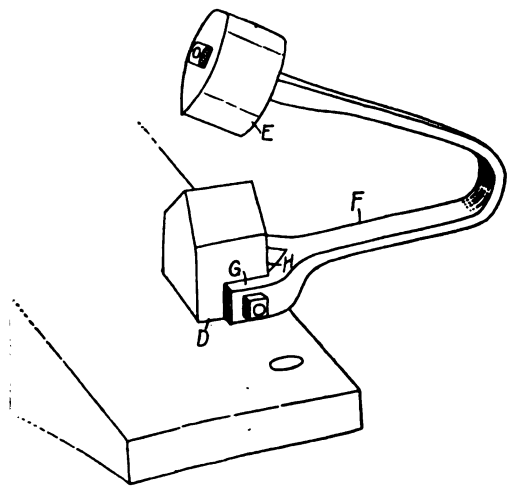


Fig. 2. A Handy Rock Drill Swage.

ends same as if he was welding a tire or any other piece of steel, upset both pieces a bit, then plated them out under the hand hammer, no flatter being used, and no striking at all being done on the job. The ends were scarfed or bevelled about one inch, or about one-half the width of the spring-leaf. The scarfed ends were heated to a dull red, then rubbed with a bit of stone and all the oxide removed from the steel, after which some "E-Z weld" powder was sprinkled upon both sides of each piece and they were placed in the fire to heat for the weld. The heating was quite slow and the smith made sure that the heat was well diffused and that no hot or cold spots existed in the steel when they were pronounced hot enough.

A little more E-Z Weld powder was dusted into the fire during the heating and when the two parts of the spring were hot enough to suit the smith, he called the other smith to hold one of the pieces while he "stuck" them

Digitized by Google

together. Both pieces were lap-down in the fire. The assistant took the piece next to him—the shorter piece, gave it a rap on the anvil, turned it over and held it in place while the smith who was doing the job, cut off the blast, raised the longer piece of spring from the fire, gave it a tap on the anvil to dislodge dirt, etc., then placed it quickly and fairly upon the other piece of spring and simply *rained* light hammer blows upon the lapped part. "Like an onery wood pecker" observed a bystander, so quickly were the blows struck.

The degree of heat at which this weld was made seemed very low indeed to the writer. It was *not* a yellow heat. There was a total absence of any sparks flying from the metal when the weld was struck with the hammer, or even when the parts were removed from the fire. The heat seemed to be no more than a good bright red—not a trace of yellow about it—and the writer wondered how the smith could make the metal "stick" under that degree of heat.

But it did unite, and to all appearances, the weld was a good and perfect one. The smith did not hammer the weld very much. A half dozen light blows from his hand-hammer and he sprinkled some more E Z Weld powder upon both sides of the spring and replaced

Fig. 3. The Three Steps in Forging the Strap Connection.

it in the fire. Another heat was taken, to exactly the same degree as the first, and the weld was hammered lightly but with very quick blows and it was not struck at all after the bright red had died out of the metal. Again the welding powder was applied and reheating and more hammering followed and still another followed, making three times reheating and hammering after the "sticking" of the pieces together with its attendant hammering. The last hammering reduced the slight bunch in the spring until it was of same thickness as the rest of it. He took care, by judicious edge-hammering, that the spring was kept down to the proper width. Indeed he was very careful not to let the spring get a bit too wide from the time the weld was first "stuck" until the weld had been fully flatted down and was ready to be filed and the edges smoothed, ready for reassembling the spring again.

There was another point which the smith looked after very closely during the hammering out of the weld. This was the alignment of the spring. Twice, between reheatings, the smith tried the next longest leaf, against the mended spring, to see whether the welded one was coming out straight. And twice he led the short end of the spring a bit sidewise by judicious hammering upon one side of the spring more than upon the other side, thus straightening the spring and keeping it straight when finished.

When the spring was taken down the smith noted in which direction the short piece of the spring chanced to come. Then, upon putting the spring together again, the weld was placed in the direction that the short piece had laid, so there was no danger of getting the spring put together wrong. The two men paid the smith $1.25 for his work upon the spring, which might have been a very little shorter than it was before, but no one could detect any appreciable difference—the men carried away the spring, put it in place themselves, with their own tools and went on their way. The weld had not broken apart at last hearing from its owners.

Forging a Strap Connection

A chap who was making up a machine for driving wire hoops upon apple barrels at the time of manufacture, came into this shop in quest of a connection to be made from 1½" x ⅜" soft steel, something as shown by Fig. 3, at P. The owner of the Hampton Smithy selected a piece of steel, I, scarfed one end, J, and bent the steel around upon itself as at K, leaving the bend open so the weld would not extend too far along bar I.

Once the weld was finished, the loop K was flattened down as shown at L and M, after which the end of the bar O, where it had been doubled over, was cut as shown at N, the place where cut, being laid upon the anvil, fair with edge Q and the cut made with a handled chisel, the smith calling upon another person to strike for this bit of work. The steel was then turned over and the other side cut, after which the double portion of M was pried open and finished as shown at P.

To make the shape shown, piece M was caught in the vise, the jaws clamped tightly against weld L, then the double ends of the shape were separated and hammered flat against the vise jaws, after which they were bent back again, but this time, with a piece of metal between R and S, and forging closely against that piece of metal, gave the finished and pleasing appearance shown at P. Later, a hole was drilled through both arms of the piece and the corners of R and S rounded off on a grinding wheel.

Storing the Horse Shoes

When kegs of horse shoes were received in this shop, they were unpacked from their kegs by a young son of the owner, a lad of not more than eight years of age, who took care of all the horse shoes. A piece of timber about eight feet long and six inches square stood on end in one corner of the shop. A square hoop of band steel had been shrunk upon each end of the timber, close to the ends, and a gudgeon, of one-inch round black steel, had been bored and driven into either end of the timber. The gudgeons were mounted in bearings, a metal lined hole in the floor for the lower one and a short sleeve, brace-attached to the sides of the shop, held the upper gudgeon firmly, yet loosely enough that the timber could be easily revolved. Three-quarter-inch rods had been driven into the timber and allowed to project about a foot on either side.

Upon these steel pins, the young lad hung the new shoes after he had sorted them into various sizes. The pins were placed just far enough apart that the several sizes of shoes could be put on and taken from the pins easily, the pins where the smaller shoes hung being placed closer together than where the No. 6 and 7 shoes were placed, and these large ones were located as close to the floor of the shop as possible. The lad had to use a step-ladder to hang away the small shoes on the upper pins of the "hedgehog," as the device was very quickly named by the shop loafers.

And say! you ought to see the shoes that they throw away in that New England shop! I tried to find some shoes heavy enough to pitch quoits with, but when through with shoes now-a-days, they are like "ciphers with the rims off!"

SERVICEABLE TO PAPA

A Red Cross Public Health nurse in a southern town has found the latest novelty in names for babies. She was weighing a little black youngster.

"What you you call your baby," she asked the grinning young mother.

"Weathah-strips," replied the parent.

"Weather-strips," exclaimed the nurse. "What's the idea, Mandy?"

"We done named her Weathah-strips 'cause she kept her papa outa de draft."

Prize Photo Announcement

WITH the November number of the BLACKSMITH AND WHEELWRIGHT we finished the prize photograph contest. In all, there were 17 photos entered and in each case the selection for prizes was easy.

The first prize goes to the reader submitting a picture in which is shown the most automobile work being done. We feel that everyone will agree that The Correll Shop and Store entry number 9, which appeared in the May, 1919 issue shows the most automobile work going on.

The second prize goes to the reader who submitted a photo of the best looking shop. We defy anyone to criticize our judgment in selecting the photograph number 10 of Mr. C. J. Johnston's shop which appeared in the May, 1919 issue. You will recall that this picture was of a concrete building, the doors and windows of which were in the shape of giant horseshoes and the general scheme of decoration was suggestive of the class of work being done.

Mr. H. F. Towner's letter in the April, 1919 issue really deserves the third prize for he evidently is going in strong for his portion of automobile work.

We have a surprise for Harry Babcock of New York, for we are sending him a prize in the shape of five dollars. He deserves it because his letter is both interesting and helpful. His system of shop arrangement and care in locating the machine tools should be considered by every smith. We venture to say that after ten hours of work, he will have accomplished more than many smiths after a twelve hour day, and be less tired. With his tools arranged conveniently he does not walk so far, waste so much motion, or use so much coal as does the smith whose tools are thrown in the shop "helter-skelter."

Mr. Babcock is a horseshoer, and a good one, too, if we can judge by the way he is making efficiency the key-note of an old-established, time-honored profession.

Mr. Littlefield of Montana has the right idea and deserves honorable mention because he is looking into the future. He is educating himself along broader lines and doubtless by this time has a shop full of automobiles.

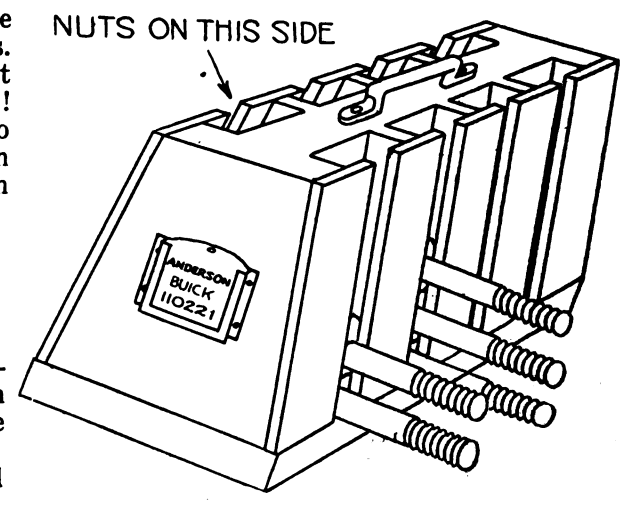
Mr. Littlefield writes that he still has plenty of horseshoeing, but there is lots of auto and tractor work to do, besides.

NUT AND BOLT CARRIER RACK

By Chas. H. Willey

I was chatting with the foreman of one of our local garage repair shops about the work being done on a nearby car, and I watched the mechanic who was working on the car as he removed the cylinder head. As he took out each cap bolt, he put it in a rack or carrier, and when he removed a nut of a stud, this, too, went into the slots of the rack.

I asked the foreman whose idea it was and he said, "Why, that's a scheme of mine. I had a lot of trouble with boys getting the



bolts and nuts mixed and lost until I had a bunch of these carriers or racks made."

I secured the foreman's permission to sketch the contrivance and pass the idea along to readers of the Blacksmith and

Digitized by Google

Wheelwright. The sketch conveys to you the idea better than a lot of printed words, but, however, I will say that the slots are of different widths to suit the various sizes of bolts and nuts, and are cut in a block of wood, and battons or strips of wood or iron are secured on, making each slot T shaped.

The bolts are slipped in the slots by their head ends and held thus. A handle is secured to the top for carrying it about the shop and a card holder tacked to one end to identify the car on which the bolts and nuts belong. The advantage of having each size bolt and nut kept together needs no argument.

The Pipe Hanger Business

One Blacksmith Has His Entire Time Occupied in Making Pipe Hangers

BY H. C. RIDGELY

SOME blacksmiths select one thing for which there is a demand and specialize on it. In that way, the work is systematized and can be turned out rapidly. There is no waste effort. Every blow struck and every movement made are just right, because the acts are performed so often that they become a habit.

In the pipe hanger business there is sufficient similarity in the different parts to reduce the work to a system, while at the same time there is enough variety in the shapes to prevent monotony. A man does not like his work to be too monotonous, for he would soon grow tired of it and want to stop.

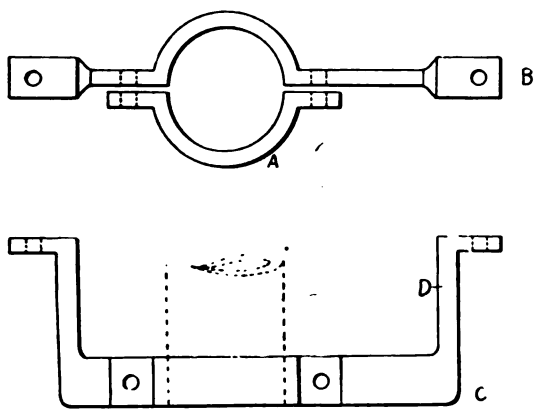


Fig. 1. Above, Plan View of Hanger; Fig. 2, Below, Shape of Hanger.

The blacksmith referred to in this article went to great pains to explain how he had worked up his specialty to a point where it is a paying business.

"It was this way," he said. There was a long pause while he lighted his cigarette with a red hot iron. He always kept a heated poker handy for that purpose.

"It was this way," he began again, after taking a couple of whiffs from his cigarette. "I got acquainted with some plumbers and pipe fitters and a few of them came to my shop to have special hangers made. Then a few more came, and still more, until the business began to get red hot. You see, it isn't always easy for pipe fitters to make the hangers where they are working. They can't carry a blacksmith shop around with them, and if they could, it would be in the way all the time. Well, that is where I come in handy. My shop is easily reached by the men who know me and business simply comes my way."

Constructing the Hanger

An iron which had been heating while the man was talking was now at the right temperature and was removed for further manipulation. A hanger was being made like that shown in Fig. 2. There were two parts to it, and later these were to be bolted together about a pipe to hold the same firmly. The holes in the ends or feet were made for screws or bolts to attach the hanger to some suitable support.

The semicircular portions were shaped by heating and hammering about a piece of piping pinned to the anvil as seen in Fig 3 at *A*. Lengths of piping like this, with various diameters, are kept on hand in large quantities so as to make possible the construction of hangers with a wide range in sizes.

The feet A and B of Fig. 1 are bent on the anvil by hammering. The shoulder *C*, however, is made by fastening the heated metal in a vise and giving it a right-angled twist before bending the upright portion D. The parts are then shaped up a little on the anvil.

"If I am making several hangers of the same size and shape, I make them all at once," the blacksmith explained. "I mean by that, that I cut off several lengths of metal for the entire number of hangers and then perform similar operations on each in turn. I make the semicircle on several pieces before going on to another operation. That is one place where system comes into the work."

Need of Mechanical Drawings

"What is the hardest part of the work?" the man at the forge was asked.

"The hardest part is to read some of the drawings which my customers make," was the reply. "The men who bring work to me are not artists at all. Most of them have never done any mechanical drawing either. The result is that freehand sketches are made on bits of greasy paper taken from lunch baskets and are difficult to interpret. I make my own sketches in a note book after a customer has explained what he was trying to draw."

Some of the customers' artistic attempts were exhibited as proof that the interpretation was one of the difficulties to be overcome. The blacksmith was right in his estimation of the drawings as works of art. Not only were they made on lunch papers, but portions of the lunch were often thrown in for good measure. A little butter and egg here and there made the pencil marks look anything but clear and legible.

Still, the men did their best, and when that has been done there is little reason in complaining. After the final sketch has been made by the blacksmith, the result is at least workable, and that is really what is wanted. Practical results are what are required and not neatness in drawings, al-

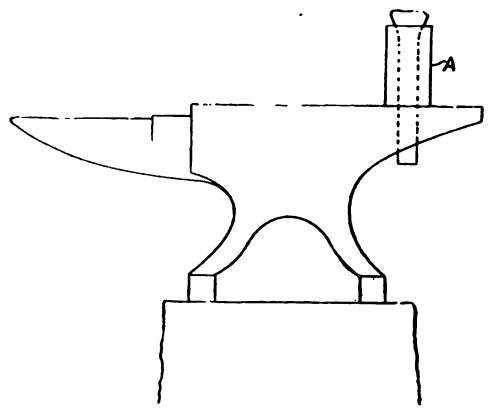


Fig. 3. Bending the Hanger Around a Pipe.

though it would be a great thing if a number of the customers described could teach themselves a little of the drawing art.

Trade Conditions

"Most of the jobs lately have been small ones connected with repair work," volunteered the blacksmith. "The big building operations have been held back for a good while. The big operations are the ones which pay, and when they get started again my business is going to be a paying proposition."

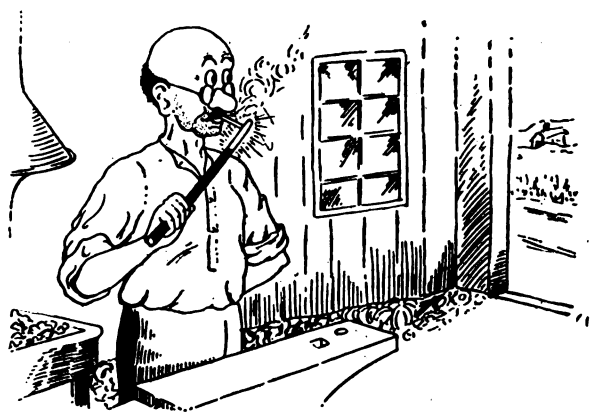
The blacksmith went on to explain how he and his father had built up the business together. It is the work of two generations, so that the son has had the advantage of his father's experience and has taken up the work where his father left off. Undoubtedly this has been a great help to the younger man. A business like his cannot be built up in a day. It takes time to put theories into practice. There is usually a little difference between theory and practice and it takes time to straighten this out and make allowance for it.

An interesting feature of this business is that it has been built up without advertising. That is rather unusual when we consider the fact that a specialty is being marketed. Ordinarily, the sale of a special commodity is preceded by an extensive publicity campaign. Often an advertising agency is made use of for the purpose, and the combined talent of the copy writer and the artist as a rule play an important part in securing customers and keeping them.

Advertising Might Be Applied

It might be interesting to speculate upon the effect which advertising would have upon such a business. How would the advertised business differ from that built up by personal contact among friends? That is an important consideration to the blacksmith who is thinking of marketing some specialized commodity. Usually a person wants to study very carefully the problems involved before he launches out into such a business.

Probably one effect of advertising would be that the man would do business with strangers instead of with friends. In other words, the business would be extended outside the immediate circle of acquaintances. Many persons consider the stranger a desirable customer—in fact more desirable than the friend, as the latter often wants the reductions in price accorded old cronies.



The Smith Lights His Cigarette with a Hot Iron.

It is probable also that the broadening of the business would result in better drawings and more up-to-date methods. If the volume of trade warrants it, a special draftsman could be assigned to the work by the blacksmith. A plumber or pipe fitter who is doing an extensive business, should be able to have a drafting department also. Blue prints could then be made for the hangers and orders for the forgings given more readily.

TRACES OBLITERATED

Into Mr. Toddles's study marched the detective.

"You sent for me, I understand," said he gravely, "to investigate a burglary that was committed here last night."

"Of course I did! Of course—of course!" fussed Mr. Toddles.

"What is missing?"

"Several odds and ends, and three complete sets of harness—brand-new, too!"

"Ah!" murmured the detective, making a note in his little book. "And have you any idea how many thieves were in this robbery? Did the thief or thieves leave any clew—any traces behind them?"

"Traces—traces!" said Mr. Toddles. "No; they took those, too!"—Answers.

Digitized by Google

BLACKSMITH & WHEELWRIGHT

The Pioneer Journal of Its Class in the World.

Member of the Audit Bureau of Circulations.

PUBLISHED MONTHLY BY

M. T. RICHARDSON COMPANY,

71-73 MURRAY STREET, NEW YORK.

POST OFFICE BOX, 654. TELEPHONE—7377-7378 Barclay.

CHICAGO OFFICE, Garland Building, 58 East Washington St.

Entered as second-class matter at the Post Office in New York City.

M. T. RICHARDSON, President and Treasurer
F. R. WHITTEN, Secretary
M. T. RICHARDSON, Editor
FRANK L. AVERY, Managing Editor

F. R. WHITTEN, Advertising Manager.

H. F. LUDINGTON, Western Representative
HOWARD COBURN, Ohio, Western N. Y. and Western, Pa.
GEO. A. SMITH, Eastern Representative
FRANKLIN MYERS, Art and Copy Dept.

FOREIGN AGENTS:

NEW ZEALAND
MR. R. HILL, Matlock House, Davenport, Auckland, New Zealand.

GREAT BRITAIN
ARTHUR F. BIRD, 22 Bedford Street, Strand, London, England.

TERMS OF SUBSCRIPTION.

One Copy, one year, including postage, if paid in advance.....$1.00
One Copy, six months, in advance.....60 cents
Single Number.....10 cents
Canadian subscriptions.....$1.25 per year
Foreign subscriptions (except Canada).....$1.50 per year
Or 6s. 3d., English Money.

Remit by Express Money Order, Draft, Post-Office Order, or Registered Letter. Foreign Remittances should be made, where possible, by International Money Order.

ADVERTISING RATES SUPPLIED ON APPLICATION.

SPECIAL NOTICE

Subscribers failing to receive their magazine regularly will favor us by giving us notification to that effect.

CHANGE OF ADDRESS

Subscribers who desire the address of their paper changed should send us the old as well as the new address.

Subscribers who wish to know when their subscriptions expire should consult the address tag on the wrapper of each copy mailed to them.

Our Editor's Letter

IF YOU have ever been away on a long visit or made your home under a canvas tent you will know just how we feel to get back home again. Our last issue of the BLACKSMITH AND WHEELWRIGHT was printed in Harrisburg, Pa., and as you all know, was somewhat of a patchwork affair. We were forced to leave out our Workshop Experience Department and a large part of our Editorial page, but at least it was a magazine and contained its regular articles.

The printers willing, we will continue to publish in New York, for, after all, there's no place like home. We, the publishers, have been through a trying period in the past two months. There have been times when it did not look as though it would be possible to print a magazine again. The printers demanded, at first, an increase in wages that would have rendered publishing an impossibility, for to pay them these wages would have meant an increase in the price of both subscriptions and advertising rates, neither of which we care to do.

The printers have finally been able to see our side of the situation and have put their case before a committee of arbitration. We have conceded that they deserve more money and have made them an offer and feel sure that the matter will soon be adjusted satisfactorily.

Labor, in this case, is at present adopting what we consider is a fair attitude—it is waiting for an adjustment, but during this wait it is working for it knows that when the award is made it will receive its money.

Perhaps we have made a statement that will bear further elaboration and in which there is a hint regarding present high prices.

There is a law which cannot be broken, that of supply of demand. If the supply of coal, for instance, is limited, then its price will go up. The reason for this is that there are always people who have money to spend and are willing to pay a premium for the filling of their orders. The same thing is true of any commodity from coal to collars, from matches to machinery.

It follows, therefore, that the price of food, clothing and other necessities is governed largely by the demand and the supply on hand to satisfy this demand. To lower prices but two things are possible, either the demand must be lessened or the supply increased. To a man dying of thirst in the desert a drink of water would be worth his entire fortune, yet that same man would not squander much of his money on water if he were immersed to his neck in a well on his farm.

Obviously, it is impossible for us to regulate "demand," but we can increase the supply. The coal miners in their strike did their part in increasing the cost of living because they stopped production of soft coal at a time when every industry in the country needed it.

The strike of any labor organization has its effect upon the community at large and tends to increase the cost of living. Even our own strike by the printers has helped to increase the cost of your food and clothing, for it has increased the cost of printing and advertising; sooner or later this increase will be passed along to you by the advertisers and manufacturers.

Production MUST not be stopped if the cost of living is to be reduced. There is but one way to settle grievances and that through a board of arbitration, a board of men who can consider both sides of a question and give an unbiased report and finding.

While the questions of labor and capital are being decided, labor cannot afford to lie idle. To do this is just as foolish as for a fire department to argue about the size of hose to use while the house burns down.

Our Anniversary Number

WE don't want our readers to forget the fact that our next number is the fortieth anniversary number of the BLACKSMITH AND WHEELWRIGHT. We have mentioned this fact before, but evidently many of our older readers have overlooked it.

We want to make this issue a sort of a "Family Reunion" number. All of our older subscribers, those who have read the magazine for 15 years or more, should send us their names so that they can be placed on our ROLL OF HONOR. If you have time to write a short letter, telling about your shop and the length of time you have been in business, so much the better, but don't forget to tell us how long you have been a reader of this magazine.

Buy!

PROBABLY never before in our recollection has the word "Buy" been brought home to us as it has in the past few years. First it was the opening Liberty Loan, "Buy bonds"; then the War Savings Stamps, "Buy them"; then another Liberty Loan, and more Savings Stamps—and we bought.

We bought bonds and stamps, watches and shoes, automobiles, machinery, jewelry and diamonds, yes, thousands of diamonds at prices that would have made a Shylock blush a few years ago—and we wondered what it was all coming to—and kept on buying.

We are still at it.

But now there are lots of things we can't buy; not for love nor money; simple little things of which there seemed, once, to be an inexhaustible supply. That is, we can't buy them immediately, or we must go further for them.

And we start wondering again, "What is this leading us to? Has it all been a big mistake? If we hadn't bought so freely, would conditions be better now? Or if we stop now, will things right themselves? Oh, why didn't I buy that motor?" Or that lathe. Or those tools. Or that stock. There are still many things you need and haven't bought. And if you can buy them now they will cost you double the price you could have bought them for when first needed. But you need them more than ever now—need them, because *for every buyer there is a seller*, and you have been selling more. It may have been selling labor, repairing, merchandise, ideas, or a hundred different things, but you have been selling more unless you belong to the minority. Just as you have been paying more for what you bought, so you have been receiving more for what you sold, unless you still belong to the minority.

This country has just been through a war the destructiveness of which has been enormous, so great that it can hardly even be estimated. The resources of the world have been diminished and wasted. The United States has borne a share of this loss, but also marketed, at a big profit ,a part of her tremendous natural resources. The other countries had to buy, buy, buy; mostly from us. Our ingenuities were taxed to convert our resources as rapidly as possible into munitions and supplies for ourselves and our allies.

Naturally, efficiency in production, manufacture and transportation was brought to a point never before attained, and was directly responsible for the success of the Allies in November, 1918.

We put forth a mighty effort, and the natural tendency now, with the war over, is to relax. But war conditions are still here, to a large extent, and work must continue. Premier Clemenceau made "work" the keynote of his speech of reconstruction to the French people. He did not need to say "Buy." The French, noted for their thriftiness, are buying as far as their weakened credit will allow. And England, Germany and Italy—all are buying.

Business and living conditions that confront the people of this country now are not very reassuring at first glance. Labor is dissatisfied and demands more pay. Strikes ensue, and everybody is affectd more or less. Capital is dissatisfied and raises prices, and we all feel it. Production is curtailed, and we suffer. But the strikes are finally settled; the goods are sold, and we do manage to buy what we want, sooner or later.

The fact of the matter is that the country is prosperous and actually getting more so. But great changes have taken place, more are in the making, and still more will come. The adjustment period we are going through is natural and necessary, and the wonder of it is that these changes are taking shape so smoothly. There is work for everybody for a long time to come, and nobody is starving.

Prices may keep on going up, or they may go down. We do not know. Wages may continue to rise, or they may not; it all makes little difference, as long as the relative value of things tends to keep pace, one way or the other, and we are willing to work, and produce, and buy.

We have confidence in American goods, American methods, and in the American people.

Buy!

The Prize Photo Contest

ANNOUNCEMENT of the winners of prizes in the prize photograph contest is made in this issue, and after careful consideration we feel that the judgment made is correct beyond question.

In this contest it was our desire to bring out the fact that automobile work was a possibility for the smith. We wanted to impress upon our readers the fact that they had a future, regardless of the trend of horsedrawn vehicles, but we are not satisfied with the result. It is our intention to start another contest early next year and we want our friends and readers to support us in our search for side lines for the smith.

We want to know just how the various smiths in the country are keeping busy, what work they are doing to take the place of shoeing. We know that they are not idle, and feel that an interchange of ideas along this line will be valuable to everyone.

In all probability our next contest will concern various side lines and we want to get all photographs possible. Let's all get busy now and pull together.

Digitized by Google

Farmers' Utility and Live-Stock Body

A Large, Roomy Body for General Farm Hauling, Adaptable for Live Stock

A FARMER'S use of an automobile truck is varied and very exacting; more so than is usually met with in other lines of business. He needs a truck that will cart his fertilizer from, and take his crops to the markets; sometimes a heavy load of potatoes and other times, perhaps, a bulky load of cauliflower—and for many other uses that he couldn't even tell you of himself, until the need arises.

It must be a heavy duty truck. One that will do very satisfactory service on the well-paved streets of the city, may be quite unsuitable for the rough work, over rough roads, that the farmer demands of it. He knows this, usually, and looks about for a chassis and body that will be strong enough to keep going, and adaptable enough for the various uses to which he must put it.

There always comes a time when the farmer must use his truck to carry livestock, of one kind or another, and there are many who do it regularly, as a large part of their business. The ordinary body is not suitable for this work, and a body that can handle it, in addition to doing the other work well, should be very acceptable.

The body illustrated below is one that has several features particularly fitting it to the farmer's needs. It is shown mounted on a standard chassis, and the dimensions are intended for a three-ton body, though they can be reduced to fit a smaller chassis with good results.

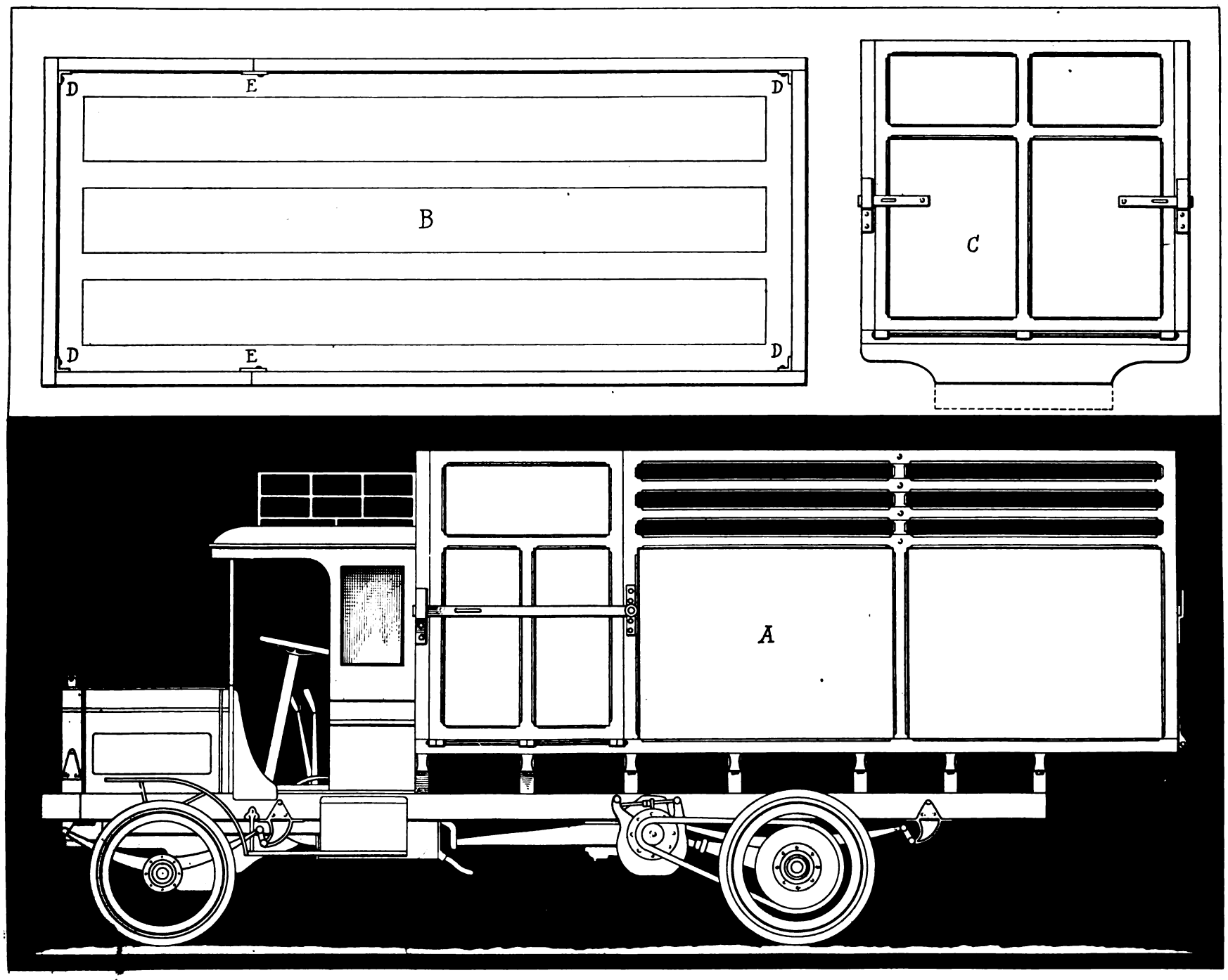
The body is 15 feet long, 6 feet 6 inches wide and 6 feet high; mounted on seven cross bars bolted to the chassis in the usual manner. Figures A, B and C show the side, plan and rear views, respectively. There are three doors in the design shown, all six feet high and dropping from the body on bar hinges. The rear door is the full width of the body, while the side doors are 3 feet 9 inches wide. Four angle iron door stops, D, are at the corners, and flat iron stops at E. Two swinging latches lock the rear door, and one large swinging latch goes clear across the side doors.

It is a simple box body, with ventilated opening on the sides as shown in the illustration, and the details of construction may be left largely to the shop constructor, remembering that a strong body is needed, for heavy duty work. The doors, both the paneling and the frame, must be of fairly heavy construction too, in order to stand the weight of entering animals; and should be cleated on the inside to prevent slipping. Three cross-bars should connect the body sides at the top. They may be made removable, if desired, but a six feet high loading space will ordinarily be ample for animals, and the bars will not materially interfere with other loads rising above them.

The advantages of this style body, especially for stock, can readily be seen. The dropping of these high doors makes a runway from the ground to the body, and does away with the necessity for a loading platform. A six or eight inch block placed under each corner of the door, when let down, will put the runway on an angle that any small animal, or a horse, will negotiate with ease, and that cattle should be able to take without much trouble. Loading platforms are not very plentiful on farms, and this ground-loading feature should recommend itself strongly to farmers.

Another innovation is the loading accessibility,—three separate entrances, all of which can be used at the same time to load or unload quickly. The inside can be penned off very easily into three pens, each with a door to it, and pigs, calves or even full-grown cattle can be carried in groups, and singled out for unloading without disturbing the whole load, where different deliveries are to be made. Or three different kinds of farm products can be loaded, loose, into the truck without mixing.

This is a really practical truck body, and even disregarding the adaptability for different kinds of work, explained above, it will do the farmer's work day by day in the capacity of a regular truck body. It will carry a loose load of small stuff right up to the top, and its size enables it to carry bulky, light loads equally as well as the heavier loads of potatoes, fruits, fertilizer, etc.



YOUR NEIGHBOR—THE RED CROSS

With a few hours' notice to collect his belongings and start for the U. S. A., the doughboy abroad didn't have any too much time to wind up his affairs.

Recently the Red Cross received a letter from a demobilized soldier inclosing an affidavit showing he had 3,000 francs on deposit somewhere in France, and asked the Red Cross to get it for him. His bank book had been lost in action, and he had forgotten the name of the bank, remembering only the name of the town.

That was all the Red Cross Home Service had to work on. Finally the bank was located and money sent to the doughboy.

The Home Service had its beginning in service to the American fighters. It helped

Digitized by Google

solve their problems—mental, financial and family. It will be your friend, too, for the true meaning of Home Service is neighborliness.

Go to the Home Service with your worries. The soldier did. No business tangle is too complicated, or any question too trivial, for the Home Service worker.

Many of the 30,000 men and women, most of them volunteers, who helped the men in khaki and in blue will continue their work in its broader peacetime meaning of service to all. Make a neighbor of the Red Cross.

A $130,000 HORSE

The purchase by Gifford A. Cochran of Major August Belmont's stallion Fair Play for the equivalent of $130,000 the other day is an interesting answer to the question, "Is the horse becoming extinct?" The answer is "No" to the extent of what is probably the highest price that ever has been paid for an American-bred horse.

Racing is not the sport it used to be. Anti-betting legislation has reduced in considerable measure the financial inducements for the raising of swift horses. But there are still hundreds of thousands of persons of both sexes in New York and in many other communities in America who consider an afternoon spent on the race track as a delightful and exhilarating occasion. These hundreds of thousands, even with the stimulus of money bets eliminated, are still worth catering to, and the lively scenes on every race track during the season show that they are being catered to.

But there are signs that the race horse interest is no longer the principal motive back of the promotion at heavy expense of great horse-breeding establishments. Despite the almost phenomenal development of the automobile industry, the horse still retains its position as the main tractive power for short hauls. During the war the race of horses suffered even more severely than the human race. It is estimated that the life of a horse in the fighting armies averaged twenty-four hours. It will now be necessary to raise large numbers of horses to replace this heavy wastage, and the industry is more lucrative than ever, despite the heavier cost of labor and supplies.

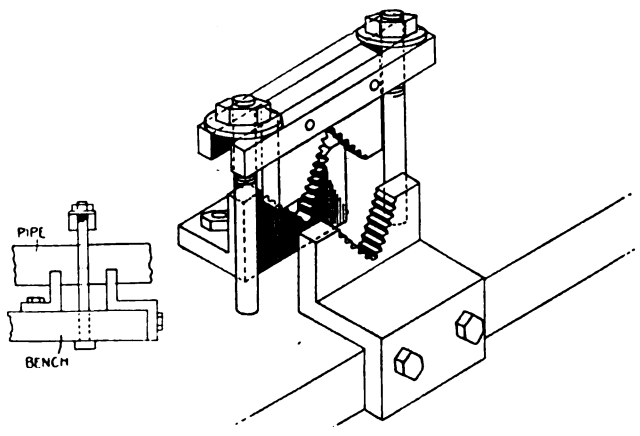
It would be safe to say that, however widespread the use of automobiles may become in this age of stimulated speed, the horse will always remain the friend and helper of man that he has been since his first subjection to the will of man many thousands of years ago.

The sale of Fair Play for $130,000 is a reminder of this fact.—*N. Y. Evening Mail.*

A CHEAP PIPE VISE

By Chas. H. Willey

AN extra pipe vise can be had for the shop bench quite cheaply from the odd pieces of stock lying in the junk bin. I have



Details of the Pipe Vise.

made one with no other expense than that of a couple of hours' time when things were going smoothly.

It is so simple to construct that I am passing the idea along in the sketches which show both the detailed and assembled parts. The jaws are made of ½-inch stock, a V-piece being cut out of each jaw and teeth filed into them. The lower jaws are bent to the shapes shown for securing to the bench. The top jaw is riveted to two cross pieces and long bolts are used for operating it.

Practical Horse Shoeing

The Right Way: Fitting the Shoe to the Hoof, Not Fitting the Hoof to the Shoe

THE wear of the old shoe will often tell a great deal. Thus, if the shoe shows distinctly more wear on one side than on the other, there is probably something wrong either with the form, the dimensions, the manner of placing the shoe on the hoof, or else in the way the bearing surface of the hoof was prepared.

The side of the shoe that is heavily worn away may be too narrow relatively to the other side. If this is the trouble, then one considers which of several remedies to apply. The heavily worn side may in the new shoe be broadened. There may, however, be some objection to this remedy. Thus, the side may already be as broad as the thickness of the horny wall renders advisable. A second remedy consists in narrowing the side which showed the lesser wear. And a third remedy consists in combining the widening and narrowing. But one-sided wear may be caused by wrong trimming of the bearing surface of the horny wall.

If the wall has been left too high on one side and too low on the other, the one side will naturally strike the ground first or with greater force and bring about excessive wear. The remedy consists in paring off more horn on the side of excessive wear, so as to bring about a more even placing of the shod hoof on the ground. The unequal wear may, however, be due to the fact that the excessively worn part of the shoe is unnecessarily located too close to the center of the hoof. This is corrected, naturally, by attending to this matter when shaping the shoe.

Handling the Horse

The lifting of the horse's foot for shoeing or other purposes is general, in the United States and England, since in these countries horses grow up accustomed to it. There are exceptions to the general rule, especially where the horse is timid or vicious or quite young. An assistant may be needed to hold a horse. In cases where the horse is to be tied, it will ordinarly be well to loosely secure the halter rather than tie it with a firm knot. That is, pass the free end of the halter through a ring and then wind it round the other part, using several turns. The idea is so to arrange affairs that if the horse "hangs back," the halter will give.

In general, but not always, it is best to handle a horse's leg more or less before grasping the foot and lifting it. There are cases, however, where the horse-shoer will probably do better by taking a firm hold at once. Thus, this treatment may seem preferable with ticklish horses. It is well, as a general rule, when dealing with the usual horse, to get him accustomed to standing on three legs before going on with the shoeing. Sometimes, especially with young horses, it will be well not to keep the foot in a raised position too long at a time, but to allow a short rest.

If the horse is old and stiff, one may make a mistake in lifting the foot too high. If a horse's hocks seem stiff, one does well not to draw the leg forward, but to shift it back and up. The horse is, naturally, not to be unbalanced when the leg is moved in this manner; otherwise an accident may occur.

An approved method of lifting a fore foot is as follows. The horse-shoer stands facing the horse but to the left side, in case it is the left fore foot that is to be raised. After speaking to the horse and reassuring him thus in a quiet way, he places his open right hand flat on the horse's shoulder. Simultaneously, he uses his left hand to stroke the limb downward to the cannon bone. This is the long bone above the fetlock joint. The bone is now grasped from the front. The right hand is kept in place on the shoulder, but is exerted to push the animal gently to the right. The object is to get the weight off of the left leg.

The left hand, still grasping the cannon bone, now lifts the leg, the right hand being moved at once to grasp the upper pastern—the bone just below the fetlock joint—on the inside. The left hand is shifted from the front of the cannon bone to the upper pastern on the outside. The horse-shoer now turns somewhat to the right and supports the horse's leg on his own left leg.

Similarly, the left hind leg. The horse-shoer smooths or strokes the horse gently towards the rear, until he reaches the angle of the hip. The left hand is placed against it, while the right strokes the leg downward until the middle of the cannon bone is reached. This bone is then seized from behind. The left hand, still on the hip, is now exerted to press the horse gently to the right in order to relieve the left leg of load.

The right hand is next exerted to lift the foot forward and outward from the body. This movement bends the leg at the hock. The horse-shoer now turns somewhat to the right and places his own left leg against the front of the fetlock joint. In doing this, the horse's foot is to be shifted back, while his left arm is passed over the animal's croup, and also "above and to the inner side of the hock." Then both hands get hold of the upper pastern bone.

Similar methods are employed in dealing with the right fore foot and the right hind foot, with proper reversals of the right and left hands, etc. The foregoing directions are from A. Lungwitz.

Troublesome horses may create difficulty. The following is a method for raising the hind foot. A broad band of webbing is knotted into the tail. It is then looped around the fetlock and the free end held in the hands. The man takes hold of the webbing close up to the fetlock and draws the foot beneath the body towards the front and holds on to the end. The object is partly to support the horse and partly to compel him to assist in supporting himself. There is also the purpose of hindering kicking. When this method is to be used, the fore foot on the same side is to be lifted prior to making any attempt to put the band around the hind fetlock.

Getting Old Shoes Off

Old shoes may be taken off in three or more ways. One begins as follows: (1) the clinches are all cut, care being taken not to injure the surface of the hoof. A pair of pincers with broad bills is now used to encompass the branch of the shoe in such way as to come together underneath the shoe. Then the handles of the pincers are moved in the direction of the branch. The effect of this lever-like operation is to loosen the branch and partially draw the nails. Or (2), instead of using the pincers after cutting the clinches, the nail-cutter may be driven from behind in between the hoof and the shoe. In this way, the branches are somewhat raised, carrying the nails with them. After the nails are loosened and started by either of

Digitized by Google

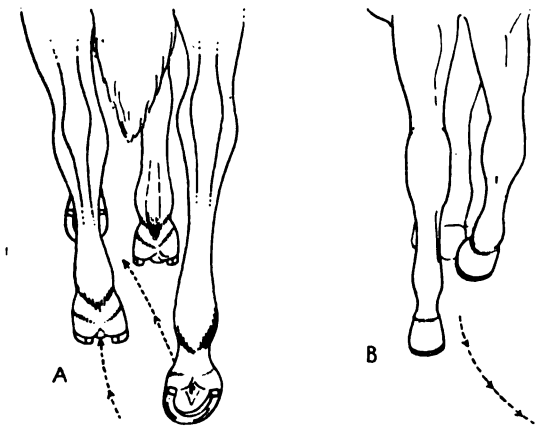
the foregoing methods, there will be little or no trouble in drawing them singly. The remaining method (3) consists in driving out the nails, one by one, from the points where the clinches are cut off. The first of the three procedures is perhaps the best. The last is suited to troublesome horses or to cases where the shoes have recently been put on, or to cases where the hoof is brittle.

Prior to the removal of the shoe, it will be well to make sure that the hoof is thoroughly clean. If it is encrusted with dirt, a stiff brush will usually be an adequate means for its removal.

Getting the Hoof Ready

Naturally, the hoof grows when it is protected from wear by the shoe. In consequence, after the old shoe has been gotten off, it will be necessary to pare it down to a proper level. This operation is probably the most important of all that the horse-shoer has to perform. This will be clear, perhaps, to those who have read with care the preceding instalments of this account. Upon the proper paring (dressing or trimming) of the hoof will often depend the correction and prevention of strained tendons, retarded circulation, irregular growth of the horny parts of the foot, etc., etc. The cutting down of the hoof should be done in the course of every three or four weeks. Neglect of this for six or eight weeks will ordinarily result in a change of the relation of the hoof to the fetlock. "The gait loses in freedom and certainty, the toe grows too long, an increased strain is thrown on the flexor tendons which favors stumbling, the shoes become relatively too short and too narrow, and are overgrown by the hoof, while corns may be caused by pressure on the angles of the heels."

The *hoof knife* and the *rasp* are necessary tools. If the hoof is quite big and hard, it may seem advisable to use a sharp *hewing knife* whose sides are flat and smooth, and which is fitted with a broad handle. First, one gets rid of any dirt previously left and removes loose flakes of horn. Such flakes may form in consequence of repeated bendings of the lower border of the wall. Then,



Two Kinds of Gaits: A, Feet Swing In; B, Feet Swing Out.

on the horny sole of the foot, there may be more or less dead horn. These pieces are removed. The trimming proper may now begin.

The tools used in taking off old shoes and in cutting down and paring the horny parts of the hoof are more or less familiar. At the same time, it may be best to avoid all misunderstanding by adding a word or two on this head. The *buffer* and the *shoeing hammer* are employed together to cut the clinches and in driving- and turning-down new nails. The former is made from high carbon steel—a piece of an old rasp will answer. The cutting edge is hardened and tempered. The buffer requires a pretty accurate degree of tempering, so that it will not be brittle and yet will cut the metal of the nails. The temper used for hacksaws will be about right. The hardening may be done as usual—that is, the piece is heated up, say, to a *bright cherry red* and then quenched in water or oil, preferably oil. The tempering may properly be done by using a slab of metal to impart the heat. That is, after the hardening operation, the slab is heated, say, to a black heat which is about to turn to a dull red. The cold work is laid on the hot slab, a working spot being selected where there will be no drafts and where the changes of color will be readily watched. When the color has deepened to a *light purple*, the work is quenched quickly in oil or water, preferably oil.

The *drawing knife* is another important instrument that may be made from an old discarded tool. Thus, an old file may be used as the basic material. Several sizes are to be provided. The hardening and tempering may be carried out along the same lines as set forth in connection with the buffer. A *toeing knife* may also be made from file metal—an old rasp, for example. Such a knife is, however, not to be put into the hands of a careless or ignorant man, as he can cut away horn material too easily. Once cut away, it cannot, of course, be restored. The toe knife may be omitted altogether, if desired.

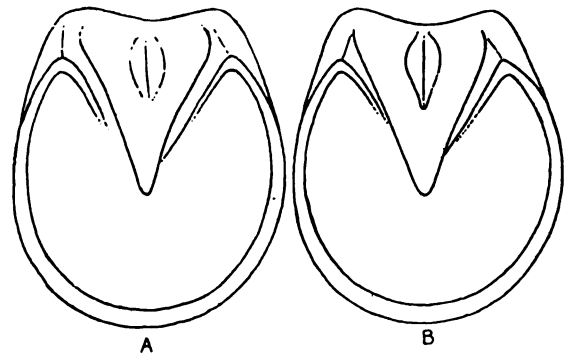
There are cases where the hoof is quite weak; and the horse-shoer may feel that, if anything, he should add horn rather than cut it away. He will do well, then, to proceed cautiously in such cases. As to loose horn, this is to be cut away under any circumstances, as it would not sensibly help to provide support, if left in place. The *white line* is now of importance. The horse-shoer aims to supply himself with a clear view of the white line all around. The workman then notes the condition of the white line itself, and observes the thickness of the horny wall by its aid. The wall is cut to the level indicated by conditions. This matter has already been gone into pretty well. The horny sole should be relieved of any horse material. Ordinarily, nothing more should be done to the sole, at this juncture, except as provided in the next few sentences. In general, the bearing surface of the horny wall is to be cut down until the sole is involved in the cut. That is, the bearing surface is pared down until there is included in it a very narrow border of the sole. This narrow border will lie next to the white line and within it. Its width will properly be about that of a wheat straw. The paring should generally stop when this narrow margin of the sole is brought into the bearing surface. The whole bearing surface will now consist of three rings of the general shape of a horseshoe. These are, (1) the bottom edge of the horny hoof; (2) the white line; and (3) the outer margin of the horny sole. The bearing surface is now leveled off to suit conditions, the leveling being done with the rasp alone. Sometimes, it will happen that little or nothing is to be removed at various points of the horny wall, because it is already down as far as it seems safe to cut or file.

The sole may be rather thick or it may be quite thin. A thick sole is indicated by a dull color, small cracks in the horny material, and deep lateral grooves along the sides of the horny frog. The sole loses material through natural causes, such as the growth of the sole itself, the alternate dryness and wetness of its substance, the elasticity of the sole, and the movement when the horse is in action. All these combine to loosen horn and to break it off. In fact, the loss of material from a sole will frequenly, or usually, be enough to reduce and weaken it—"a strong sole is rare." On the other hand, if the foot is upright and the horny wall steep, the sole will tend to strength.

Ordinarily, the bars should not be cut. They should always have connection with the wall at the quarters, and this connection should not in any case be cut through. They may be left level with the bearing surface of the wall, or else a trifle lower. The extreme rear parts of the sole should be trimmed, say 1/12 inch.

The frog is left prominent. It may be allowed to project beyond the bearing surfaces of the quarters an amount about equal to the thickness of a flat shoe. It is an error to weaken the frog by any unnecessary paring; as such weakness tends to make it less active. Shrinkage ensues and the hoof narrows. This last is not wanted, ordinarily; and so, one must not unnecessarily weaken the frog and bring it about. If, however, the frog is entirely too prominent, one necessarily has to trim it a little. Where the foot has contracted the diseased condition known as *thrush*, it is proper to pare away diseased pieces of the horny material of the frog. The foregoing is not to be understood as cautioning against the removal of loose material. The thing to bear in mind is to provide, as far as possible, for a strong frog. It may then be frequently left to wear to precise dimensions.

The extreme margin of the bearing surface is to be narrowed by rounding the inclined outer surface of the hoof next the bearing surface. Let this point be thoroughly understood. The bearing surface itself is not rounded; nor is it now tampered with further than narrowing it by taking off material from the outer margin. This taking off of material occurs in the rounding, but does not affect the flatness of the bearing surface. The proper amount of rounding is partially indicated by the following requirement. The narrowed bearing surface of the horny wall



Steps in Trimming Hoof.

is to be just about as wide as the hoof wall is thick, when the thickness is properly measured perpendicularly through the wall. A bearing surface, prepared by simply trimming it horizontally, will be wider than the true thickness of the wall. This is due to the slant of the horny wall, and has already been explained in a former instalment of the present series of articles. The rounding narrows the bearing surface of the horny wall to some extent. The amount left is to be as wide as the horny wall is thick (the thickness being properly measured). In short, the rounding is done until the apparent thickness and the true thickness are just alike.

Some special points need to be noted. If the toes are turned out, the outer wall of a hoof will appear longer than the inner wall, if the hoof is viewed from a point in advance. Similarly, if the toes turn in, the inner wall will be the longer of the two. The horse-shoer will do well, then, to note such conditions, and observe just how the true axis runs, before he begins trimming. The authority of Goyau is understood to be back of the following suggestions. First, seek to imitate the effects produced by natural wear. "Natural wear produces a flat foot of a form best suited to the conformation of the limb it terminates. It shortens and rounds the toe, lowering it to a greater extent than the heels; removes horn only from the anterior part of the sole, leaving the connection between walls and sole of full strength; rounds off the outer edge of the wall more than the inner, and spares the sole, frog and bars, which shed their superfluous growth naturally. Natural wear gives to the foot the form best suited to the animal's action, and produces a perfectly flat bearing surface from the quarters to the heels." Goyau states that the equilibrium of the limb should result, in so far as possible, from the preparation of the hoof rather than from a shoe providing varying thicknesses of metal.

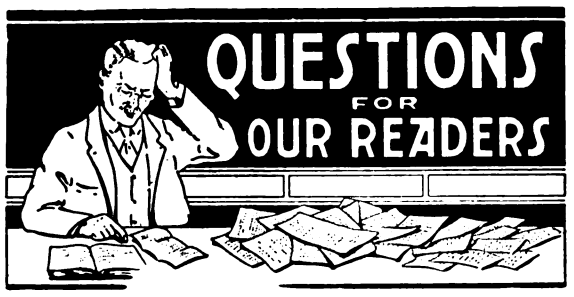
A Tailor's Sign

The tailor's sign in a little inland town was an apple, simply an apple. The people were amazed at it. They came in crowds to the tailor, asking him what on earth the meaning of the sign was.

The tailor, with a complacent smile, replied:

"If it hadn't been for an apple, where would the clothing business be today?"

Digitized by Google



Brake Testing for Horse Power

From J. T. Gayton, Georgia.—Will you please send me plans for making a Brake Test for engines?

Have any of our readers actually worked this out practically? We should like to publish working plans for a simple brake test on gas engines for Mr. Gayton and other of our readers who would like to test their engines and actually know, in horsepower, just what power they are delivering. There are several simple ways of doing this; perhaps some of our readers have done it. For the information of those who would like to work it out, one horsepower is the energy required to lift 33,000 lbs. one foot in one minute; or, any like proportion, as 3,000 lbs. eleven feet in one minute.

Wanted—A Tire Shrinker

From Frank Morris, Washington.—I would like to obtain a second-hand, number 3 Ayres Tire Shrinker, or if not, a Number 1 or 2 Champion Star Shrinker would be just as satisfactory. I think that it is very probable some one of the readers of the B. & W. may have such a machine in good condition and be willing to part with it.

If any reader has such a device they can get in communication with me through the magazine.

HARD ON THE HORSE

There are many different kinds of shoes for horses, but our printer evidently has his own ideas on the subject. Mr. Springer, in his interesting article on horseshoeing, running in these columns, advocates a thin shoe, where possible. When the manuscript was returned by the printer, set up in type, our proof-reader, though not a veteran horseshoer, was surprised to read *"A tin shoe is advocated."*

NEW BOOKS RECEIVED

Techno-Chemical Receipt Book.—Sold by the Henry Carey Baird & Co., of 116 Nassau Street, New York City, at $2.50. This book is really a general encyclopedia of formulas of use to everyone. It will be of interest to the manufacturer of alloys, of explosives, of earthenware or leather;—to the confectioner, to the engineer, to the painter and to the housekeeper. It is more than worth its price in the money that it will save.

Forge Practice.—This is the third edition of the book written by John Lord Bacon and sold by John Wiley & Sons, 432 Fourth Avenue, New York City. This book describes in detail the forge and tools, then gives directions for doing practically all kinds of forge work. It has a chapter devoted to welding and one devoted to tool forging and tempering. It should fill a big want among all workers of iron and steel. Its cost is $1.75.

Automobile Engineering.—The six volume set of automobile engineering books which is published by the American Technical Society, Dept. A-67, Chicago, Illinois, is without doubt one of the most complete instructional automobile references on the market. This set is so written that the amateur can understand it fully and by careful study acquire a working knowledge of automobile mechanics. The books are written for the man who has not had the opportunity to educate himself.

In volume one the power plant is taken up and the parts described. This volume takes up in detail the troubles common to engines, carburetion and lubrication. Volume two takes up clutches, transmissions, running gear and chassis. Volume three is devoted to ignition, starting, lighting and wiring diagrams. Volume four continues the electrical system with a special emphasis upon the Ford system and on storage batteries. Volume five is a treatise upon welding and repair shop practice. It also includes the subjects of motorcycles and steam cars. Volume six is devoted to tractors, electric, and commercial vehicles. It also contains the general index.

The whole set of six books is sold upon an easy payment basis. Should our readers be interested they may obtain the set for a seven-day's examination.

Freight Haulage—Rail or Motor?

The Results of a Careful Comparison by a Large Company with Fifteen Trucks

Increased haulage is creating a demand for trucks and wagons which ought to make the business hum, and the wheelwright and blacksmith will get their share of the business from all appearances. Haulage is a paying proposition today. No distance seems too long for the modern truck with its special body adapted to the particular needs of the shipper.

Careful comparison of the cost of shipping by motor truck and by rail, as made by the Fisk Rubber Co., of Chicopee Falls, Mass., shows that it is cheaper to make shipments from the factory to New York and Boston by motor truck than by railroad express or freight.

The analysis made by the company's road transportation department, which has been in operation for some time and has greatly developed, is based on the operation of fifteen motor trucks, including trucks of ¾, 2, 3, and 5-tons capacity. No trailers are operated with the trucks as yet, but the company has been considering the use of trailers as a means of still further reducing its haulage costs.

Comparative figures are as follows:

This table emphasizes strikingly the economy and importance of operating trucks at as nearly as possible their full capacity, and also the superior economy of the larger trucks over the smaller units.

Outgoing shipments from the factory consist of automobile and truck tires and sundries, and incoming shipments of tire fabrics, litharge and valves. Following is an analysis of the freight and express costs, including haulage at both ends in the case of freight shipments and war tax on both freight and express shipments:

ITEMIZED FREIGHT RATES

Outgoing	New York Cents		Boston Cents	
80% Tires @ 63c per cwt	50.4		50.4	
20% Sundries @ 42c per cwt	8.4		8.4	
War Tax @ 3%	1.8		1.8	
Hauling per cwt	45.0		40.0	
Total		10.56		10.06
Incoming				
50% Fabric @ 30.5 per cwt	15.3		30.5	
30% Litharge @ 23 per cwt	6.9		..	
20% Valves @ 36 per cwt	7.2		..	
War Tax @ 3%	0.8		0.9	
Hauling per cwt	20.0		20.0	
Total		50.2		51.4
Average per cwt	77.9		76.0	
Cost per ton-mile (rate × 20 ÷ mileage)	10.4		15.2	

ITEMIZED EXPRESS RATES

Outgoing and Incoming	New York		Boston	
Express rate per cwt	126.0		99.0	
War Tax @ 5%	6.3		4.9	
Total		132.3		103.9
Cost per ton-mile (rate × 20 ÷ mileage)		17.6		20.8

Thus, it is cheaper for a company in or near Springfield, Mass., to do its hauling to Boston with its own motor trucks of 2, 3 or 5 tons capacity than to ship by freight, provided full loads are carried by the 2 and 3 ton trucks and loads of 2½ to 5 tons are carried by the 5-ton trucks, and is cheaper to haul to New York with its 5-ton trucks, loaded with 3½ to 5 tons, than to ship by freight.

To ship to Boston by express costs more than to ship by trucks of 1 to 5 tons capacity, provided the 1-ton trucks are loaded to capacity, the 2-ton trucks carry ½ to 2 tons, the 3-ton trucks carry more than 1½ tons and the 5-ton trucks carry 1¾ tons or more.

COST PER TON-MILE

	To Boston or New York by Motor Truck, Full Load. Cents	TO BOSTON Express Cents	TO BOSTON Freight Cents	TO NEW YORK Express Cents	TO NEW YORK Freight Cents
5-ton truck	6.9	20.8	15.2	17.6	10.4
3-ton truck	10.5				
2-ton truck	13.82				
¾-ton truck	17.15				

COST PER TON-MILE BY TRUCK WITH VARIOUS LOADS

Load	5-ton Truck Cents	3-ton Truck Cents	2-ton Truck Cents	Cents	¾-ton Truck Cents
5 tons	6.9				
4 tons	8.6				
3½ tons	10.0				
3 tons	11.5	10.5			
2 tons	17.25	15.75	13.5–14.15		
1½ tons	23.0	21.0	18.0–19.0		
1 ton	34.6	31.5	27.0–28.3		17.08
¾ ton	51.0	42.0	36.0–37.5		22.75

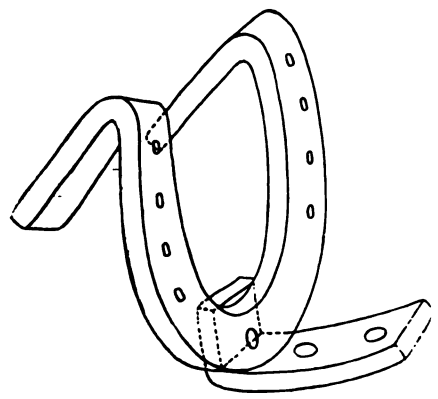
Digitized by Google



A Peculiar Case

From Theo. Anderson, Nebraska.—I am sending some pictures of a horse's foot which I shod. This horse was born with a club foot (he walks on the front of the foot instead of the bottom) and now works fine with the shoe I put on.

I turned the heels at the nailholes on a slant and welded a piece of steel on the toe four



A Sketch Showing Construction of the Shoe.

inches long and one and a-half inches wide. The shoe used is a No. 4 in order to leave stock enough to bend into a four inch high heel.

* * *

We feel that our readers are interested in peculiar problems like that which Mr. Anderson has brought to our attention and so we have reproduced on this page all of the pictures which he sent us.

In addition to the photographs which he sent, our artist has sketched the shoe itself which appears above and how the shoe looks when it is applied. The latter sketch is shown in the lower right hand corner of this page.

Undoubtedly there are many horses in the country which have deformed feet and unless some method is used whereby shoes can be applied, the horse cannot do a great amount of work. There must be, as in the case of which Mr. Anderson speaks, a method of shoeing in practically every case.

This is a good opportunity for some of our readers to tell us about "Strange Cases they have Shod." It would be interesting to know if any brother readers have treated similar cases and if their methods have differed. We cannot see why it would not be possible to make a combination metal and leather or metal and wood shoe which would even off the bottom of the foot and bring the strain more in line with the center of the leg.

(EDITOR.).

Pointing Plows

From John Newman, Kansas.—A great many blacksmiths do not know how to weld plow points on, well enough to take more than one or at most two sharpenings, then the welding has to be done over again. There are several reasons why the work is faulty. The main one is that they want to get the work done in a short time with one heat, whereas two or more welding heats would make a much better job.

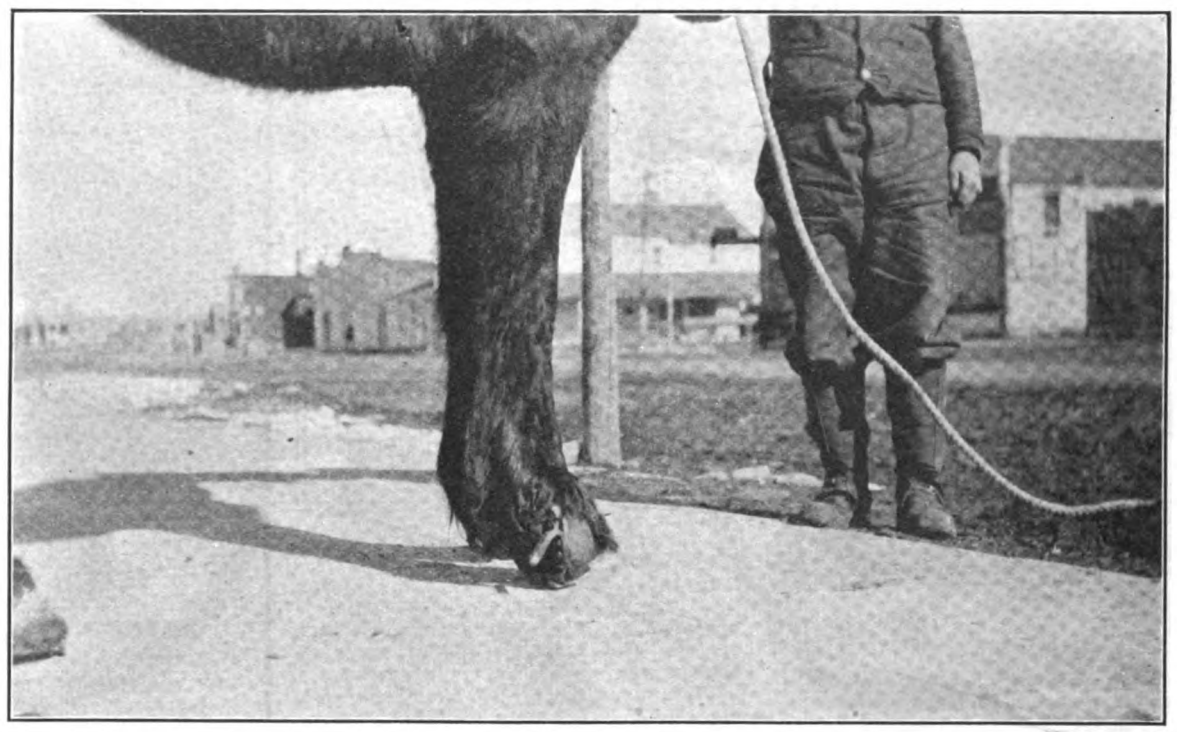
When one smith puts on a poorly welded point, the next blacksmith, who gets the work to sharpen, has a job—the job of re-welding and the customer usually makes a kick about paying for the extra work. The writer has done hundreds of such jobs without any pay.

When I first came to my present location, an old blacksmith used to drop into the shop very occasionally and watch my work. He was 82 years old and of course had retired from business, but though he seemed to think my way of pointing shares was very satisfactory, he said that it took me too long and that I made hard work of it.

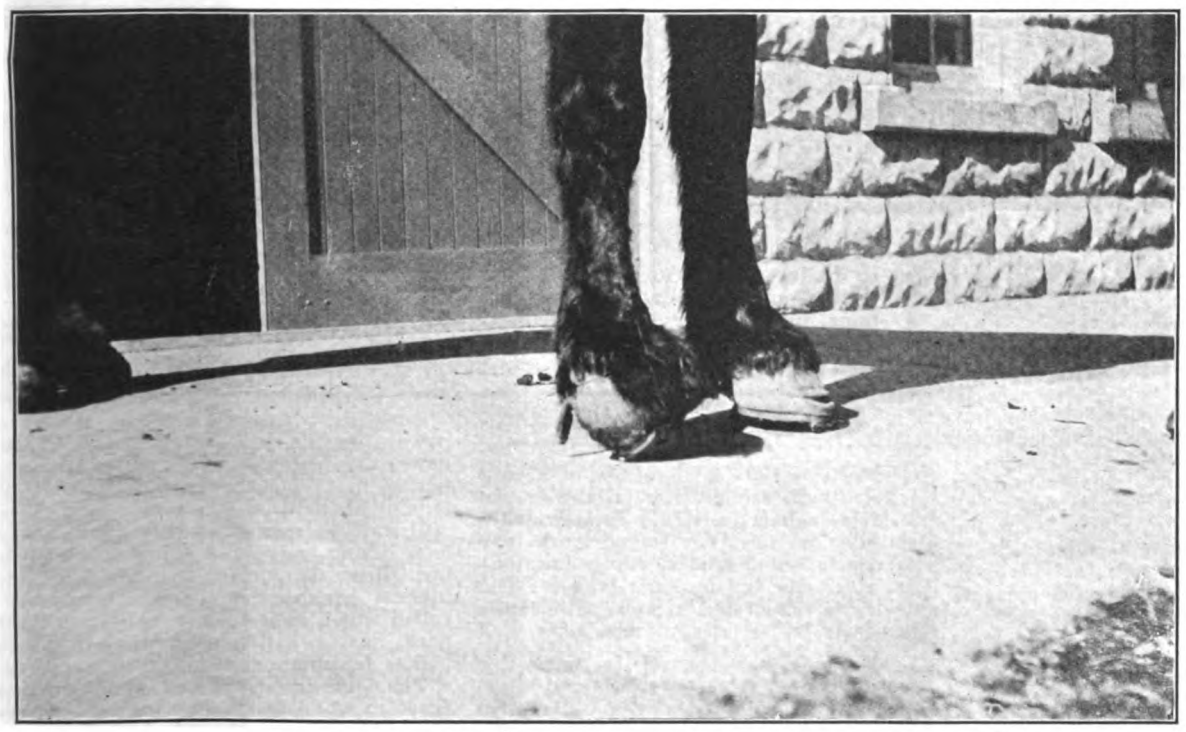
One day when he came in, he suggested that he would like to show me how he made his points. He thought that it was a much



A Photograph Showing the Shoe in Place with the Foot Lifted to Give a Better Idea of the Construction and Application.



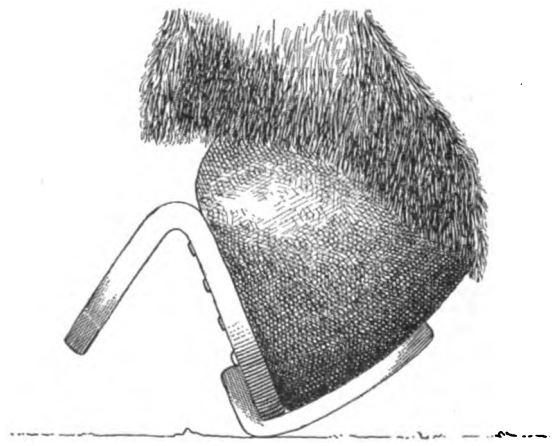
A Rear View of the Shoe in Place and the Horse Standing On It.



Photograph Showing How the Horse Stands.

easier way than mine, and in fact thought that it saved about half of the work. I told him that the next plow I had, I would call upon him to do. At that time the old man told me how he came to learn the trick.

It seems that when he was in business in Iowa a long time ago, one noon hour his helper, while the old man was at dinner, pointed a share in his own way. When the

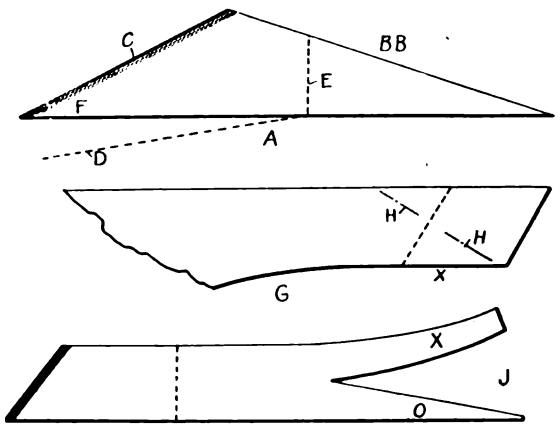


Sketch Showing the Placing of the Shoe.

Digitized by Google

old man saw the work, he realized that it was done in a better way than that which he did it himself. The old man said that the helper was not of much account in other work, but this was the only useful thing he could do.

Now there may be a great many smiths who do pointing in the same way, but I have never seen them. At figure *A* is shown the shape of the steel. A rasp or old file will make an excellent point. If any thinner material is used the points will have to be cut wider and the edge marked *BB* hammered back. The shaded edge *C* is drawn out sharp and in drawing it, that part will shape or curve to fit the share somewhat as shown by the dotted line *D*.



How Mr. Newman Makes and Welds His Plow Points.

The material is next thinned along the dotted line *E* with a fuller or hammer so that it can be bent under and back easily. Then the point *F* in the drawing *A* should be bent downward until it comes to the point *X*, as shown in drawing *G*, where it should be held with a pair of tongs and given the first heat at *BB*. You will be surprised at the easy job this makes.

The two lines *HH* on view *G* show how most smiths point. This way does not give any material in the throat of the share where material is needed. View *J* gives an idea of the method I used for a good many years. It makes a fairly good job, but takes lots of time and requires work. It cannot be done very well without a helper to cut out the material at *O* and *X*.

The points *O* and *X* are welded to the bottom of the share; *O*, on the landside point, *X* on the throat of the share. The shaded upper end is drawn out and welded at the dotted line. It is fullered thin to bend up and back in the proper position of the share. On first appearances one might think that *J* would make a better job than that shown at *A*, but it does not.

I might say a few words about tempering plow-shares. In the first place, never try to temper a solid steel share, for many of them will go to pieces. A soft center share, however, can be tempered fairly easy. After sharpening, one should be sure that the share does not have too much curve where it joins the mold board, but should be shaped so that it will be almost straight.

The share should then be heated red hot all over in order that it may take an even temper. If the heat is spotted, you will get poor results. The tempering liquid that I use is mixed as follows:

Into one-half a barrel of water place about a peck of common salt and a bucketful of hard-wood ashes. Many smiths also add blue-stone (copper sulphate) though I have never tried it.

I wish that more of the smiths would say something about tempering plow-shares for I have an idea that there are many better methods than mine. In this location I do not have to temper them because they are hard steel, but where I used to work practically all of them had to be tempered because they were the soft center type.

I may mention that when the share I have spoken of is first made it will be practically straight before it is put in the tempering bath and the cooling will curve it to its proper shape usually. Once in a while, however, the share curves too much. In such event, the share must be reheated and done over.

In plunging the share into the cooling liquid, it should be plunged in its full length with the mold board edge downward. I always grip the share by the wide part of the land side. Then there are no soft spots in the edge of the share.

Tradesmen and Laborers Headquarters

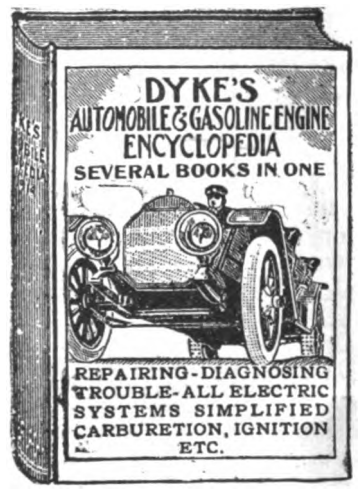
FURNISHING best class of help to employers, free of charge. Phone write or wire us your wants.

DIAMOND LABOR AGENCY

557 W. Madison St. Chicago, Ill.

Phone Main 5074

How to Become An Expert Automobile Mechanician



It's worth ten times its cost if only placed on the shelf and used as a reference.

Price, Cloth Bound

$5.46 prepaid

The quickest and cheapest, but BEST way, is by studying Dyke's Automobile and Gasoline Engine Encyclopedia.

It is a practical, simplified instruction on everything you want to know and OUGHT to know about motoring.

First you learn the principle of construction of each and every part of a car and engine—then the variance of construction—then the adjustments and repairs.

You learn how to diagnose troubles in a scientific manner. Step by step you advance until you are a *real expert* on timing the valves and ignition, repairing and adjusting. You learn the carburetion, ignition, and *storage battery* subject so thoroughly, you can adjust and repair any make.

You will like this book, in fact we will guarantee you would not sell it for three times its cost if you could not get another.

You will also understand Aviation, Truck and Tractor Engines as well as the Auto Engine when you complete this book.

Beware of Imitators—this is the *original, simplified* book on REPAIRING, ELECTRICAL SYSTEMS, TROUBLES, Etc. It is the only book in the world combining all these subjects under one cover. Why get three—or four books?

Mr. Dyke published the first practical book on automobiles, originated the first auto supply business and manufactured and marketed the first blast feed carburetor in America.

DYKE'S AUTOMOBILE ENCYCLOPEDIA—TENTH EDITION

Is a non-technical treatise with simplified illustrations on Construction, Operation, Repairs and Adjustments, Cares and Troubles of the Automobile.

There are 50 **Instructions**—Simplified and Practical.
3362 **Illustrations**—the kind you understand at a glance.
2 Supplements, part printed in two colors, treating on the construction, operation, repairing and adjusting of the **FORD** and **PACKARD**—tells how to make a Ford do 60 miles per hour; how to get more mileage per gallon; how to convert into a truck, racer, fine point adjustments, etc.
775 illustrations and 279 pages on **Electric Ignition, Electric Starters** and **Generators**, etc.
51 pages and 79 illustrations on the **Delco** system alone.
60 pages and 254 illustrations on **Adjustments, Tests**, etc., of leading **Electric Systems.**
154 pages and 1189 illustrations on **Repairing.**
Oxy-Acetylene welding. **Axle, Differential** and all engine and running gear repairs simplified. How to remove and adjust all axles, steering gears, etc., included.
27 pages and 180 illustrations on **Tires** and **Tire Repairing.**
44 pages and 119 illustrations on **Carburetion.**
89 pages and 291 illustrations on **Engines** and **Parts.**
16 pages on **Digest of Troubles.**
6000 lines to the **Index.** This is a feature worth noticing, as it means a ready reference on everything pertaining to motoring. **Index** begins on **colored** paper, easy to refer to.
Dictionary is also included, which gives the meaning of motoring terms.
Inserts: There are five—printed in colors. **New** features you never before saw or heard of in one of the inserts.

In addition to instructions on every detail of the automobile, from Repairing to Equipping a Shop and Starting into the Business. There are also instructions, fully illustrated, on TRUCKS, TRACTORS, MOTORCYCLES, AIRPLANES and LIBERTY ENGINE.

Address all orders to THE BLACKSMITH & WHEELWRIGHT, 73 Murray St., New York



The Presto-O-Lite Service

The Prest-O-Lite Company originally started to produce gas for automobile head light consumption and has been in the field for a long time. This company also manufactures gas for brazing, welding and cutting. As the call for lighting acetylene dropped off, this company gradually worked into the welding-gas line and have really grown up in this particular field.

At present the company are supplying gas for welding all over the country and users are fully satisfied with the quality. Our readers who do welding should investigate the Prest-O-Lite service and will find the gas made by this company to be of the best quality.

The New 1920 Model

We wish to call you attention to page 28, the L. S. P. Calking Machine Co.'s advertisement; it is at this time of year they announce their New Model.

We all know that during the War and these War time prices that nearly all machinery and parts have been advanced two or three times the former prices, and in many cases making it prohibitive for some to have the benefit of labor saving machinery when so much needed.

We have been constantly doing business with the L. S. P. Calking Machine Co., Wyalusing, Pa., for the past ten years, and it is with the utmost pleasure we are privileged to give you the following facts:

In the first place, we might mention that the L. S. P. Calking Machine is patented, therefore, there are no strings on this Company; it has a right to charge what it wishes.

We understand that it has no competitors, as it is the only Calking Machine advertised in the trade papers, and being behind with orders from a week to a month, it would be nothing only natural to expect this machine to be boosted in price to the limit, however, the price of this wonderful machine has not been advanced ONE CENT.

When the World War started and help leaving the shops, the L. S. P. Calking Machine Co. said they would do their bit by furnishing the Horseshoers with this labor saving machine at a price that all could receive the benefit.

Many would have had to close up shops without this machine, for they could not get help. This company not only made good during the War, but also are holding to the same price now, and assure us that if they are compelled to advance the price, it will be strictly necessary.

No; they have not cheapened the machine; on the other hand they have strengthened the weak parts, making it more expensive to make.

A few reasons, which has made it possible for this machine to be sold at the same price of four years ago, it has gone through the experimental stage, which is expensive. A great satisfaction to the purchaser to know; he has a perfected machine, not one to be improved the next month: the only change in their Model being the date.

They sell by Mail order and through the Jobbers, no salesmen on the road, one machine selling another, which is the best testimonial that any machine can have.

Hi-Lo Jack

The Rowe Calk & Chain Co., of Plantsville, Conn., are putting on the market a device called the Hi-Lo Jack, which is suitable not only for wagon work, passenger cars and trucks, but is adaptable for railroads and building trades. This device is made in six sizes with capacites from half-ton to 12-tons.

The jack has several features that distinguish it from the ordinary device, the first being its compressibility, that is, it can be closed to within six nches of the ground and at that point will exert a large percentage of lifting power; as the jack extends the lifting power increases, and when fully extended to 17 inches, the power is at its maximum.

It can be seen that this jack has a long lifting range and a low initial lifting point. The device is made from the highest grade of malleable iron, cold-rolled steel and drop forgings. Each pack has a ball-bearing thrust which makes for easy operation.

The load can be raised or lowered a fraction of an inch. The manufacturers claim that they test each jack before it is shipped and each jack is guaranteed to be perfect in every way.

Digitized by Google

I AM THE FOUNTAIN HEAD OF THE ABUNDANCE OF THINGS

I KEEP the populace awake when otherwise they would slumber—I am the active agent stirring up work for millions of men and women—I keep doors from rusting on their hinges—I make folks think—I compel them to open their purses and buy anything—Everything that is good—I am Advertising.

Oxygen for Cutting

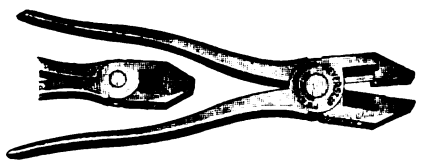
Oxygen is being used more and more by the wheelwrights and blacksmiths, as its value is becoming understood, for cutting and other purposes. The service problem is to make it readily available as it is needed. The Linde Air Products Company, of New York, manufacture it and have kept adding to their distributing stations till now they have sixty-four of them, located in thirty-one states. Their advertisement in this issue states that a mail or telephone order will be shipped the day it is received from any of these stations, and gives a list of the addresses, by states.

The Neverslip Plier

The Neverslip Works of New Brunswick, N. J., have announced an addition to their line of the Neverslip Plier. This plier is the development of a war-time condition,—conservation and the manufacturers are to be commended upon the fact that they have produced a plier which is practically indestructible.

The life of a plier depends entirely upon the life of its cutting blades as soon as the cutting edges are broken or worn, then the value of the tool is reduced to almost nothing for it no longer is of use in cutting but is simply a pinching or holding tool.

The Neverslip Side Cutting Plier, however, is of unique construction for the *cutting edges are renewable.* This means that the plier can be used indefinitely. As soon as the blades are worn, they can be replaced with new for only a few



Above, the Neverslip Plier; at Right, the Plier Jaws.



cents. If, for any reason, the blades should be nicked or broken the plier can be restored to its value by replacing the broken blades.

This feature makes possible the use of selected steel for the blades. Steel which is best adapted for the work to be done. In other words, each part of the plier can be made to do its own part of the work.

The body of this plier is made from drop forged steel with jaws that combine toughness with strength while the jaws are made from steel that is both tough and hard. Our readers should write for an illustrated catalogue.

The A-B-C of Ford Motor Repairing

The manufacturers of the Sioux valve grinders and valve resurfacers have just issued a little booklet which is called "The A-B-C of Ford Motor Repairing," and without doubt this booklet will fill a long felt want on the part of both the car owner and the mechanic who repairs cars.

Primarily the booklet is intended to accompany the Sioux valve grinding and refinishing tools. For the benefit of our readers we will mention that these tools are manufactured by Albertson & Co., of Sioux City, Iowa. The tools consist of a mechanical valve grinder, a valve trueing and refacing device and a valve seat resurfacer.

The valve grinder is hand operated and gives a reciprocating or forward and back movement which is necessary if the valves are to be ground properly.

The valve refacing tool is so designed that the valve can be placed in it and turned with a handle. As the valve is turned a cutting tool removes the rough spots and leaves a true valve face.

The valve seat reamer or resurfacer is really a taper reamer which cuts the valve seat at the proper angle to receive the valve.

In addition to the above tools the outfit includes two boxes of valve compound and a spring which is placed beneath the valve so as to lift it from its seat while it is being ground as the pressure upon the grinding tool is removed.

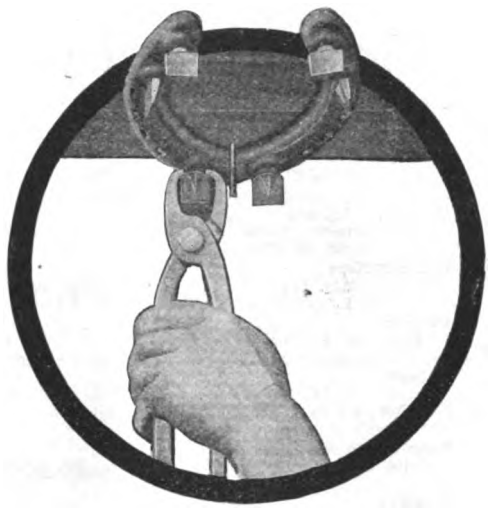
The little booklet gives not only specific directions for doing all of the work necessary in cutting the valves, reaming the seats and grinding them in place but also illustrates every step with clear pictures.

We should advise all of our readers to investigate the Sioux line of tools if they do automobile work.

The Neverslip Line

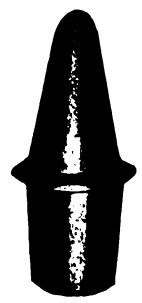
The Neverslip Works of New Brunswick, N. J., are said to manufacture the only complete line of calks and horse and mule shoes. The calks and shoes produced by this firm are designed along practical lines and are the result of years of experience. Not only are the calks and shoes excellent products but the prices are right.

We should advise our readers to write the above company for their catalog and prices.



The weight of a heavy man suspended from this calk failed to budge it.

ROUND SHARP



Standard Blade



Short Blade

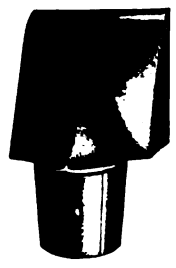


The same man's entire weight failed to twist this calk so much as a hair.

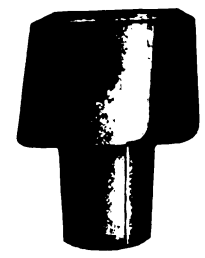
DIAMOND Calks

Fit Absolutely Tight

don't twist in the shoe or fall out, and we know it because—



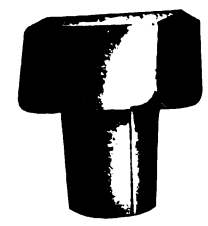
Regular Blade



Standard Blade



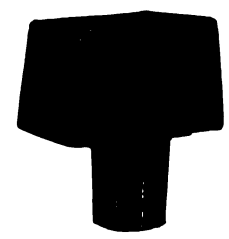
Standard Blade



Short Blade



Short Blade



Block Calk

FIRST—We make them so accurate that the calk holes and calk shanks don't vary 1/10,000 of an inch in diameter.

SECOND—The extra heavy reinforcing around the calk hole adds 50% to the grip of the calk.

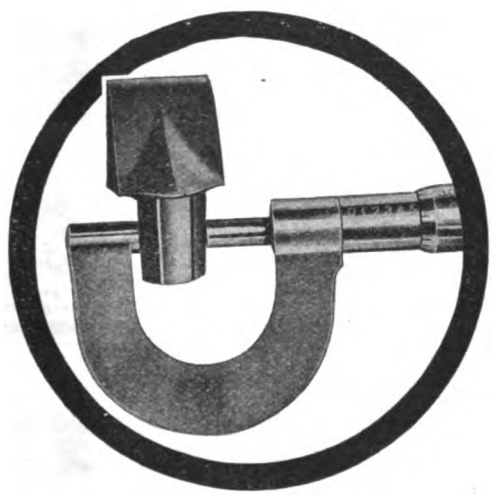
THIRD—The small ribs on the calk shank bite into the sides of the calk hole and prevent twisting.

FOURTH—We've made severe tests in our shop which show that the weight of a heavy man suspended from the calk can neither pull it out nor twist it so much as a hair.

FIFTH—Users of Diamond Calks unhesitatingly testify to their accuracy of fit, and—

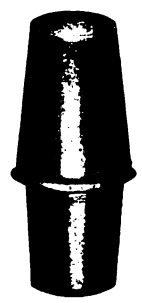
There's a Diamond Calk for every purpose

DIAMOND CALK HORSE SHOE CO.
Duluth, Minn.



The shanks and calk holes are so accurate as not to vary 1-10,000 of an inch in diameter.

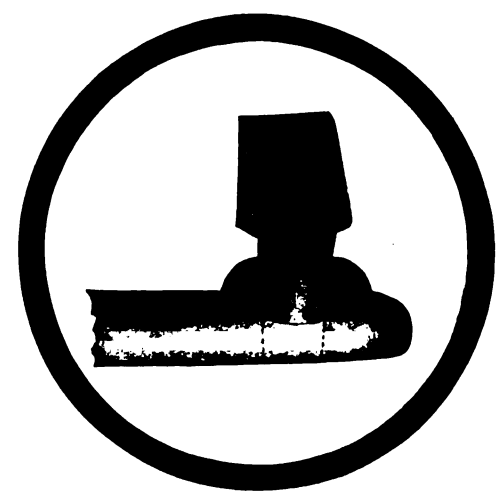
ROUND DULL



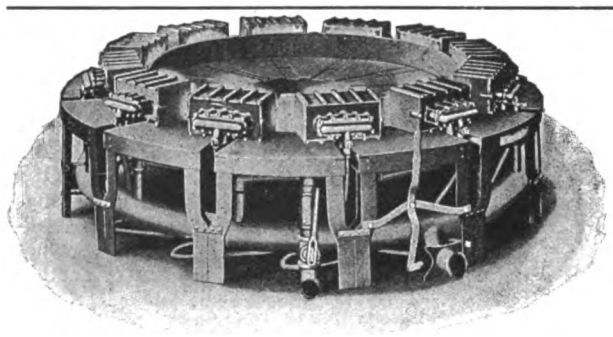
Standard Blade



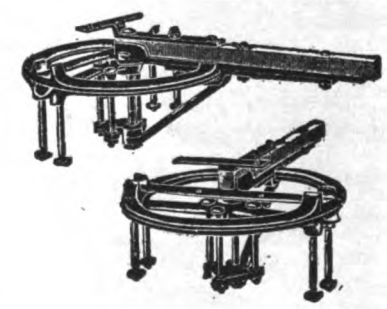
Short Blade



The heavy reinforcing around the calk holes adds 50 per cent to the "grip." The ribs on the shank absolutely prevent turning or twisting.







TIRE HEATERS for all fuels and purposes. Oil, Artificial Gas, Natural Gas and Gasoline Tire Heaters. Also Tire Coolers.

OUR GOODS ARE THE BEST IN THE MARKET FOR THE BEST RESULTS WITH HARD SERVICE.

Center and Rear King Bolt Fifth Wheels, End Gate Springs, Flare Board Irons, Body Braces, Heating Furnaces, Blow Pipes, etc.

THE COCEL MFG. CO., TOLEDO, OHIO.

An Advertisement in the *Blacksmith and Wheelwright* Brings Replies and

S A L E S

Digitized by Google

Index to Advertisers

Adjustable Wagon Tire Mfg. Co., tires, Front cover
Admiral Welding Machine Co., welding plants 26
Aetna Nut Co., horseshoe calks.....Front cover
Akron-Selle Co., gears .....4th cover
American Calk Co., calks.....Front cover
American Carriage Co., supplies..... 23
American Chain Co., grip chains.....4-5
American Horse Shoe Co., horseshoes..... 1
American Technical Society, books..... 27
Anti-Borax Compound Co., welding compounds 27
Armstrong Mfg. Co., bolt dies 8
Armstrong-Blum Mfg. Co., punches and shears .....Front cover

Barcus Mfg. Co., horse stocks.....3rd cover
Barnett, G. H., files and rasps.....Front cover
Bertschy-Bermo Co., welding plants..... 24
Bradley, C. C. & Son, shaft coupler....3rd cover
Bryden Horse Shoe Works, horseshoes..Front cover
Buffalo Forge Co., blacksmiths' tools..... 7
Burden Iron Company, Horseshoes.....3rd cover
Bush Motor Co., automobiles.....4th cover
Butterfield & Co., taps, dies and screw plates 8

Campbell Iron Co., supplies 23
Canedy-Otto Mfg. Co., blacksmiths' tools..... 6
Capewell Horse Nail Co., horse nails..Front cover
Champion Blower & Forge Co., blowers..2nd cover
Champion Tool Co., blacksmiths' tools..... 2
Columbus Anvil & Forging Co., anvils..4th cover
Columbus Forge & Iron Co., anvils..... 28
Cortland Welding Compound Co., welding compounds .....4th cover
Cray Bros., blacksmiths' tools 27
Crescent Machine Co., woodworking machinery 27

Diamond Calk Horseshoe Co., horseshoes..... 21
Doxey, N. D., welding compounds..... 24
Durner, A. E., Disc Sharpeners..... 26

Edwards Mfg. Co., C. D., shears..... 24
Electric Blower Co., blowers..... 25
Electric Wheel Co., wheels..... 23
Empire Mfg. Co., wheels..... 24

Firestone Tire & Rubber Co., tires 25
Fisher & Norris, anvils and vises 8
Franklin Steel Works, toe calks..... 27

Giant Grip Horseshoe Co., horseshoes..... 3
Gogel Mfg. Co., tire heaters..... 21
Goodyear Tire & Rubber Co., tires..... 28
Greb Co., grip pullers..... 24

Gwilliam Co., ball bearings .....4th cover

H. B. Tempering Process Co., tempering process 24
Hart Mfg. Co., stocks and dies .....4th cover
Harvey Spring & Forging Co., auto springs... 26
Hay-Budden Mfg. Co., anvils .....4th cover
Heller Bros., horse rasps, tools, etc..... 8
House Cold Tire Setter Co., tire setters, hollow and spoke augers .....4th cover

Jenner, H. W. T., patents 22

Kaukauna Machine Works, hammers..... 26
Kerrihard Co., hammers.....4th cover

Little Giant Co., hammers .....4th cover
Linde Air Products Co., oxygen 8
L. S. P. Calking Machine Co., calking machines 28

Ness, Geo. M., Jr., steel stamps.....Front cover
Neverslip Works, horseshoe calks..... 6
Nicholson File Co., files and rasps..... 25

Ottawa Mfg. Co., engines..... 22

Parker, C. L., attorney 23
Parks Ball Bearing Machine Co., woodworking machinery 22
Phillips-Laffite Co., welding plates..... 25
Phœnix Horseshoe Co., horseshoes and toe calks 27
Porter, H. K., bolt clipper .....4th cover
Prentiss Vise Co., vises .....4th cover
Plymouth Foundry & Machine Co., punches and shears 25
Prest-O-Lite Co., Inc., gas 8

Rosewater Electric Co., blowers..... 24
Rowe Calk & Chain Company, horseshoe calks .....Front cover

Sheldon Axle & Spring Co., axles..... 2
Sherwood, W. L., woodworking machinery.... 24
Standard Horse Nail Company, horseshoe nails .....4th cover
Star Mfg. Co., agricultural implements 6
Stokes Bros. Mfg. Co., rasps.....Front cover
Strite Governor Pulley Co., plow blade sharpeners .....3d cover
Sturtevant Co., F. C., veterinary remedies.... 24

Union Horse Nail Co., horse nails..... 23

West Tire Setter Co., tire setters, hammers... 24
Wheel B. Top and Hardware Co., supplies.... 4
Whisler Manufacturing Company, nut splitters, jointer heads .....Front cover
Witte Engine Works, engines 23

Young, W. F., veterinary remedies.....4th cover

CLASSIFIED BUYERS' GUIDE

Agricultural Implements
Star Mfg. Co. 24

Anvils
Columbus Anvil & Forging Co.....4th cover
Columbus Forge & Iron Co..... 28
Fisher & Norris 8
Hay-Budden Mfg. Co.....4th cover

Attorneys
Parker, C. L..... 23

Automobiles
Bush Motor Co., automobile .....4th cover

Automobile Springs
Harvey Spring & Forging Co..... 26

Axles
Sheldon Axle & Spring Co..... 2

Ball Bearings
Gwilliam Co.....4th cover

Blacksmiths' Tools
Buffalo Forge Co..... 7
Butterfield & Co..... 8
Canedy-Otto Mfg. Co..... 6
Champion Blower & Forge Co.....2nd cover
Champion Tool Co..... 2
Cray Bros..... 27
Heller Bros. Co..... 8
Nicholson File Co..... 25

Blowers
Buffalo Forge Co..... 7
Champion Blower & Forge Co.....2nd cover
Champion Tool Co..... 2
Electric Blower Co..... 25
Rosewater Electric Co..... 24

Bolt Dies
Armstrong Mfg. Co..... 8

Bolt and Rivet Clippers
Porter, H. K.....4th cover

Books
American Technical Society 27

Calking Machines
L. S. P. Calking Machine Co..... 28

Calks, Horseshoe
Aetna Nut Co.....Front cover
American Calk Co.....Front cover
Neverslip Works 6
Rowe Calk & Chain Co.....Front cover

Calks, Toe
Franklin Steel Works 27

Chisels
Champion Tool Co..... 2

Chucks
Buffalo Forge Co..... 7

Disc Sharpeners
Durner, A. E..... 26
Little Giant Co.....4th cover

Engines
Ottawa Mfg. Co..... 22
Witte Engine Works 23

Farriers' Tools
Barnett Co., G. & H.....Front cover
Champion Tool Co..... 2
Heller Bros. Co..... 8

Files and Rasps
Barnett Co., G. & H.....Front cover
Nicholson File Co..... 25
Stokes Bros. Mfg. Co.....Front cover

Forges
Buffalo Forge Co..... 7
Champion Blower & Forge Co.....2nd cover

Gas
Prest-O-Lite Co., Inc..... 8

Gasoline Engines
Witte Engine Works 23

Gears
Akron-Selle Co.....4th cover

Grip Chains
American Chain Co.....4-5

Grip Pullers
Greb Co. 24

Hammers
Champion Tool Co..... 2
Kaukauna Machine Works 26
Kerrihard Co. .....4th cover
Little Giant Co.....4th cover
West Tire Setter Co..... 24

Hollow Augers
House Cold Tire Setter Co.....4th cover

Hoof Nippers
Champion Tool Co..... 2

Hoof Parers
Champion Tool Co..... 2

Hoof Shears
Champion Tool Co..... 2

Horseshoes
American Horseshoe Co..... 1
Bryden Horse Shoe Works.....Front cover
Burden Iron Co.....3rd cover
Giant Grip Horseshoe Co..... 3
Phœnix Horseshoe Co..... 27
Rowe Calk & Chain Co.....Front cover

Horseshoe Calks
Diamond Calk Horseshoe Co..... 21
Neverslip Works 6
Rowe Calk & Chain Co.....Front cover

Horseshoe Nails
Capewell Horse Nail Co.....Front cover
Standard Horse Nail Co.....4th cover
Union Horse Nail Co..... 23

Horse Stocks
Barcus Mfg. Co.....3rd cover

Jack Mfrs.
Rowe Calk & Chain Co.....Front cover

Kerosene Engines
Witte Engine Works 23

Nut Splitters
Whisler Mfg. Co.....Front cover

Oxygen
Linde Air Products Co..... 8

Patents
Jenner, H. W. T..... 23
Parker, C. L..... 23

Plow Blade Sharpeners
Strite Governor Pulley Co.....3d cover

Punches
Champion Blower & Forge Co.....2nd cover

Punches and Shears
Plymouth Foundry & Machine Co..... 25

Screw Plates
Butterfield & Co..... 8
Buffalo Forge Co..... 7
Champion Blower & Forge Co.....2nd cover

Shaft Coupling
Bradley & Son, C. C.....3d cover

Shears
Edwards Mfg. Co., C. D..... 24

Spoke Augers
House Cold Tire Setter Co.....4th cover

Steel Stamps
Ness, George M., Jr.....Front cover

Stocks and Dies
Butterfield & Co..... 8
Champion Blower & Forge Co.....2nd cover
Hart Mfg. Co.....4th cover

Supplies
American Carriage Co..... 23
Campbell Iron Co..... 23
Wheel B, Top & Hardware Co..... 4

Swages
Champion Blower & Forge Co.....2nd cover

Tempering Process
H. B. Tempering Process Co..... 24

Tires
Adjustable Wagon Tire Mfg. Co....Front cover
Goodyear Tire & Rubber Co..... 28

Tire Bending Machines
Buffalo Forge Co..... 7
Champion Blower & Forge Co.....2nd cover

Tire Heaters
Gogel Mfg. Co..... 21

Tire Setters
Buffalo Forge Co..... 7
House Cold Tire Setter Co.....4th cover
West Tire Setter Co..... 24

Tire Shrinkers
Buffalo Forge Co..... 7
Champion Blower & Forge Co.....2nd cover

Tongs
Champion Tool Co..... 2

Tool Grinders
Phœnix Horseshoe Co..... 28

Trucks
Akron-Selle Co.....4th cover

Tuyere Irons
Buffalo Forge Co..... 7
Champion Blower & Forge Co.....2nd cover

Veterinary Remedies
Sturtevant Co., F. C..... 24
Young, W. F.....4th cover

Vises
Butterfield & Co..... 8
Fisher & Norris 8
Prentiss Vise Co.....4th cover

Wagons
Akron-Selle Co.....4th cover

Welding Compounds
Anti-Borax Compound Co..... 27
Cortland Welding Compound Co.....4th cover
Doxey, N. D. 24

Welding Plants
Admiral Welding Machine Co..... 26
Bertschy-Bermo Co..... 24

Welding Plates
Phillips-Laffitte Co..... 25

Welding Supplies
Linde Air Products Co..... 8

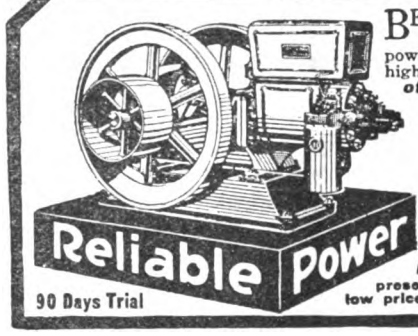
Wheel Dishers
Crescent Machine Co..... 27

Wheels
Electric Wheel Co..... 23
Empire Mfg. Co..... 24

Woodworking Machinery
Buffalo Forge Co. 7
Crescent Machine Co..... 27
Parks Ball Bearing Machine Co..... 22
Sherwood, W. L..... 24

Wrenches
Champion Tool Co..... 2

Lower Prices Now



BEST time now for getting your new engine—prices lower—prompt shipments. More power, per gallon, from cheap Kerosene than from high-priced gasoline. ***Easy to start in any kind of weather.*** Same engine also burns gasoline.

OTTAWA

Kerosene and Gasoline Engines. For all outdoor and indoor work. Sizes 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 16 and 22 H-P. Stationary, Portable and Saw-Rig styles. **10-Year Guarantee.** Get our catalog and prices and see big saving you can make now.

Book Free Easy to understand. Explains all about engines. **Write today for present low prices.** OTTAWA MFG. CO. 1784 King St., Ottawa, Kans.

More Tenons by 45 to 1

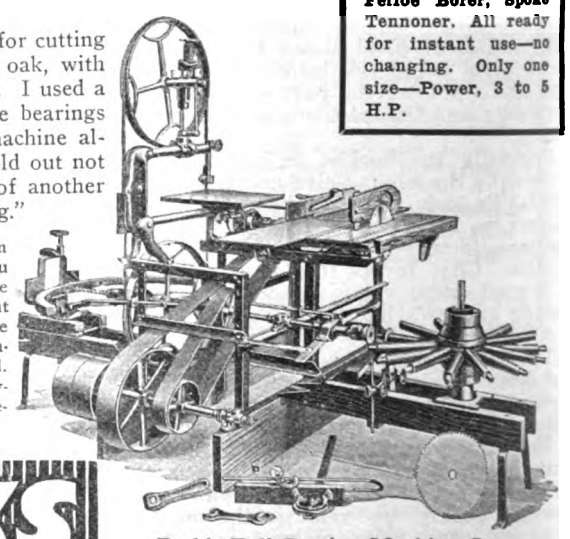
"YOUR spoke auger machine cuts tenons smooth and straight," says W. J. Vanstory, of Rienzi, Miss. "I have timed myself and cut as many in one minute as I could cut in 45 minutes by hand. One great advantage the Parks has, the tables are made of angle steel, well braced, and don't require concrete beds or heavy sills for foundation.

"I have used this Band Saw for cutting 4 in. wagon rims, seasoned oak, with it just standing on dirt floor. I used a Parks about 3 years and the bearings were good as new. This machine always gave satisfaction. I sold out not long since and am in need of another machine. Please send catalog."

If every user of the Parks Wagon Shop Special told his story you wouldn't hesitate another minute about getting one. It all but eliminates hard labor; saves time and makes money. Price, complete, $203. Ten days' free trial. Write for catalog telling everything about machine, its arrangement and operation.

Wagon Shop Special

A combination of Circular, Rip and Cross Cut Saws, 22" Band Saw, 12" Jointer, Rim Rounder, Felloe Borer, Spoke Tennoner. **All ready for instant use—no changing. Only one size—Power, 3 to 5 H.P.**



PARKS
Wood Working Machines

Park's Ball Bearing Machine Co.
North Side Station Cincinnati, Ohio

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

WANT ADVERTISEMENTS

ADVERTISEMENTS of SHOPS FOR SALE or TO RENT, SHOPS WANTED or SITUATIONS or HELP WANTED,

will be inserted under this head at 3 cents a word, including the address, for each insertion, payable in advance; but no advertisement will be accepted for less than 60 cents, however small.

Remittances may be made in postage stamps where the amount to be sent is less than $1.00. Address

M. T. RICHARDSON CO., 71-73 Murray St., New York
PUBLISHERS OF THE BLACKSMITH AND WHEELWRIGHT

Patents

PATENTS FOR INVENTIONS.

H. W. T. JENNER, patent attorney and mechanical expert, 622 F Street, Washington, D. C. Established 1883. I make an examination and report if a patent can be had and the exact cost. Send for full information. Inventors assisted in developing ideas and inventions. Trademarks registered.

FOR SALE

An old-established horseshoeing and wagon shop with stock and tools with nine room house and garage, also 1¼ acres land. Will sell at a bargain. Reason for selling, am in poor health. For particulars write owner, J. Alexander, North Main St., Winsted, Conn.

FOR SALE

If you can't get the nuts off from old bolts that turn when taking machinery apart, try one of our Nut Splitters. Splits all nuts three-quarter inch and smaller. Get circulars. Whisler Mfg. Co., Gibson, Iowa.

FOR SALE

Residence and well equipped blacksmith shop, stock and tools. Fine location; good business; excellent opportunity. Write to A. Edward Clark, Bergen, New York.

FOR SALE

Finished felloes, good dry stock, any height, $3.00 per set.
Log wagon felloes, 3 inches wide, 35c each.
Log wagon felloes, 4 inches wide, 50c each.
Finished wagon tongues, good straight grain oak, $1.75 each.
Finished bolsters, front and hind, including sand bolster, 75c each.
Tongue hounds, finished, 70c per pair.
Rear hounds, 70c per pair.
Wagon reaches, 2 x 4 x 8 feet, finished, 75c each.
Wagon box patterns of good clear gum lumber, 12 inch top, complete with sideboard cleats and 4 sills, 2 bottom boards 14 inches wide with 2 end gates, 2 top boards with endgates, 12 inches wide, with endgate cleats all dressed and cut to fit without bottom, $9.50.
With hard pine bottom, tongued and grooved, $11.75.
The same as above in maple lumber with bottom of pine, $12.90.
Price list of spokes.—
Second growth,
2⅛, $6.40; 2¼, $6.75; 2⅜, $7.00; 2½, $7.25
A grade,
2⅛, 4.75; 2¼, 5.00; 2⅜, 5.40; 2½, 6.00
B grade,
2⅛, 4.25; 2¼, 4.50; 2⅜, 5.00; 2½, 5.50
C grade
2⅛, 3.75; 2¼, 4.25; 2⅜, 4.75; 2½, 5.00
D grade,
2⅛, 2.75; 2¼, 3.25; 2⅜, 3.75; 2½, 4.50
The above is all good dry stock and finished of oak timber.
The above prices are for full sets of 92 spokes, one bundle each hind and front.
Wagon neck yokes, good grade, $2.40 per dozen.
Wagon doubletrees, 90c each.
All prices are f. o. b. cars Biggers, Ark., cash with order. All orders shipped promptly.
J. W. MAYNARD & SONS.

FOR SALE

In Florida. An established blacksmith's shop doing a good business; fine chance for two young men. Little cash wanted. Write for details. J. L. Lucas, Melbourne, Fla.

DOUBLE TREAD TIRES

We carry a full line of new and used tires and tubes. H. GINSBERG & SONS, 236 W. 48th Street, New York City.

A Real Bargain

We call the attention of our readers to the advertisement of F. C. Sturtevant Co., Hartford, Conn., which appears on page 24 of this issue, and it would seem that the special offer should be taken advantage of by many of the smiths who are interested in buying or selling tonics, liniments or hoof ointment.

There is no telling how long this special offer will be open and in these days of rising prices every bargain should be seriously considered.

A Commendable Act

Nearly $1,000,000 in life insurance was taken out for its 1,200 employees by the Peck, Stow and Wilcox Co., in celebration of its centennial anniversary.

Announcement of this was made by President Lyman H. Treadway, following his presentation of gold and silver service medals to employees who had been with the company 25 years or more.

The insurance, which is retroactive, went into effect October 1st.

The plan is to provide a policy of $500 for every employee after he or she has been with the company for three months; $600 after one's year's employment; $700 after two years; $800 after three years; $900 after four years; and $1000 for every one who has been with the concern for five years or more. There may be slight modifications in the working out of this but they will be only minor.

With the long periods of service on the part of so many men and women in the organization, this means an average of between $700 and $800, totaling to something over $840,000.

The Giant Grip Company

Subscribers will probably remember the Giant Grip Shoes and Calks as one of the old-timers. They are still agoing, stronger than ever. A modern factory and methods enable them to keep up with the times and prices. They are making tools now, too, according to their advertisement in these pages.

Tires

Telephone Circle 2460

B. LIBEN & CO.
DEALERS AND JOBBERS
in all Makes of Auto Tires and Tubes
261 WEST 54th STREET, NEW YORK

Biggest Drop in History in

Double Tread Tires

Greatest selection in factory seconds and blemished tires.

Write for information.

Tire Dealers Attention!

Reduced Prices on 5000 Miles Guaranteed Tires

30 x 3 Plain - $ 8.50
30 x 3½ NonSkid $12.50

All other sizes on request. 20% deposit on C. O. D. orders required. Write for list to

M. LIBEN & CO.
793k 7th AVE. NEW YORK CITY

PRICE WRECKERS

Double Tread Tires with Double Lock Stitch

30x3	N. S.	$5.50	34x4½	N. S.	$11.00
30x3½	"	6.50	35x4	"	10.00
32x3½	"	7.25	36x4	"	10.25
31x4	"	7.50	36x4½	"	11.00
32x4	"	8.00	36x5	"	12.00
33x4	"	9.50	37x4½	"	12.25
34x4	"	10.00	37x5	"	13.00

We carry a full line of Firsts and Factory Blemished Tires and Tubes at moderate prices.

ROYAL TIRE EXCHANGE
282 Halsey St. Newark, N. J.

FOR PROMPT SHIPMENT

40 lb. Bradley Helve Hammer	$300.00
600 lb. Bliss Board Drop	750.00
300 lb. Beaudry Forging Hammer	650.00
800 lb. Billings & Spencer Board Drop Hammer	800.00

We have several of these 800 lb. hammers we are overhauling and they are all good buys.

1 Champion Forge, excellent condition	$30.00
2 Millers Falls Power Hack Saws, each	47.50

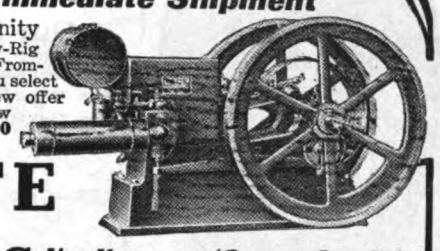
J. L. LUCAS & SON, INC.
3 Fox St., Bridgeport, Conn.



DIRECT TO YOU *from* WITTE

ENGINE PRICES NOW REDUCED
All Sizes—Immediate Shipment

Don't miss this opportunity to get a WITTE Engine, Saw-Rig or Portable at a Direct-From-Factory price. Before you select **any** engine, get this new offer and new book showing how I can save you **$15 to $200** on engines 2 to 30 H-P.



Buy on Your Own Terms ALL CASH or PART CASH As You Wish

WITTE KEROSENE ENGINES *Use Kerosene (Common Coal Oil) Operate At Half the Cost*

Lifetime guarantee protects you against **defect** of material or workmanship—the **quantity** of fuel required and the **horse-power** of your engine. 33 years of success building engines **exclusively** is **best proof** that you should own a WITTE. I cannot **begin** to tell you everything in this ad, but **I can tell you why** the WITTE is **better** than other engines if you will send me your name and address. **Do this today.**



Write For My New FREE Book

"HOW TO JUDGE ENGINES"—The greatest of all **engine** books—the **best** illustrated and printed—the most **widely** read, most **talked** about, and most extensively **copied.** Be sure to read this original, instructive, valuable and **true engine factory book.** It will open your eyes and **save you money.** Send postal card or coupon.—ED. H. WITTE, Pres.

WITTE ENGINE WORKS,
2442 Oakland Ave., Kansas City, Mo.
2442 Empire Bldg. Pittsburgh, Pa.

Just Send Name and Address
Before you decide on any make of engine be sure to get my latest and best factory book mailed FREE.
Name.....
Town.....
State.....
R.F.D.....
2442

PATENTS
C. L. PARKER
Ex-Member Examining Corps, U. S. Patent Office
Attorney-at-Law and Solicitor of Patents
American and foreign Patents secured. Trade marks registered. Searches made to determine patentability, validity and infringement. Patent suits conducted. Pamphlet of instructions sent upon request.
McGill Building WASHINGTON, D. C.

For Sale - Bargain Price

1 1/16 Axles, Fan Tail and Coach.
Buckboard and Light Delivery Bodies.
Brewster Side Bar Clips, Spring Bar Clips and Saddle Clips.
All sizes Screw Clamps.
Also Light Bobs, Cutters, and Runner Attachments.
AMERICAN CARRIAGE COMPANY
KALAMAZOO, MICH.

Blacksmith and Wheelwright
SUBSCRIPTION RATES
Domestic, $1.00 Canadian, $1.25
Foreign, $1.50



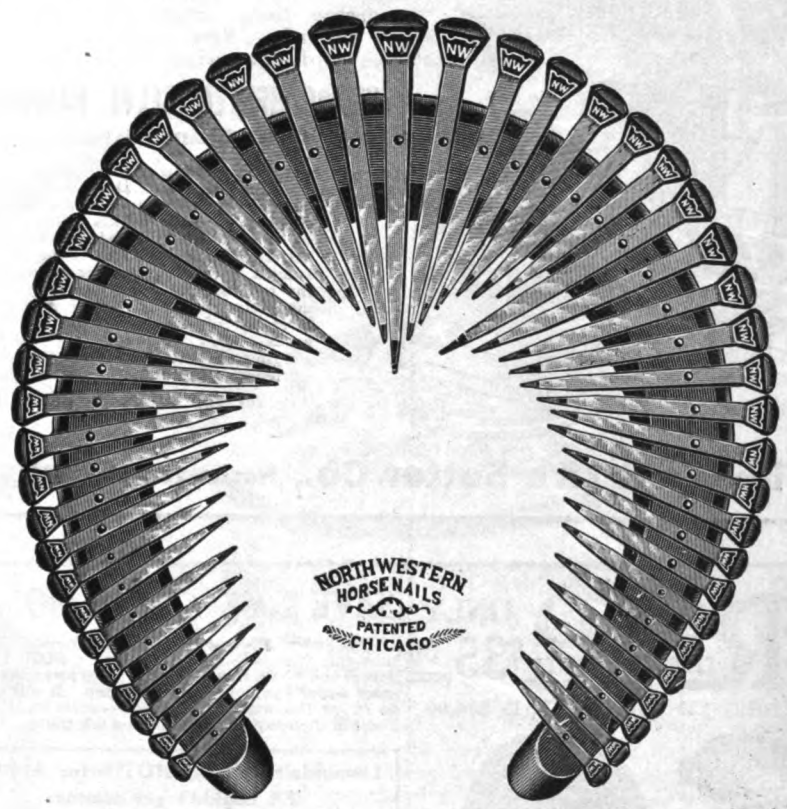
Our Grooved Tire

We Make **STEEL WHEELS**
To Fit Any Axle
Plain or Grooved Tire
Steel or Hickory Axles
Any Size
A Full Line of Wood and Steel
Farm Trucks
With Steel or Wood Wheels
Write for Large Catalog and Prices
ELECTRIC WHEEL CO.
Box N, Quincy, Ill.

The Campbell Iron Company
WHOLESALE SUPPLIES

Still carry a stock of Wagon, Blacksmith Materials, Farrier Supplies, as well as Tools, Hardware Supplies and Duplicate Parts for Fords.
Write for Machinery, Tool and Equipment Catalogue
Our Price, Discount Sheet and Supplement is being distributed.
817 CASS AVENUE ST. LOUIS, MO.

NORTHWESTERN HORSE NAILS



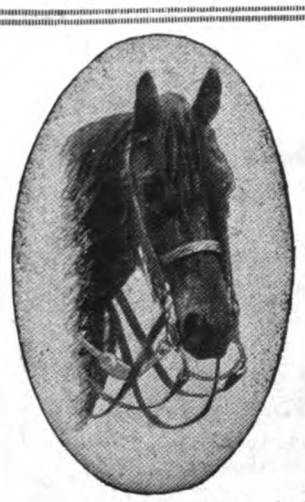
MADE OF THE BEST QUALITY MATERIAL

The most perfect in form and finish and will hold a shoe longer than any other nail made.

THE RE-INFORCED POINT makes it the easiest to drive and the safest to use.

UNION HORSE NAIL COMPANY
Manufacturers
CHICAGO ILLS.

Digitized by Google



Make More Money

Selling Columbia Veterinary Remedies

Our Special Monthly Offer

2 doz. Columbia Stock Tonic, 60c. size, $4.80 doz...$9.60
2 Doz. Columbia Liniment, 60c size, $4.80 doz..... 9.60
1 Doz. Columbia Hoof Ointment, 60c. size, $4.80 doz. 4.80
$24.00

FREE

FREE—1 doz. Hoof Ointment, 60c. size, $4.80..... 4.80
$19.20

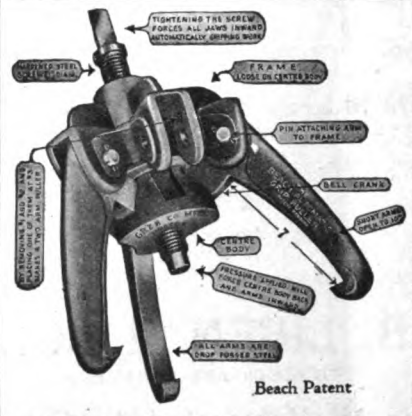
We include Free goods to cover transportation charges to your town.

Selling Price of above $43.20
Cost to you 19.20
Net profit $24.00

Send your order direct to

THE F. C. STURTEVANT CO. :: :: Hartford, Conn.

GREB AUTOMATIC GRIP PULLER



Make Your Gear and Wheel Pulling Show a Profit.

A Powerful automatic one-man Puller, whicn adjusts to work instantly. Combination of two or three arms. Two complete sets of three arms.

Senior Size for heavy work, Capacity 1 to 18 in.
Junior Size for small work, Capacity 1 to 7 in.

Ten Days' Trial

If your jobber does not have them, we will send you one. Try it ten days. If not satisfactory, return it to us and we will refund your money. We also make the Greb Rim Tool and Grebford Extension.

10 DAYS TRIAL

THE GREB COMPANY, 219 State St., Boston, Mass.

H-B Tempering Process

BLACKSMITHS,—are you making a business of TEMPERING? It is a general fact that Tempering of Steel is a side issue with the Blacksmiths. Why not make it a business that will bring more MONEY and GREATER RESULTS.

WRITE FOR PARTICULARS.

A ready mixed sample will be sent on the receipt of $1.00 with directions how to use.

ORDER AT ONCE ***IT WILL CONVINCE***

Manufactured by the

H-B TEMPERING PROCESS CO.

CLEARBROOK, MINN.

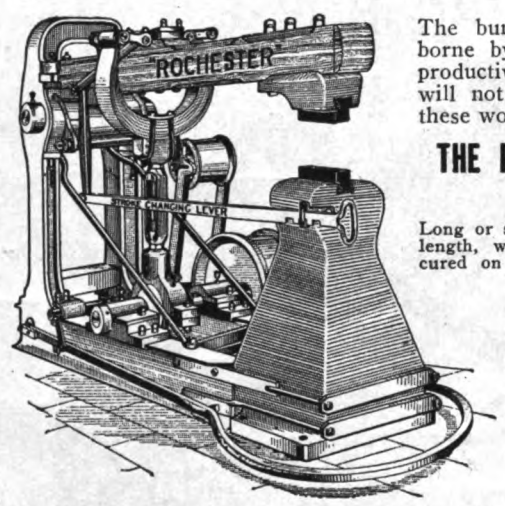
STEEL STAR SHAPES



Any Size or Quality Desired
All Jobbers Handle Them

Star Manufacturing Co.
Carpentersville, Ill.

TIMES HAVE CHANGED



The burden of manufacture has to be borne by proper time-saving, dependable, productive tools. Putting off the issue will not help. Now is the time. Mark these words down where you will see them.

THE ROCHESTER HELVE HAMMER

Quick Change Stroke

Long or short, fast or slow, heavy or light—any length, weight and force of blow instantly secured on the Rochester "Helve" while the machine is running. This feature alone saves so much time where there is a variety of small work to be forged, swaged or welded, that it recommends the tool without reference to its other distinctive features. Made in 6 sizes, 2 styles of frames 25-lb. to 100-lb. heads. For Welding and General Forging the "Rochester" is peerless in efficiency. Full description in catalog.

Ask for the Rochester Helve Hammer Book

The West Tire Setter Co., Rochester, N.Y., U.S.A.

Edwards Shears

For twenty-four years the **Two Leading Low Priced Shears** in the U. S., representing the **Greatest Value** for the **Least Money.**

No. 5, weighs 200 lbs., cuts 4x½ inch soft steel.
No. 10, weighs 430 lbs., cuts 4x¾ inch soft steel.

At their price you should have had one long ago. **Order one** from the first iron man that calls on you. **They All Sell Them.**

Write for descriptive circular and prices.

C. D. EDWARDS MFG. CO.
Albert Lea, Minn.



SAMPLE OF WELDING COMPOUND FREE

BLACKSMITHS! Anchor Welding Compound has no equal for strength. It welds the hardest steel. Good for both big and little jobs. Try it.

Write to-day and mention The Blacksmith and Wheelwright.

N. D. DOXEY, ELMIRA, N. Y.

ADVERTISING RATES
OF
BLACKSMITH AND WHEELWRIGHT
MADE KNOWN ON
APPLICATION

WELDING PLANTS, $25.00 to $300.00

Designed for all purposes. Small cash payment; balance, three to six months.
Every mechanic and shop should have one.

BERTSCHY-BERMO CO. **OMAHA, U. S. A.**

The ROTO ELECTRIC BLOWER ONLY $35.00

EXCEPT 220 VOLT WHICH IS $36.00



One Dollar Cash Discount allowed if payment is received with Order.

SAVE TIME! SAVE MONEY!

Are you still blowing your forge by hand? Do you know this time is WASTED? Install a ROTO Electric Blower and SAVE this time. It is the greatest *time and labor saver* you can put in your shop. It will let you do *twice* the work, do it *better—quicker—cheaper.* You will then say, like hundreds of our customers,

I wouldn't sell my ROTO for $100.00 if I couldn't get another.

Buy direct and *save the middleman's profits* of $10 to $20. The ROTO is used in several departments of the U. S. Government. You can rely on it. Write for more information or, better yet, mail the coupon today and try this blower in your own shop. If not satisfied, send it back at our expense. That's fair isn't it?

Send the Coupon—Do it Now

THE ROSEWATER ELECTRIC CO.
5516 KINSMAN ROAD, CLEVELAND, OHIO

Send me by.....An AIR COOLED ROTO BLOWER with one year's guarantee, complete with cord, plug and Speed Regulator. I will return it to you at the end of 30 days, if it does not give me entire satisfaction, and if I keep it, I will pay you $35.00 for the 110 Volt, or $36.00 for the 220 Volt Blower at the end of 30 days.

Name.....Address.....

Current.....Voltage.....Cycles.....

Your Electric Light or Power Company Will Give You This Information.

EMPIRE STEEL WHEELS



Plain or Grooved Tire
To Fit Any Wagon.

FARM TRUCKS
All Standard Types

Write today for Proposition to Blacksmiths

EMPIRE MFG. CO.
P. O. B. 209
QUINCY, ILL.



5" Hand Planer or Bench Jointer for $36.00

Same quick easy adjustable features used on our larger sizes of machines. Cast iron and steel construction.

Catalogue No. 15 gives further information on the above and other sizes.

W. L. SHERWOOD, Kirksville, Mo.

ROBERGE'S GREAT BOOK

"THE FOOT OF THE HORSE"

By DAVID ROBERGE

The author of this book for many years enjoyed the entire confidence of Robert Bonner, who, in his day, owned many of the fastest trotters the world has ever seen. Bonner and Roberge worked together in shoeing the former's horses. Many believe that David Roberge was the ablest horseshoer this country has ever seen. His book is filled with plates and illustrations showing proper methods of shoeing horses for every kind of lameness. We have sold large numbers of these books and they have always given entire satisfaction. The work represents the life experience of its author. Sent to any address, postage prepaid, on receipt of price, **$5.00.** Address

M. T. RICHARDSON CO., Publishers, 71-73 Murray Street, New York.

Digitized by Google



Established in Favor—

Electrical power is speedily winning the same established favor in industrial centers as that long enjoyed by NICHOLSON FILES, and these best files are widely used in the making of better electrical machinery.

NICHOLSON FILES

assure manufacturers of uniform excellence in files. Uniformity of temper, secured by scientific methods of hardening. Uniformity of cutting of each keen, ready-sharp tooth, 6,000 kinds of best FILES—a file for every purpose.

"File Filosophy" and our Catalog are full of interesting and valuable File information.

NICHOLSON FILE CO.
PROVIDENCE, R. I., U. S. A.

"Didn't I Tell You

LAFFITTE WELDING PLATES WERE ALL RIGHT?"



Don't get the idea that they are for just ordinary simple welding jobs—you can weld odd and difficult jobs too! It's a cinch!

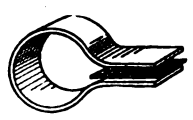
The most important feature of a "Laffitte" plate is the fact that it gives you a real honest-to-goodness weld. There's no "maybe" about it—the workman is never kept in a guessing mood—nor does he have to wonder whether the weld will hold all right or not. Your welding job is a solid piece, Mr. Workman. You can count on that!

Now, if we can count on you sending for Free Samples with full instructions, we will be only too pleased to comply with your request, for then we know we can get the whole story before you—in complete form.

In about three minutes, you'll learn more about practical welding than you ever thought possible in that space of time—write


Jump Weld


Welding a Tire—No Rivcting


Welding Spring Steel


Welding Broken Wagon Axle

THE PHILLIPS LAFFITTE CO.
Pennsylvania Building
Philadelphia, Pa.

Have you been Brazing High Speed Tool Steel Points to Carbon Steel Shanks with Laffitte Brazing Plate No. 3—it's marvelous.

PLYMOUTH COMBINED HAND POWER

PUNCH AND SHEAR

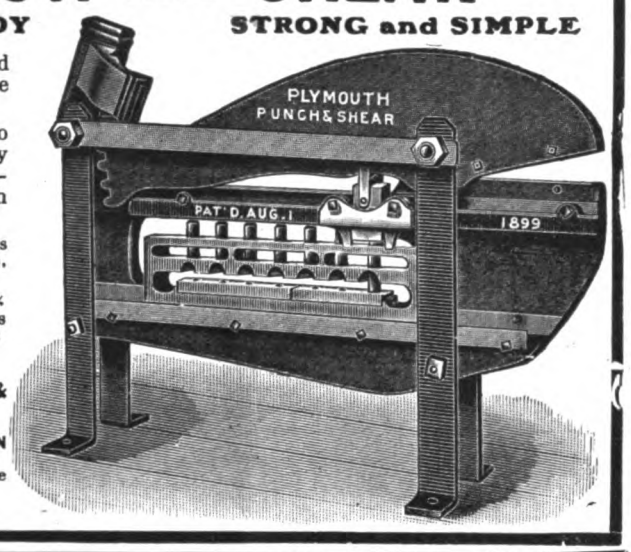
ALWAYS READY **STRONG and SIMPLE**

No lost or misplaced Punches — always in the machine.

Punch Rack shifted to position for use of any punch in a moment without the need of a wrench or any other tool.

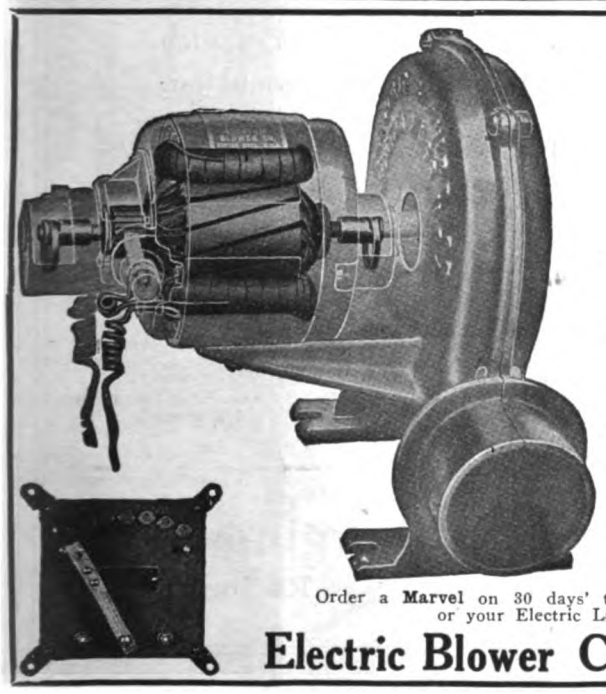
Seven different size punches with every machine, ¼, ⅛, ⅜, ½, ⅝, ¾, and ⅞.

Will punch ½ in. hole in ¼ in. iron or its equivalent. Shears 4x¼ or 3x⅜ or 1 in. Round Iron



Manufactured By
PLYMOUTH FOUNDRY & MACHINE CO.
PLYMOUTH, WISCONSIN

For sale by all Heavy Hardware Jobbers and Blacksmiths' Supply Houses.



"ONE FIRE" MARVEL

A. C. or D. C.
or
UNIVERSAL MOTORS

Extra Large
Ring Oil Bearings

Case Hardened
Armature Shaft

$40.00 Net

Order a **Marvel** on 30 days' trial through your Dealer, or your Electric Light Company

Electric Blower Co., 352 Atlantic Avenue BOSTON, MASS.

Extract from page 324 of the June, 1917, issue of The Horseshoers' Journal

Horseshoeing business in Albany opened very quietly this spring. In fact, we still feel the harmful effect that the drive calks has done the business, but strikes in the building line has also effected trade, a large number of horses owned by contractors are remaining unshod, and are still carrying (to May 10th) their winter shoes of drive calk variety.
CHAS. W. KIRK.

ARE YOU *in this boat?*

John Wiseman Says to Bill from Missouri:



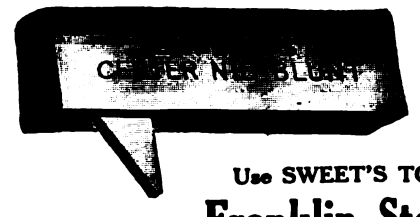
"It's time for a lot of you fellows to wake up. Ram your hand down into your pocket and see if the cash jingles with the merry sound as of yore.

"If not, why not?"

"There's a Reason, of course. And that reason is that you've been using calks that the owner can replace himself. Naturally his horses come less frequently to your shop. You have less business—less cash to jingle in your jeans.

"Do you get the idea?"





Every set of welded calks you put on helps to keep your shop full because the horses must be brought to you to have the worn calks replaced. And the users are satisfied users, too.

Use SWEET'S TOE CALKS—"The Cold Cut Dreadnaught."

No. 2.

Franklin Steel Works, JOLIET, ILL. CAMBRIDGE, MASS. HAMILTON, ONTARIO

Please Mention "The Blacksmith and Wheelwright" when writing to advertisers.

Digitized by Google

THE MAYER POWER HAMMER

Don't think of a power hammer as just a machine that will help turn out your work — look past this to the big vitally important purpose that a power hammer must serve and to the responsibility it must assume.

Will the power hammer you put in stand up so everlastingly strong that it does not have to be watched day in and day out?

The MAYER Power Hammer

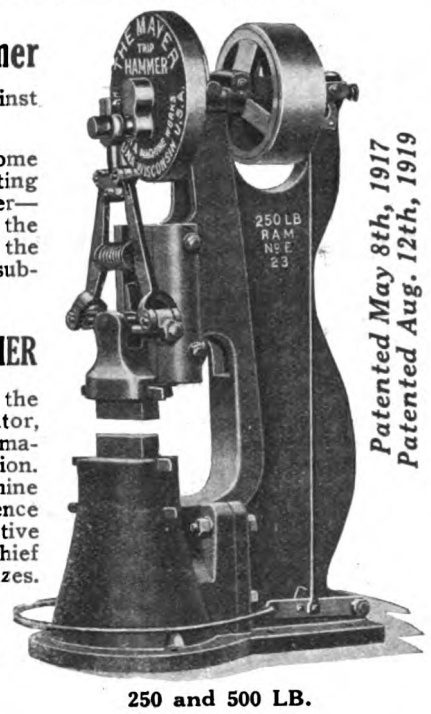
is fortified in exclusive ways against the possibility of trouble.

MAYER supremacy has become an institution — the discriminating buyer is always sure of the Mayer— because he is first, last and all the time sure of the vitals of the MAYER—the parts which are subjected to WEAR.

THE MAYER POWER HAMMER

is being built by experts under the personal supervision of the inventor, and only the best—the very best materials are used in its construction. It is a strictly high-class machine deserving your fullest confidence and recommendation, its attractive price being by no means its chief "talking point." Made in five sizes.

All details of capacity—quality points, advantages and price given by return mail—upon receipt of your letter—write.



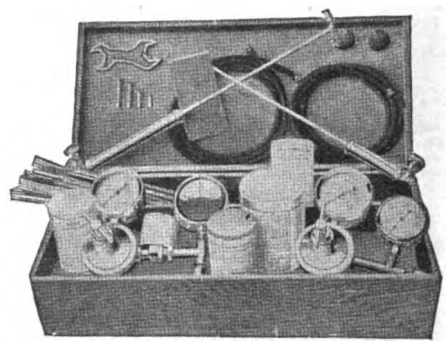
Patented May 8th, 1917
Patented Aug. 12th, 1919

250 and 500 LB.

KAUKAUNA MACHINE WORKS

KAUKAUNA, WIS.

ADMIRAL WELDING EQUIPMENT



COMBINES { EFFICIENCY, ECONOMICAL OPERATION, PORTABILITY, ABSOLUTE SAFETY, A REASONABLE PRICE }

It has been thoroughly developed under actual working conditions. It has been on the market over nine years. Over 10,000 Admiral Welding Equipments in the hands of satisfied users doing all kinds of work.

It will give you the best of satisfaction, and make you more money than any shop equipment you can buy at anywhere near its price.

We sell the highest quality of welding supplies at reasonable prices.

Ask for Catalog.

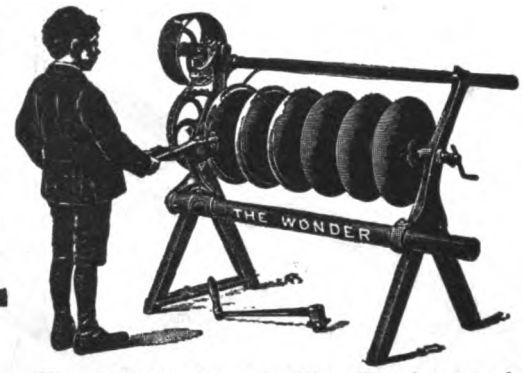
ADMIRAL WELDING MACHINE COMPANY

1603 Locust Street — Kansas City, Missouri

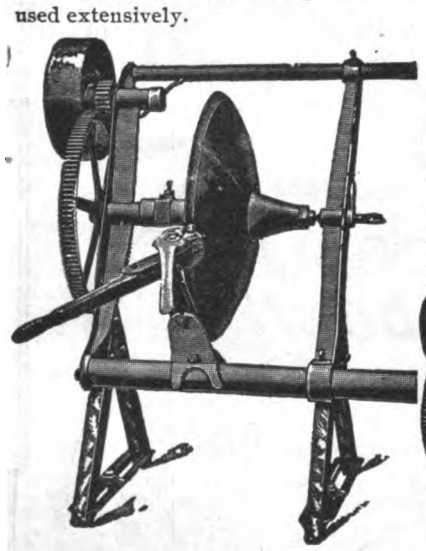
THE WONDER DISC SHARPENERS

BUILT LIKE A LATHE

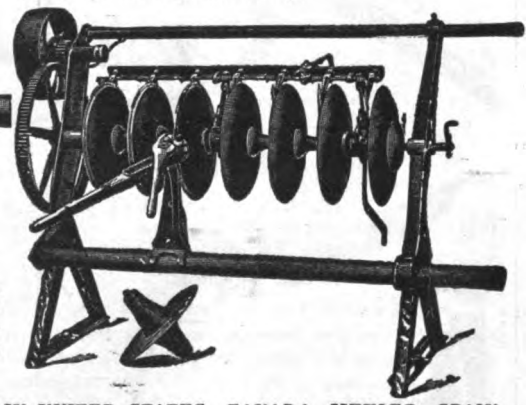
This cut shows the Little Wonder at work on a whole section of discs. This machine is especially adapted for sharpening disc harrows. While the Little Wonder is being successfully used to sharpen plow discs of 22 inches or less, we would recommend the Giant Wonder where disc plows are used extensively.



The cut below shows the Giant Wonder at work on a seven-disc section without removing discs, thereby saving one-half the time and labor, as in many cases you can sharpen a whole section of discs while your competitor is taking his off the shaft the old fashioned way.



The above cut shows the Giant Wonder at work on disc plows. Will sharpen any size from 12 to 32 inches in diameter.



FOR SALE BY LEADING JOBBERS IN UNITED STATES, CANADA, MEXICO, SPAIN, AUSTRALIA, ARGENTINE REPUBLIC, SOUTH AFRICA AND FIJI ISLANDS.

A. E. DURNER, Manufacturer — EVANSVILLE, WIS., and BRANDON, MAN., CAN.

ADDRESS ALL INQUIRIES TO

A. E. DURNER; Head Office, Evansville, Wis.

Both size machines are equipped regular, long enough to take in 8 disc section Special length furnished for 10 and 12 disc section at small cost.

I hold the original patent on this style sharpener. I could build them cheaper, but I won't. I would build them better, but I can't. Write for testimonials from your neighbor. Did you ever buy a cheap machine that gave satisfaction?

THINK ABOUT IT, THEN BUY A WONDER.

Harvey RACINE

BOLTLESS AUTOMOBILE SPRINGS

Easy Riding - Guaranteed

Springs You Can Trust

Harvey Springs are specially designed for easy riding and great strength. They're boltless—no weak spot in them. And they're tempered exactly right, each leaf exactly the same by the patented Harvey process. Tested under such great force that no ordinary spring could endure it.

Harvey Springs mean protection to the dealer—and more sales. Many sales helps supplied. Harvey Spring Book lists over a thousand springs—for every make and model of passenger car or truck. A Harvey jobber, near you, can supply you promptly. Write for the Harvey Book.

Harvey Spring & Forging Co.

108 A-17th St. — Racine, Wis.

Digitized by Google



"E-Z" and "Crescent" Welding Compounds

It Pays to Use Only the Best

For welding axles, tires, springs and lap welding of all kinds, no other compounds give you such uniformly perfect results at low heats as "E-Z" and Crescent Compounds. In all around blacksmith work they have no equals.

"E-Z" works equally well on all kinds of steel. Welds at lower heat. Sticks to the metal. Does not boil away and waste. Leaves no scale.

Crescent is especially good for plow work. Makes perfect welds on toe-calks. Insures smooth finish on split welds, finishing heats, welding under dies, etc.

Carried in stock by leading jobbers and dealers in United States and Canada. Your money back if not satisfied.

Write for large free sample.

Anti-Borax Compound Company
FT. WAYNE, INDIANA



Free 448 PAGES OF BARGAINS

POST PAID

WE WANT TO SEND YOU THIS 448 PACE MONEY MAKING BOOK

It is our New Net Price Catalog for Blacksmiths, Wagonmakers, Horseshoers, and Automobile Repair Men.

It contains thousands of articles you can use in your business and thousands you can sell to your trade on which you can make good money. 3000 illustrations.

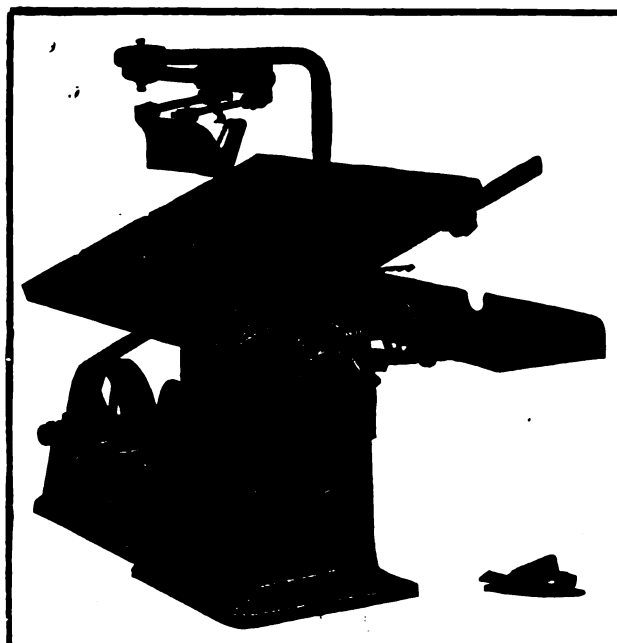
Tells how you can work up a profitable auto supply and repair business.

Serves as a price guide on all supplies.

Saves you money on anything you need.

Write for your copy today, sending business card, letterhead or some other evidence that you are in the trade.

CRAY BROTHERS, Carriage Hardware and Auto Accessories
1117 W. 11th Street, Cleveland, Ohio, U. S. A.



CRESCENT Wood Working Machines

will always satisfy those particular users who want the highest quality at reasonable price.

Send today for catalog of band saws, saw tables, shapers, jointers, variety wood workers, planers, planers and matchers, swing saws, cut off table, disk grinder, borers, hollow chisel mortiser, Universal wood workers.

THE CRESCENT MACHINE CO.
203 Main Street
LEETONIA, OHIO, U.S.A.

PHOENIX HORSE SHOES

Constant Demand is the Best Proof of Their Superiority.

Practical to the Highest Degree. **Made of Unexcelled Material.**

BULL DOG CALKS

Hold Firmly to the Shoe. Never Jump Out When Set. Easy to Drive in Shoe.
Perfect in Every Detail.

FOR SALE BY ALL DEALERS. **WRITE FOR SAMPLES.**

WE ARE THE LARGEST HORSE SHOE MANUFACTURERS IN THE WORLD.





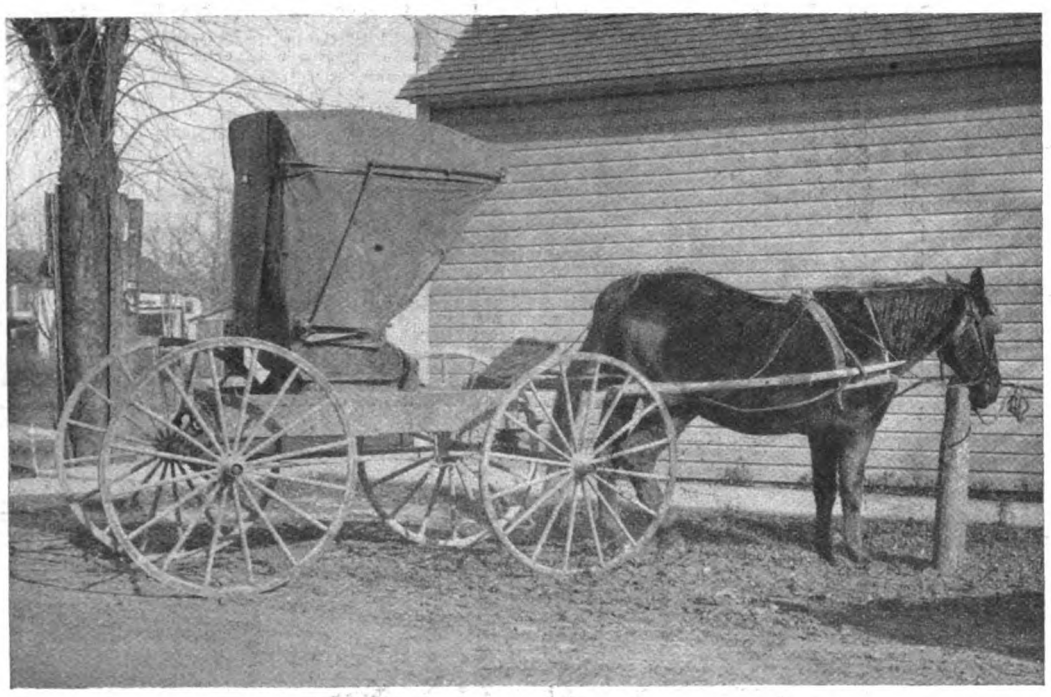
PHOENIX Horse Shoe Company

CHICAGO, ILLINOIS

ROLLING MILLS and FACTORIES { **JOLIET, ILLINOIS** / **POUGHKEEPSIE, N. Y.**

Digitized by Google

More Profits



GOODYEAR Carriage Rubber runs *more feet to the pound.*

So every pound on every reel yields you more in feet and more in profit.

It yields more in profit because more tires can be cut and sold from each length.

It yields more in profit because more customers want it, and more buy Goodyear Carriage Rubber.

They buy it, and continue to buy it, because it wears long, because it makes riding comfortable, because it is resilient.

Make more money for yourself, satisfy more customers, sell Goodyear Carriage Rubber. It runs more feet to the pound.

GOODYEAR

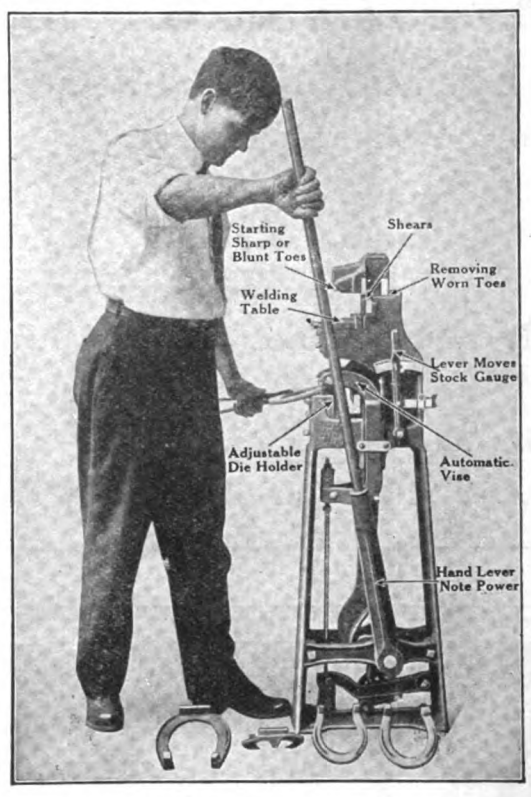
INDIAN CHIEF
Black-smiths' VISES Horse-shoers'



BOKER CUTLERY & HARDWARE CO., Inc.
Sole Sales Agents
101-103 Duane Street, New York City

Solid Box – Solid steel drop forged jaws faced with crucible tool steel. Improved screw of one piece of forged steel. Built right throughout.
THE COLUMBUS FORGE & IRON CO., COLUMBUS, OHIO.

1920 MODEL
THE L. S. P. CALKING MACHINE
The Greatest Time and Labor Saving Machine On Earth



1920 MODEL—Fully covered with Patents

OUR 1920 Model is the same as our 1918 and 1919, we agree with the users and so would you that it cannot be improved.

Do not mistake this for a machine which makes toe calks or a foot vise. This machine is for turning heel calks, both Blunt and Sharp, sticking and welding toe calks, clipping and trimming ends of shoes. IT CALKS SHOES, doing the work just the same as you do by hand with the hammer, only it is done much better and easier, and in a fraction of the time.

In turning heels, you can turn up just as much stock as you wish, upset or stoveup to make as heavy as you like and square up the calks without use of hammer. There is no losing of toes when you weld on the L. S. P.

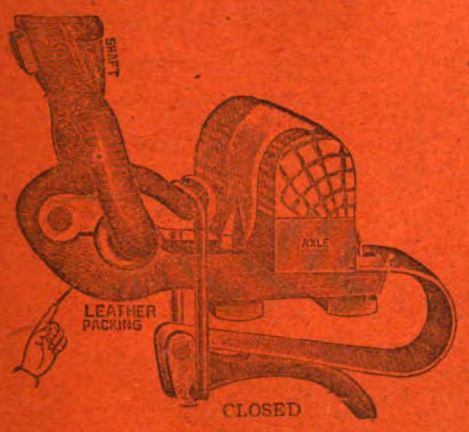
It is a strong, handsome, well made machine and will last, as you might say, a life time, fully warranted for one year. It is in use in the best shops in the United States, users claiming more for it than we do.

Write at once for full information and prices.

L. S. P. CALKING MACHINE CO.
P. O. Box 225 WYALUSING, PA., U. S. A.
NATIONAL MACHINE CO., Brighton, Ontario, Canada

Digitized by Google

BRADLEY
Carriage Couplers



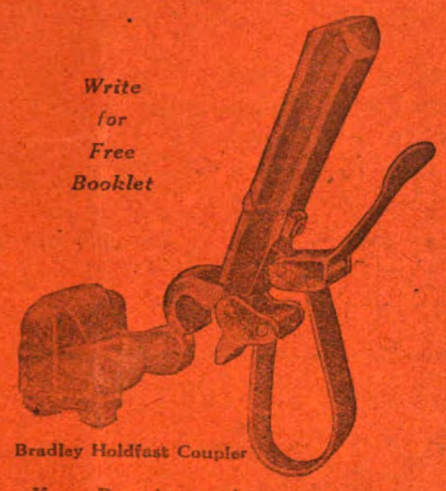
Bradley Ball Bearing Coupler

PERFECTLY SAFE

ALL STEEL

A Positive Anti-Rattler and Rapid Shifter

Write for Free Booklet



Bradley Holdfast Coupler

Used on a majority of the better known vehicles

Let Us Quote You on Your Requirements

C. C. BRADLEY & SON, Inc.
SYRACUSE, N. Y.

BURDEN
HORSE SHOES

MADE BY

THE BURDEN IRON COMPANY
TROY, N. Y.

IT WILL EASILY
PAY FOR ITSELF IN TWO DAYS
JUSTRITE PLOW BLADE SHARPENER

Silverton, Texas, July 24, 1919.

STRITE GOVERNOR PULLEY CO.,
MINNEAPOLIS, MINN.

Gentlemen:

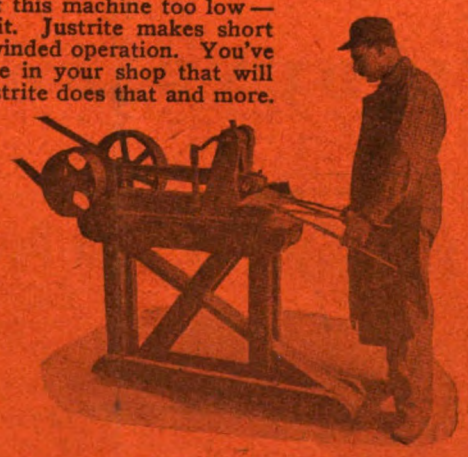
As to recommendation of the JUSTRITE PLOW BLADE SHARPENER for Plow Blade work I would recommend it to any Blacksmith who has plows to sharpen or similar tools that need drawing to a keen smooth, sharp edge.

Any blacksmith cannot afford to be without this machine in Plow Sharpening time; it will easily pay for itself in two days.

Yours very truly,

(Signed) G. A. NIX.

May be we've got the price of this machine too low—but we're not going to change it. Justrite makes short work of what used to be a long-winded operation. You've got to have at least one machine in your shop that will pay your overhead expenses. Justrite does that and more. What we say here will not amount to two cents unless you put this machine right on the floor of your shop and get to work—just thinking about it—and doing nothing keeps you in the rut—the profits going somewhere else.



Justrite gets the money for you hand over fist! No fooling around—no lagging behind—it pays for itself in double quick time. You can't beat it for speed and accurate, smooth work—no battering or nicks—no chance work—no guess work. Justrite is right—it is sure—it is strong—it will be your good friend and it is almighty reasonable in price.

This ROLL is what makes the Justrite the most modern and the most profitable method of sharpening implements. Its scoop is broad and it handles plow blades, road scrapers, drag teeth, drill shoes, cultivator shovels, corn knives—in fact, anything needing to be drawn down to a fine, clean edge.

Justrite is a master worker—easily—very easily handled. Two horsepower is all that is required to handle it. How much sand have you got? Are you willing to find out the full particulars—all right—write!

STRITE GOVERNOR PULLEY COMPANY
307-309 SOUTH THIRD STREET MINNEAPOLIS, MINNESOTA

Would You Sell Your Life For $65?

You wouldn't part with even an arm or a leg for that figure, would you?

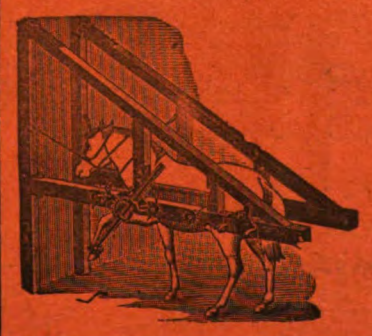
Yet every vicious horse you shoe is likely to do more damage in the twinkling of an eye than can be repaired at several times the cost of **Barcus Stocks.**

When you place a horse in a Barcus Stock, he is harmless—he cannot hurt either you or himself. Costing only $65 it is cheap insurance, indeed.

BARCUS STOCKS not only furnish the logical way to observe "Safety First," but they are also a positive aid to good shoeing. The BARCUS is a modern Stock—automatic working parts instead of the bothersome ropes, straps and blocks that made the old style stock almost more of a nuisance than a help.

If you don't know about **Barcus Stocks** you owe it to yourself and your family to write **at once** for the complete details.

The Barcus Mfg. Co.,
Wabash, Ind.



Please send me full
regarding your Horse
any obligation on m

Name.....

Town.....

Digitized by Google



PRENTISS' PATENT VISES

LARGEST AND BEST LINE IN THE WORLD

Illustrated Catalogue of All Kinds of Vises Mailed

PRENTISS VISE CO

Hardware Building
106-110 Lafayette St., cor. Walker St., NEW YORK
MONTREAL: A. Macfarlane & Co.

LONDON: Chas. Neat & Co.



HERE'S YOUR CHANCE

This 5 Passenger, 4 cylinder, 37 H. P. BUSH Car—Timken Bearings—Willard Batteries—2 Unit Starting & Ltg.—116-inch whl. base. Write at once for the best Automobile Offer in existence—Don't wait—Cars guaranteed or money back.

BUSH Address J. H. Bush, President, Dept. K-5 MOTOR CO., Bush Temple, Chicago, Illinois.

SHARP DIES

Are what are needed for cutting good threads.



The "Duplex" Die Stock Set is what you want, if you wish to always have such dies on hand

Catalog sent on request.

Made by

THE HART MFG. CO.
81 Wood Street Cleveland, O.

PORTER'S BOLT CLIPPERS

THE BEST

H. K. PORTER

Ashland St., EVERETT, MASS.

"EASY" Nos. 1 and 2. "NEW EASY" Nos. 0, 1, 2 and 3.



Beware of Imitations.

Parts always to be had
Porter's Name on all genuine tools



BALL AND ROLLER

BEARINGS

ALL TYPES — IN STOCK — MANY SIZES

THE GWILLIAM COMPANY
ENGINEERS
253 W. 58th St. (at Broadway) NEW YORK
Branch: 1314 Arch St., Philadelphia

STANDARD HORSE NAIL CO.
NEW BRIGHTON, PA., U.S.A.
MANUFACTURE
A Full Line of Horse Nails
Send for Catalogue, Prices & Samples.

"GEARS AND WAGONS"

Selle Gears Forty years of success has placed "Selle Gears" and Wagons in the hands of the largest wagon users in the world. Express and Transfer Companies, Department Stores, etc., specify "Selle Gears" and will take no other after once tried. 230 Page Catalog Free.

THE AKRON-SELLE CO. Akron, Ohio

FIRST MADE IN AMERICA

250,000 ANVILS IN USE

Solid Forged Steel Top Welded to a Forged Base Makes a Solid Forged Anvil.



GENERAL BLACKSMITH ANVIL

Still In the Lead

No More Loose Faces

HAY-BUDDDEN MFG. CO.
254 No. Henry St.
Brooklyn, N. Y.
U. S. A.

HE WHO MAINTAINS

unbroken inner determination to bring plans to a successful issue is bound to succeed. Let the live energy of your purpose include



THE KERRIHARD POWER HAMMER

and you'll "get there" quicker—it does the work of four men.

Learn more—write for particulars

THE KERRIHARD CO.
Kerrihard Station, Red Oak, Iowa, U. S. A.

The House Cold Tire Setter Co.



Manufacturers and sellers of the best Cold Tire Setter the world has ever known. Both Hydraulic and Lever power.

Write today for PRICES AND TERMS.

HOUSE COLD TIRE SETTER CO.,
4143 Laclede Ave., St. Louis, Mo.

YOU CAN'T CUT OUT A DOG SPAVIN OR THOROUGHPIN but you can clean them off promptly with



ABSORBINE
TRADE MARK REG. U.S. PAT. OFF

and you work the horse same time. **Does not blister** or remove the hair. $2.50 per bottle, delivered. Will tell you more if you write. **Book 4 R free.** ABSORBINE, JR., the antiseptic liniment for mankind, reduces Varicose Veins, Ruptured Muscles or Ligaments, Enlarged Glands, Wens, Cysts. Allays pain quickly. Price $1.25 a bottle at druggists or delivered. Made in the U. S. A. by

W. F. YOUNG, Inc., 55 Temple St., Springfield, Mass.

YOU CAN WELD STEEL AS EASILY AS IRON



Especially adapted for welding tires, axles, springs and all lap welding.

Either of these compounds will weld steel at the lowest possible heat that steel can be welded. Also protects steel at high heat.

Owing to our improved process of manufacturing, these compounds do not boil off and waste in the fire but adhere to the metal when applied.

FOR SALE BY ALL LEADING DEALERS IN BLACKSMITH SUPPLIES IN UNITED STATES AND CANADA

Large Free Samples Sent upon Request

CORTLAND WELDING COMPOUND CO.
CORTLAND, N. Y.



PREPARED ESPECIALLY FOR WELDING
FAR SUPERIOR TO COMMON BORAX

A flux which causes the steel to weld like iron. Not necessary to apply between the lap, but may be applied to the outer surface of the work, the same as borax. Has no equal for plow work. Just the thing for welding toe-calks so they can't knock off.

THE most important part of an anvil is the face or working surface. The best material is none too good. We use only the highest grade tool steel available for that purpose. A wrought iron body, a tool steel ce; some combination!

COLUMBUS ANVIL & FORGING CO.
COLUMBUS, OHIO, U. S. A.

Little Giant Power Hammers

25, 50, 100, 250 and 500 lb. Models.

BELT OR MOTOR DRIVEN.



MOTOR DRIVEN

The Boys in Khaki and Sailor Blue Will Be the Farmers of the Future.

Their war equipment has been the most modern, and when they return home the old out-of-date methods will no longer satisfy them.

They will insist on their farm equipment being kept in first class repair and they will take their work to the blacksmith who has up-to-date shop equipment.

No blacksmith shop is modern unless it has a Little Giant Power Hammer. Either of our models will pay for itself in a few months on our easy payment terms, and continue to repay for itself for many years after.



BELT DRIVEN

The first Little Giant Power Hammer made 26 years ago and every one since sold,—some 8,000 in all,—are still in use. There is no wear-out to them.

Average annual repair sales on all Little Giant Power Hammers in use, large and small, from oldest to latest, is 48¢ each or less than 2/5 of 1% of original cost to user.

Any Belt Driven Little Giant Power Hammer can be quickly changed to a Motor Driven Outfit. Ask your power plant superintendent for current, voltage, phase and cycles of motor required. Send this information to us and we will quote prices.

Little Giant Power Hammers are guaranteed FOREVER against defective material and workmanship, and are shipped on 30 days' trial.

Write Your Jobber, or Direct To Us

Little Giant Company, Established 1876. **103 Rock Street,** MANKATO, MINN., U. S. A.

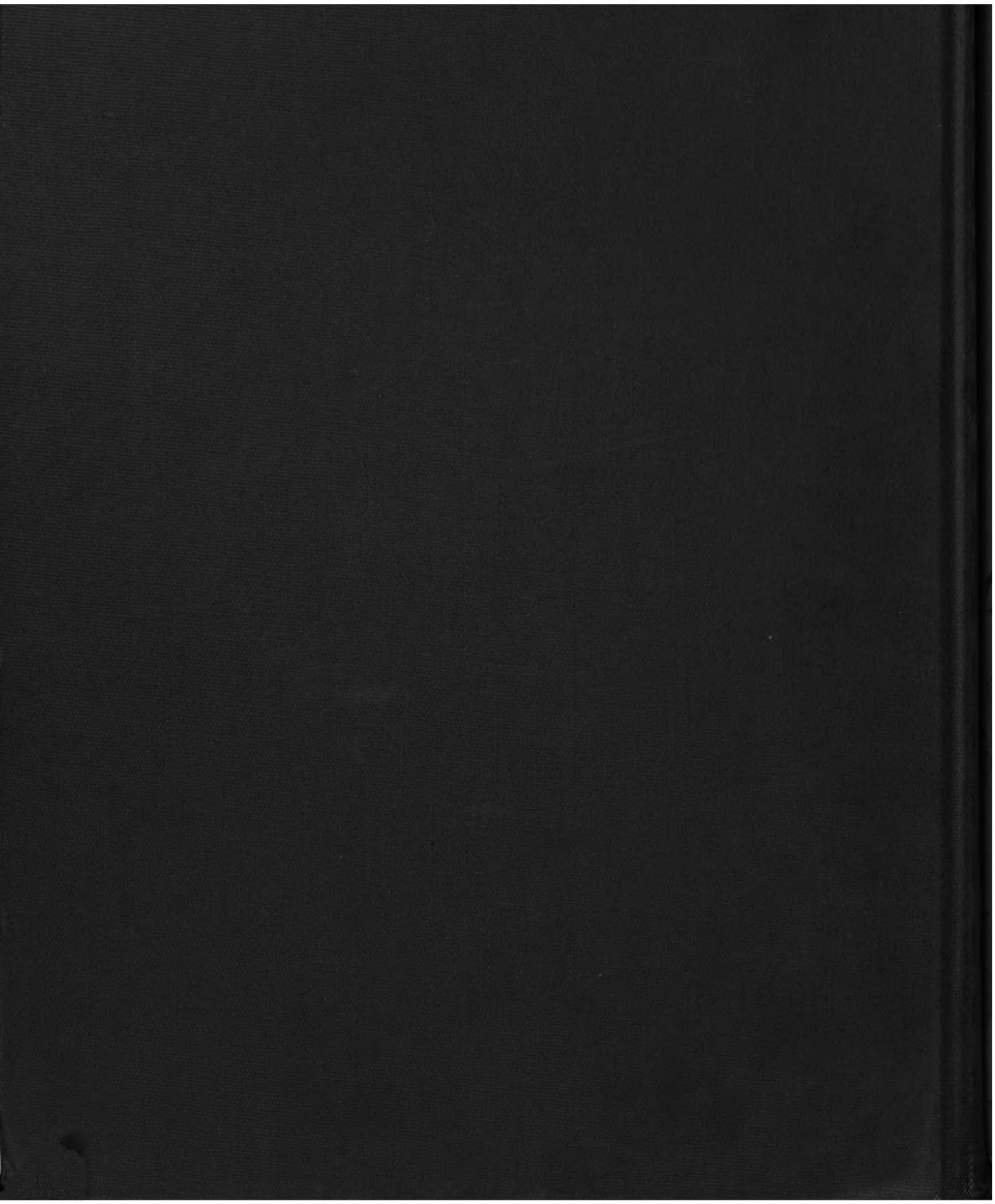
Digitized by Google

Digitized by Google

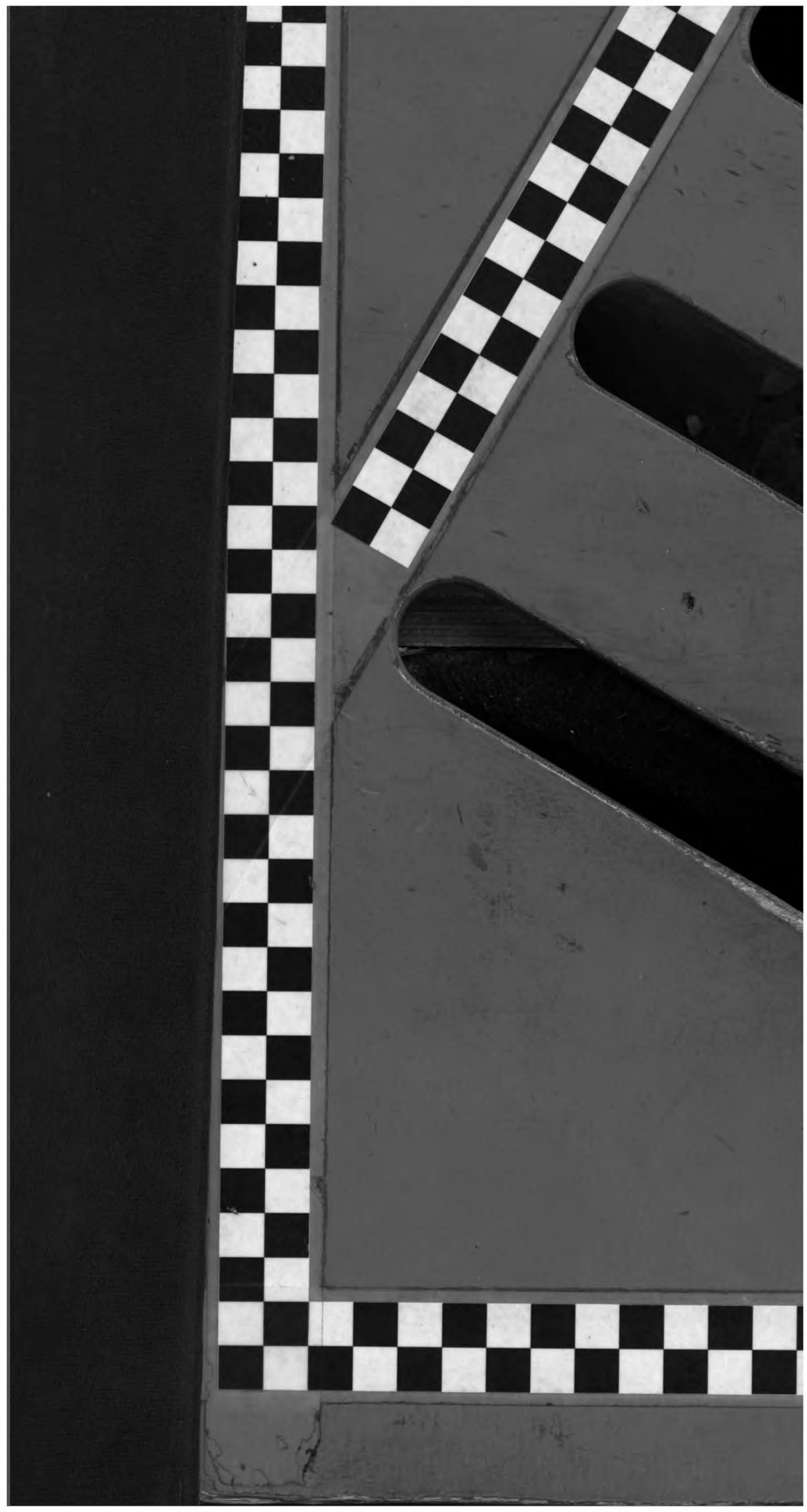
Digitized by Google

DEC 31 1935

Digitized by Google

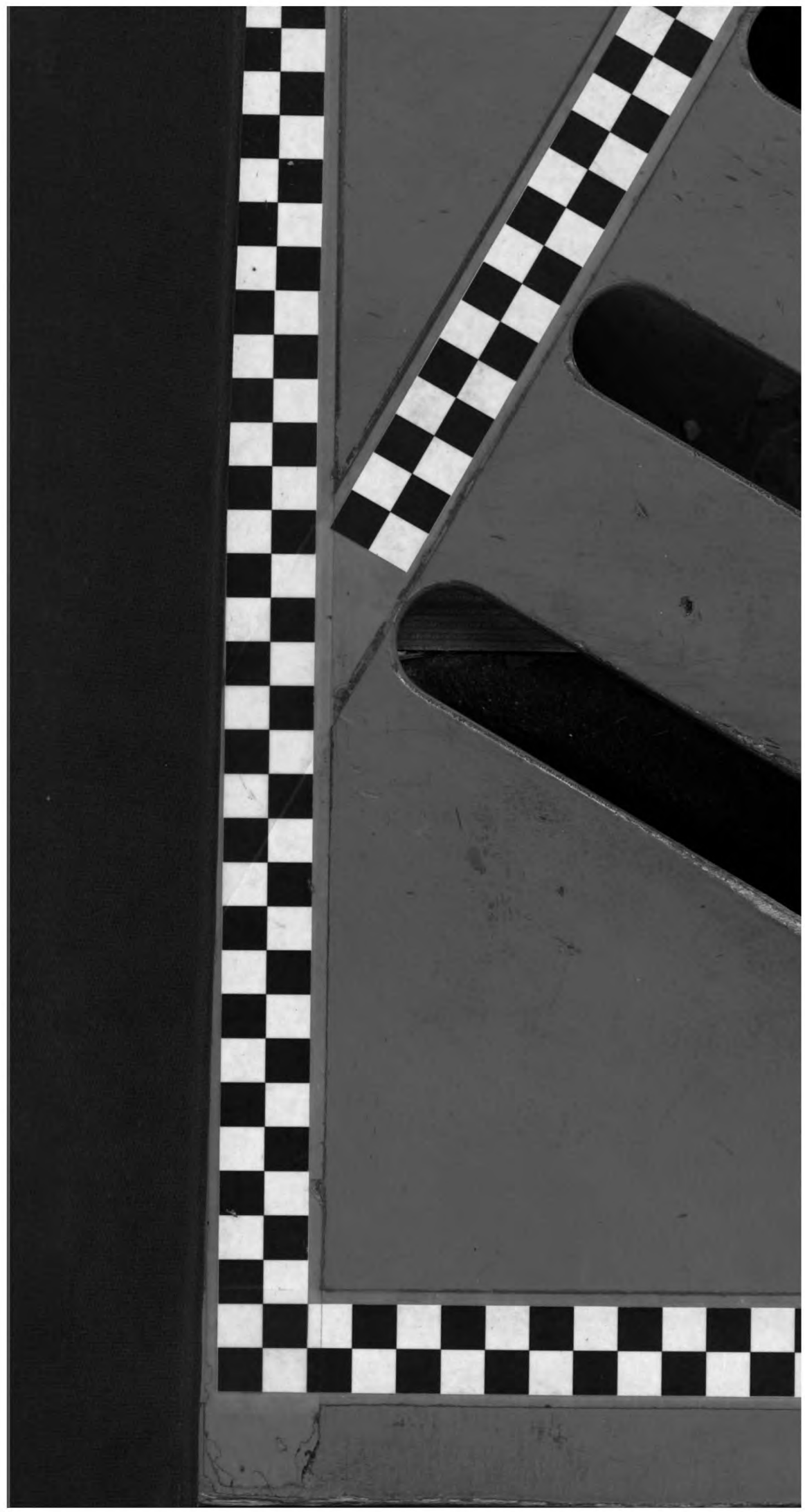


Digitized by Google



Digitized by Google

Digitized by Google



Digitized by Google

Digitized by Google